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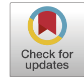

Investigating the relationship between health and gender equality: What role do maternal, reproductive, and sexual health services play?

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ABSTRACT

Examining the causal nexus between health services and gender equality is of paramount significance in policy formulation and academic inquiry. This paper concentrates on maternal, sexual, and reproductive health, offering a critical narrative review of empirical research exploring the causal relationship between enhanced women's health, stemming from either overall healthcare amelioration or specific interventions, and broader gender equality objectives. A conceptual framework is devised to elucidate the causal pathways between health and gender equality across various dimensions. The final review encompasses 30 empirical papers, revealing both direct and indirect effects of improved maternal, reproductive, and sexual health outcomes on labour participation and educational investment, with fertility decisions and autonomy serving as primary intermediary factors. Evidence predominantly indicates that interventions like contraception, family planning, and abortion policies yield enduring effects beyond health, influencing reproductive choices. Specific medical procedures, such as caesarean deliveries and sterilization, also impact fertility and labour market outcomes. Furthermore, public healthcare infrastructure contributes to combating gender-based violence by facilitating incident reporting and access to protection. Recognizing, documenting, and monitoring these co-benefits arising from improved women's health are pivotal for delineating future health sector priorities and advancing the global gender equality and sustainable development agenda.

1. Introduction

Social and economic determinants of health have been a central focus in public health discourse for many years, both in scholarly literature as well as in the policy arena. Extensive empirical evidence, accumulated across different disciplines, has demonstrated how factors such as income, education, employment, and social support significantly influence individual and population health outcomes [1]. This research underpinned the endorsement of the "Health in All Policies" approach, first introduced in policy contexts in 2006, which encouraged governments worldwide to adopt intersectoral policies aimed at promoting health across various sectors [2].

In the same period, however, there has been less attention given to the relationship between health and other sectors in the opposite direction: i.e., the co-benefits that health and health systems can bring to other sectors of society, including economic activities, social affairs, and education. This dramatically changed with a recent worldwide health crisis that vividly highlighted the causal connection between health and other societal goals. The unprecedented global event demonstrated how a health crisis can lead to widespread disruption, impacting nearly every aspect of life at all levels, from individual to societal. At the global level, among other damages, the interaction of the pandemic and various social, economic, and policy responses reversed the already faltering progress the world was making on UN Sustainable Development Goals Agenda (SDGs) .

Given these lessons, it is essential to deepen our understanding of the connection between health and other areas addressed by the SDGs. This knowledge is crucial for designing interventions that can accelerate progress towards achieving the SDGs by 2030.Within the broad agenda covered by the 17 SDGs, issues related to women's empowerment and gender equality (SDG 5), have received increasing interest both from scholars as well as the policy community [3]. This is not surprising since a key aspect of gender inequality has to do with health, and thus it is essential to understand the mechanisms through which improved

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women's health at the individual level, as well as targeted health policies at the system level, contribute to closing the gender gap.

While acknowledging the plurality of ways through which women's health can contribute to reducing gender inequalities, in this paper we focus on one specific issue that has received a lot of attention in the literature as being among the most straightforward causal pathways between health and gender inequality: maternal, reproductive, and sexual health [4].

There are numerous channels through which maternal, reproductive, and sexual health can significantly affect women's ability to participate in economic activities. Broadly speaking, women in good health are better equipped to engage in the labour force and contribute positively to it, which directly affects the availability of labour and, consequently, the amount and rate of economic output. High maternal mortality rates, often linked to inadequate access to healthcare services, can lead to the premature death of women, leaving families without caregivers and eroding women's economic productivity (UNFPA, 2020). Better health increases the returns on educational investments. Additionally, compromised reproductive health can create vulnerability for women, further exacerbating gender inequalities. Improved female health may have a cascading effect on female labour participation and educational investments by reducing fertility and, consequently, youth reliance. Gender-based violence, including intimate partner violence, can have profound physical and psychological consequences for women's health [5]. These forms of violence not only harm women's well-being but also hinder their full participation in society, from education to employment.

In this paper, we provide a novel narrative review of studies that empirically investigate how improved maternal, reproductive, and sexual health outcomes, whether due to the general improvement of healthcare services or after specific interventions, can benefit some of the goals set within SDG5 and gender equality at large. While acknowledging the breadth of literature and analysing the issue using different study designs, in our review we focus only on the studies that assessed the causal impact of health and health services on different facets of gender equality. We adopt this somewhat limited scope for several reasons.

Firstly, empirical studies that investigate causality provide concrete evidence to substantiate claims about the cause-and-effect relationships between health improvements and gender equality outcomes. We believe that policymakers and stakeholders are more likely to trust and act upon evidence that is based on robust methodologies capable of demonstrating causation. This trust is essential for securing the political and financial support necessary for implementing large-scale health and gender equality initiatives.

Secondly, investigating causality helps identify the most effective interventions and can provide insights into the mechanisms through which health improvements influence gender equality. When empirical studies show which health interventions lead to positive gender equality outcomes and how, resources can be allocated more efficiently.

Moreover, empirical research that focuses on causality can highlight the multifaceted benefits of health improvements, reinforcing the importance of a holistic approach to policy design. Improved health outcomes often lead to benefits in multiple areas of gender equality, such as economic participation, education, and political empowerment. Documenting these co-benefits empirically can strengthen the case for integrated policies that address both health and gender equality simultaneously. This strategic approach ensures that health sector advancements are aligned with broader societal goals, promoting sustainable and inclusive development.

2. Methods

We conducted a narrative review between May 2023 and December 2023 to uncover and systematically synthesise previously published empirical studies on the causal impact of women's health on the various dimensions of gender equality. Literature was drawn from ScienceDirect, Google Scholar and Pubmed, with the assistance of Artificial Intelligence (AI)-empowered online tools such as Elicit and Litmaps. We use the following keywords for the two main components that we look for in the article:

- Health: keywords include health*, reproductive health*, maternal health*, sexual health*, women's health*, mortality, morbidity, abortion, fertility, contraception, IVF, sterili*.
- Gender Equality: keywords include gender equality, education*, labour participation, wage gap, education, human capital, career, empower*, autonomy, decision, bargain*, violence.

From the identified articles, we further snowball to other relevant articles by looking through the references. The search was limited to articles published in English between 1990 and 2023 to ensure relevance to contemporary issues. After the initial search based on titles and abstracts, we collected 70 relevant articles that clearly stated the objectives and findings of the studies. We further read the full texts of the articles carefully and excluded the ones that did not fulfil the following criteria:

- Identifies a health outcome (including fertility behaviour) or a healthcare intervention as the primary determinant in the study.
- Identifies at least one aspect of gender equality as the primary outcome of the study.
- Draws causal inference or spill-over effects from health/healthcare interventions to gender equality.

As a result, we excluded the articles that did not investigate an outcome or an intervention that were strictly health-specific (11). This exclusion criteria includes some social intervention such as vouchers to incentivize socialization during family planning [6–8]. These studies are critical in understanding how different social and family dynamics improve reproductive autonomy, but we cannot directly interpret their roles on the causal pathway from health to gender equality. Similarly, we do not consider (2) studies that investigate the impact of gender-based violence on labour market outcomes because the role of health is ambiguous [9,10]. Others (4) that looked at the reverse causal relationship from gender norms, empowerment, or culture on health are also omitted [11–14].

Several articles (13) that are reviews of other studies or have only investigated associations instead of causality are excluded [15–25,27]. We are not including a significant body of research (3) that focuses on the intergenerational transmission of human capital [28–30], which analyses how mothers' health can impact the skills, knowledge, and abilities of their children. This is because children's achievements are not an easily interpretable result of gender equality outcomes. The articles (6) that only focus on how reproductive health and healthcare services affect fertility decisions and health outcomes in general are also excluded, as fertility decisions are not direct measures of gender equality but an intermediary determinant factor [12,31–34]. Finally, we exclude one theoretical paper [35]. After this final exclusion process, we are left with 30 relevant articles for the narrative review. We acknowledge the significance of all these excluded studies, many of which greatly contributed to our conceptual framework.

The papers included primarily come from economic journals (17), with some others from political economy (5), human resources (3) and demographic (1) disciplines. We also included 4 working papers, given their relevance and high quality. Data extraction was conducted using a standardized form that included the following information: author(s), publication year, journal, the health outcome, or intervention studied, gender equality measures, database used, causal impact mechanism, key findings, quantitative measures, and country.

We further group the extracted data by the type of health outcomes or health interventions investigated. The narrative synthesis approach was employed to analyse and interpret the findings from the selected articles. Specifically, we examine the current arguments, evaluate the

different research topics on causal relations, determine the knowledge gaps, and provide an outlook for future research.

Although this is not a systematic review, we aim to provide a comprehensive summary of key findings, themes, and trends observed in the selected studies and discuss their implications for policymaking.

3. Results

3.1. Conceptual framework

3.1.1. Maternal, reproductive and sexual health

To provide a more structured and comprehensive overview of the issue, we make the distinction between maternal, reproductive, and sexual health in our conceptual framework.

The primary focus of maternal health is on the health and welfare of women throughout their pregnancies, deliveries, and postpartum periods (WHO) [36]. It covers a woman's physical, mental, and emotional well-being during various periods. Maternal health care aims to promote safe pregnancies, births, and postpartum recuperations to lower maternal mortality and enhance mothers' general health. Hence, the direct outcome of improved maternal healthcare is a decline in overall maternal mortality and morbidity.

The term reproductive health, in addition to the physical components of reproduction, also includes the social, psychological, and cultural aspects that can affect one's ability to reproduce. It covers every stage of a person's life, from puberty to old age. In order to ensure access to family planning services, utilisation of different types of contraception, support safe and legal abortion when necessary, address infertility, and advocate for gender equity and rights regarding reproductive decision-making, reproductive health places a strong emphasis on encouraging healthy sexual behaviour (WHO) [37].

Related to reproductive health, the definitions of sexual health extend beyond the absence of illness or dysfunction and include a positive and considerate attitude toward sexuality (WHO) [38]. The importance of rights, consent, and the avoidance of coercion, discrimination, and violence are all emphasized in the field of sexual health. It is strongly related to more general ideas of personal agency and body autonomy in sexual affairs. Fertility, although closely tied to the concept of reproductive right is also a component of sexual health that involves the ability to conceive and bear children, and promoting sexual health involves ensuring that individuals have the knowledge, resources, and agency to make choices aligned with their reproductive goals.

3.1.2. Gender equality and women's empowerment

Progress in the advancement of maternal, reproductive, and sexual health can have a direct and indirect impact on the various aspects of gender equality. Within the framework of SDGs, Target 5.5 aims to ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic, and public life (UN). Additional measures to track progress on gender equality go beyond these explicit indicators and include the proportion of women in political or managerial positions, the gender wage gap, and women's labour participation. SDG5 further focuses on violence against women and girls, which can be measured using the prevalence of intimate partner or non-partner violence. Finally, because Target 5.6 stipulates the goal of ensuring universal access to sexual and reproductive health and reproductive rights, which is a health policy, we thus only consider this target as a determinant of other gender equality targets. In a nutshell, our conceptual framework goes beyond specific target indicators defined in SDG5 but embraces additional outcome measures to investigate the relationship between women's health, gender equality and female empowerment.

Given improvements in maternal care conditions, lower rates of pregnancy-related death and illness can affect people's investment in education, productivity and labour market participation [39–41]. Moreover, we may expect an immediate rise in fertility given the better maternal care conditions and other intermediary factors, such as changes in gender norms and improved commercial breastfeeding products. As a result, we anticipate a rise in investment in education, productivity, and women's labour participation, but a subsequent decline in fertility given the increasingly educated cohort [39,40].

As for reproductive health as a broad concept, better outcomes due to the availability of contraceptives, abortion, or other family planning schemes may lower fertility and thus youth dependency, which has a spillover effect on female labour participation and educational investment through fertility autonomy [42,43]. Moreover, advanced reproductive treatments such as in-vitro fertilization (IVF) allow women to have a less time-limited fertility window, therefore reducing the gender gap in career achievements [44]. Therefore, the effect of reproductive health on women's economic activities primarily goes through the intermediary factor of fertility decisions, including the timing, spacing, and number of children (the three components of fertility).

Finally, the pathway from sexual health to gender equality overlaps with both maternal and reproductive health – on the one hand, adequate sexual health services, including access to skilled maternal healthcare during pregnancy and childbirth, contribute to the reduction of maternal mortality; on the other hand, access to reproductive healthcare services can empower individuals to make informed decisions about their reproductive lives. Sexual health services that address issues of consent, intimate partner violence (IPV), and sexual assault contribute to the prevention and response to gender-based violence. Interventions to facilitate sexual awareness can lead to an unintended short-term increase in IPV but should in the long term reduce the incidents of gender-based violence [45]. This aspect is crucial in fostering an environment where women feel safe and empowered to participate in society. Further, family planning services empower women to decide when and how many children to have, which allows them to pursue educational and career opportunities, contributing to economic empowerment and breaking traditional gender roles. Fig. 1 illustrates the causal pathways discussed, which flow horizontally from the healthcare system on the left, through health outcomes or behaviours in the centre, to gender equality outcomes on the right. Vertically, the pathways are categorized into maternal, reproductive, and sexual health as discussed above. Solid lines represent direct impacts supported by existing evidence, while dotted lines indicate theoretical connections that have yet to be fully explored in the empirical literature.

We conclude by clarifying the definition of women's empowerment, which is intrinsically far more expansive than what can be measured by quantitative research. The discussion around women's economic activity and educational attainment should not be construed as indicators of women's economic empowerment *per se*, even though they are intertwined concepts. The fact that women work can be an important condition for women's empowerment, but it is by no means sufficient for them to express their independence and autonomy [46]. Although we primarily focus on women's investment in education and participation in the labour market, there are many ways in which women may exercise their agency, such as decision-making without coercion or violence, household bargaining power. However, due to data limitations or the inherently qualitative nature of those studies [47], they are not included in this review.

3.2. Review of the evidence

We identified a multitude of studies that cover low-, middle-, and high-income countries. Although many studies are from the US (13), several papers coverhigh countries in Europe (5), Latin America (4), Africa (2) and Asia (2), while the rest are cross-national studies (4). We categorize the studies by the different types of health outcomes and interventions and their gender implications. We observe both the direct and indirect impact of better maternal, reproductive, and sexual health outcomes on labour participation and educational investment, with fertility decisions and autonomy as the primary intermediary factors.

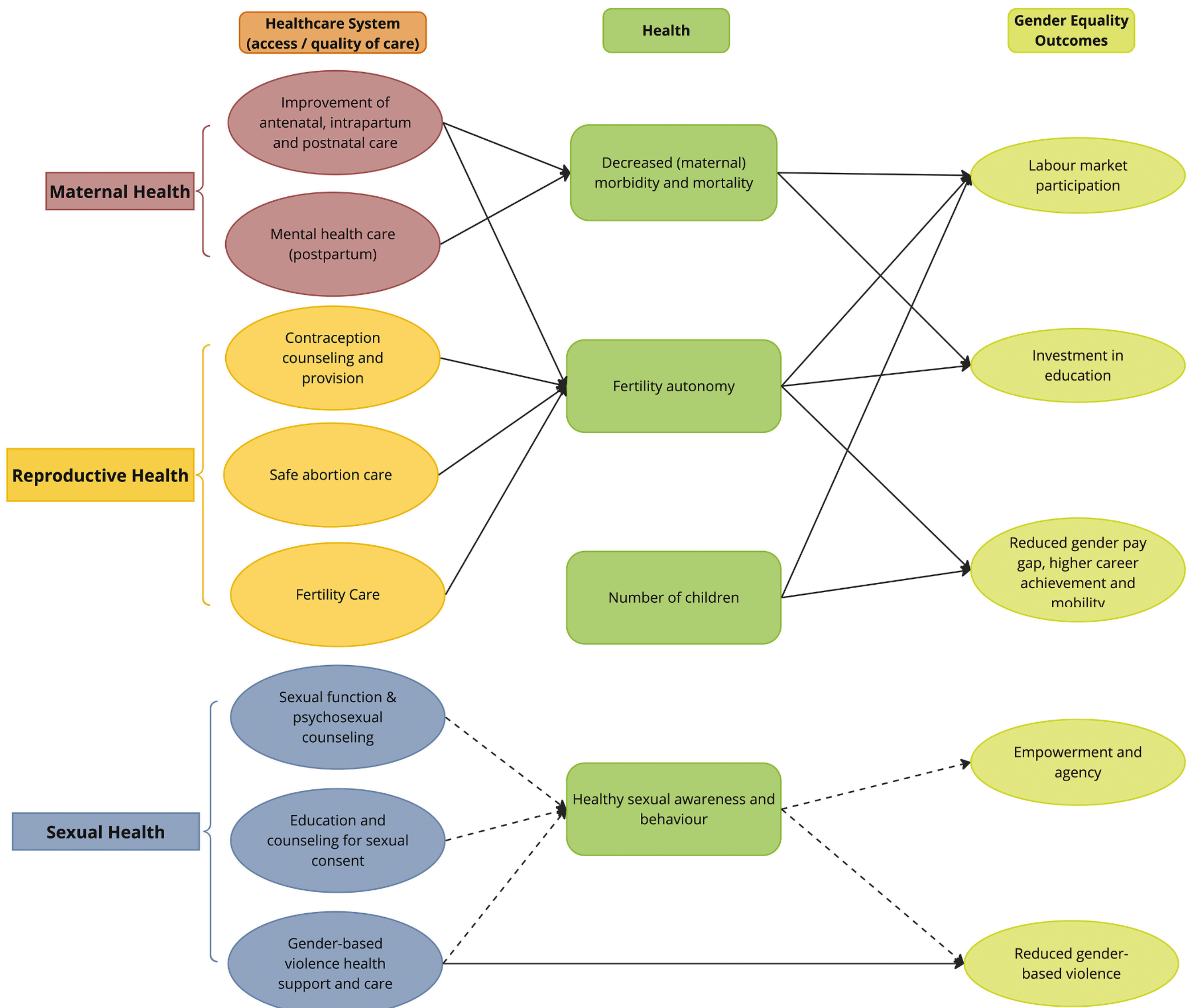

Fig. 1. Conceptual framework: causal pathways linking health care systems and gender equality outcomes.

For most studies, evidence shows that interventions such as contraception, family planning, and abortion bills have visible long-term effects beyond health itself through changes in reproductive decisions.

The measurement of maternal health, reproductive health, sexual health, and gender equality outcomes varies across articles depending on the geographic coverage and objectives. For papers that investigate maternal health as the determinant of possible outcomes related to gender equality (SDG5), the authors used the incidence of maternal mortality and burden of maternal conditions (disability-adjusted life years, DALY) using historical data on burden of disease, demographic and health surveys, and development indicators from the World Bank [39–41,48,4940]. For reproductive and sexual health outcomes, the authors have used indicators on access to contraceptives, abortion, sterilization, and other family planning services. In terms of methods, they have exploited natural experiments on legal changes to draw causal inferences on gender equality outcomes. Given the geographic and temporal variations in US laws, many studies focus on the state legalization of contraception [43,50,51], while others focus on the targeted Regulations of Abortion Providers (TRAP) laws or other abortion indexes [52,53]. These US studies primarily used Current Population Surveys (CPS), Census or National Fertility Surveys. Articles that used data from other countries such as Ethiopia, Colombia have also used population censuses or family surveys [11,54], and when available, the authors have also combined population-wide administrative databases in a Norwegian study [55]. There is also one cross-country study that relies on a database from the World Bank on the national-level abortion index [42].

To measure fertility decisions as an indirect determinant of gender equality outcomes, many articles considered family size and the number of children as measurements. Given that fertility is often inherent to gender-related outcomes, establishing a causal link is a methodological challenge. To overcome it, studies have used a variety of econometric methods (e.g. instrumental variables) to isolate the causal impact of fertility decisions on gender-related outcomes. These studies have primarily used the demographic and health survey, population survey, or census, with the exception of Lundborg et al. [56], who used the Danish administrative dataset. Other papers have investigated the effects of certain medical procedures, such as c-sections, the adoption of sex-detection technology, and IVF treatments [44,57,58]. Some of these studies used and merged various administrative sources and databases.

In the realm of scholarly literature investigating gender equality and women’s empowerment, the most studied metrics include female labour force participation, income levels, and educational achievements. These measures are generally obtained from the census and population

surveys, supplemented by additional sources of labour market information and administrative data. In a study measuring IPV, the authors rely on court reporting and protection orders to measure the incidence [59]. By delving into these key indicators, policymakers can gain invaluable insights into the efficacy of existing interventions and devise strategic measures to foster more inclusive and equitable environments for women across diverse socioeconomic strata.

We now discuss more in detail these studies across different health outcomes and interventions and the effect they had on gender equality.

3.2.1. Co-benefits of improvement in maternal health

Given the tremendous economic development and significant improvement in maternal care worldwide since the 1930s, many maternal conditions that previously had long-lasting debilitating effects on health have gradually disappeared [40]. Albanesi and Olivetti [40] used historical data from the US to demonstrate that the decline in the burden of maternal conditions, measured in DALYs, can account for approximately 50% of the increase in married women's labour force participation between 1930 and 1960. In such a way, medical progress and improvements in maternal health have enabled women to balance work and parenthood and encouraged more women to enter the workforce. This effect is further enhanced by the introduction of baby formula, which allows for more flexible feeding schedules [40]. In the African context, Soares and Falcão [49] also showed that variation in adult mortality between 1960 and 2000 across sub-Saharan African countries can be systematically related to women's labour force participation and wage gap. Overall, this evidence suggests that better maternal healthcare equips women to better contribute to the labour market, which has an immediate impact on the effective labour supply and the level of economic output.

Declines in maternal and child mortality due to better maternal care also led to a rise in educational attainment. Looking at women in the US between 1921 and 1950, Albanesi and Olivetti [39] show that a permanent decline in pregnancy-related mortality increases the returns to investments in women's human capital, measured as the percentage difference between boys and girls with a college degree in the state. Specifically, the projections indicate a decrease in maternal mortality of 10 deaths per 10.000 live births, which has led to an increase in the female-male differential in college graduation rates (college attendance of 4 or more years) by 0.05 percentage points. Similarly, Jayachandran and Lleras-Muney [41] have shown, in the Sri Lankan context, how a decline in maternal mortality increases women's investment in education, especially due to increases in life expectancy. They demonstrated that between 1946 and 1953, literacy rose by 0.7 percentage points (2%) and years of schooling rose by 0.11 years (3%) for every additional year of life expectancy [41]. Bhalotra et al. [48] contend that the decline in child mortality also allows women to be liberated from early childbearing and multiple pregnancies, improving their labour force participation in the US between 1930 and 1943. Overall, these studies used historical data to suggest that lower maternal and child mortality, due to improved maternal care, allows for investment in women's human capital in the form of education.

Few studies investigate the effects of specific maternal medical procedures on gender outcomes. One study has investigated the impact of Caesarean deliveries in Austria between 1995 and 2007 and shows that unplanned Caesarean deliveries at parity 0 decrease lifecycle fertility by almost 13.5% due to worsened health, which paradoxically translates into a temporary increase in maternal employment [58]. In India, a study that looks into the effects of prenatal sex detection technology (ultrasound) introduced in the 1970s shows that it had a large effect on the survival rate of girls after birth, which accounts for 26–29% of the reduction in under-5 excess female mortality [57].

3.2.2. Co-benefits of improvement in reproductive and sexual health and services

Ensuring access to affordable and comprehensive reproductive healthcare services, including contraception, family planning, and abortion services, is crucial for gender equality and women's empowerment. This allows women to make informed choices about their reproductive health, empowers them to plan their pregnancies, and can contribute to better educational and employment outcomes.

The literature on the effects of contraceptive pills argues that the advance in birth control technology allows women to decide the timing and number of children and alter their expectations about childbearing during critical periods of their careers, which again increases women's possibilities to invest in education and participate in the labour market. Therefore, one's fertility decision is the key intermediary step from access to contraception to women's economic outcomes. Empirical studies across countries systematically find a causal impact of the pill on the timing of the first birth and the intensity of women's labour market participation and earnings [11,43,50,51,60,61]. The implied mechanism points to the fact that early access to the pill, especially at a young age, significantly delays the age at first birth, therefore reducing the cost of investing in their education and professional career. In the US, the pill can account for 10% of the convergence of the hourly gender wage gap in the 1980s and 30% in the 1990s [51]. Another study on women's sterilization in Peru showed that the campaign-induced sterilizations in the 1990s do not increase women's probability of working, primarily because the subjects usually already have a large family and limited or no education [62]. In Colombia, girls under family planning programs in the 1960s using contraceptives completed 0.05 additional years of schooling and had a higher probability of working in the formal sector [54]. However, the only study that used a population-wide administrative database in Norway showed that, contrary to the experience in Colombia, legalization of contraception in the 1960s only had a short-term effect on women's labour market participation but no long-term effect [55]. The outcome largely depends on the take-up rate and its broader effects on women's economic empowerment.

Like contraception, abortion has an impact on gender equality outcomes. Access to abortion services can lower fertility and, thus, youth dependency, which further affects labour participation and educational investment. According to a study covering 96 countries from 1960 to 2000, the legalization of abortion dramatically lowers fertility, with each birth reducing a woman's labour supply by about two years on average during her reproductive life [42]. Two other US studies showed that in states with Targeted Regulations of Abortion Providers (TRAP) laws since the 1990s, which restrict access to abortion, women are less likely to move to an occupation with higher pay, while women who have access to publicly funded abortions tend to have higher occupational mobility and are more likely to become entrepreneurs [52,53]. In the Spanish context, González et al. [63] showed that legalization of abortion in Spain in 1985 led to more women graduates from high school, who are also less likely to marry young and have higher life satisfaction as adults. If women cannot control their birth or doing so is heavily dependent on staying in one's job, it's more difficult to plan for and take risks in their careers.

In addition to the more traditional reproductive healthcare services, some studies also looked at the implications of contemporary reproductive health interventions. For instance, an Israeli study using population census and administrative tax data shows how allowing free access to IVF in 1994 increased female college completion and improved gender gaps in labour market outcomes [44]. The authors demonstrated that the larger education investment from a less time-constraint fertility window can influence individual behaviour to invest in their human capital. This implies that women with more protection against later-life infertility can afford to make greater education investments and have more successful professional outcomes. The context is, however, unique to high-income countries, and we cannot generalize the policy to others. However, the argument is in line with the discussion on reproductive health and the ability to plan birth.

There are also many articles that analyse the direct consequence of women's fertility behaviour on women's human capital investment. The

challenge of these studies lies in the dynamic nature of fertility decisions, choices regarding fertility, labour market participation, and other forms of human capital attainment. Different types of instrumental variables (IVs) have been used in these studies to account for the possibility of bias when estimating the effect of fertility on the different outcomes they have looked into. These IVs include unexpected twin births [64,65], gender mix [66–68], IVF treatments [56], and fertility shocks [69]. The evidence systematically finds that having children lowers female employment and earnings, which can be due to reductions in the working hour (the intensive margin), exiting the labour market (the extensive margin), or change to more flexible arrangements [56, 65–70]. Many of these studies are cross-country or focus on the US, with one on Korea [68] and another on Denmark [56]. This further confirms the channel from health services to employment outcomes through fertility. These findings supplement the evidence on contraceptive pills and abortion, showing how marginal birth or fertility decisions *per se* can influence gender equality outcomes.

Finally, public healthcare as an infrastructure not only improves the health of women but can also work as a disclosure and referral mechanism for women to report violence-related incidents. Bellés-Obrero et al. [59] showed that in Spain, the removal of access to public healthcare for undocumented immigrants in 2012 quickly decreased IPV reporting and applications for protection orders by 12%. This means that, in addition to contributing to better health outcomes, the availability of the healthcare system serves as a crucial means of addressing concerns related to gender-based violence.

4. Discussion

The literature reviewed covers a wide range of studies examining the intersection of maternal, reproductive, and sexual health and its effect on gender equality outcomes across different settings. The studies are categorized by health outcomes and interventions, shedding light on both direct and indirect impacts on labour participation and educational investment, with fertility decisions and autonomy as pivotal factors.

The measurement of health outcomes is varied, with maternal health often assessed through maternal mortality rates and the burden of maternal conditions, while reproductive and sexual health outcomes are measured using indicators such as access to contraceptives, abortion, and family planning services. Geographic coverage and objectives dictate the choice of data sources, including historical data, demographic and health surveys, census data, and administrative databases.

Several studies highlight the co-benefits of improvements in maternal health, indicating a significant correlation between declines in maternal mortality and increased female labour force participation and educational attainment. Similarly, declines in child mortality are linked to improved labour force participation for women, emphasizing the importance of investing in maternal and child healthcare to enhance women's human capital and economic participation.

The evidence reviewed in Section 3.2.2 suggests that access to reproductive healthcare services, including contraception and abortion, is crucial for women's empowerment. Studies demonstrate that access to contraception enables women to control their fertility, thereby impacting educational attainment and labour market outcomes positively. Legalization of abortion has been shown to reduce fertility rates and increase women's labour supply, with implications for occupational mobility and entrepreneurship. Moreover, advanced reproductive technologies, such as in vitro fertilization (IVF) and prenatal sex detection technology, have implications for women's education and labour market outcomes. IVF access has been linked to increased female college completion, while prenatal sex detection technology has influenced gender disparities in survival rates and under-5 mortality. Specific medical procedures, such as caesarean deliveries and sterilization, also impact fertility and labour market outcomes. While caesarean deliveries may temporarily increase maternal employment, sterilization campaigns may have varying effects depending on individual circumstances, with potential positive impacts on children's health.

Additionally, public healthcare infrastructure plays a role in addressing gender-based violence by providing a platform for reporting incidents and seeking protection. The availability of healthcare services can influence the prevalence of intimate partner violence, underscoring the broader societal implications of healthcare access for women's well-being and empowerment.

In general, the literature highlights the intricate relationship among health outcomes, reproductive decisions, and gender equality, underscoring the necessity for comprehensive healthcare access and policies that promote women's autonomy and empowerment in various contexts. Many studies exploring reproductive health, fertility, and employment face limitations due to data constraints. One significant issue is the reliance on the female labour force participation rate, typically derived from cross-sectional household surveys, which creates a binary employment indicator using the International Labour Organization's definition of labour force participation. However, this definition fails to consider crucial factors such as job stability, work quality, employee vulnerability, adequacy of compensation, and most importantly, the trade-offs individuals must navigate. The necessity for women to engage in employment, rather than their voluntary decision to do so, challenges the use of female labour force participation as a sole indicator of empowerment. A more refined approach involves considering various aspects of work such as its formal nature, compensation, and full-time status to discern whether it contributes to empowerment. It's important to avoid automatically equating a woman's increased likelihood or extended hours of work with an improvement in her empowerment status.

As previously highlighted by Finlay and Lee [4], further research is required to investigate the lasting effects of advancements in reproductive health on women's economic empowerment. Certain research suggests that although there may be initial advantages, delaying the first childbirth could result in unforeseen drawbacks if the time gained isn't utilized to build essential human, social, or physical resources [71]. Without such investments, the delay might not translate into long-term economic empowerment for women.

In this review, the focus was on the causal effect of maternal, reproductive, and sexual health on women's empowerment, moderated by fertility decisions. The capacity to manage fertility using modern contraception stands as one of the paramount technological advancements of the twentieth century, holding significant potential for widespread social and economic impacts on women and society. However, our review doesn't look more closely at the nature of the fertility decisions to consider that two partners may differ on the ideal number of children, which in turn can impact household demand for fertility. This has important implications for women's autonomy as well as wellbeing, as demonstrated in the literature. In a study conducted in Zambia, researchers experimented with providing access to contraceptives to women either individually or jointly with their husbands [72]. The results revealed that women who had access to contraception jointly with their husbands, rather than individually, were less inclined to seek family planning services (by 19%) and less likely to utilize concealable contraception (by 25%). Consequently, women in this group were 27% more likely to experience childbirth than those who had independent access to contraceptives. In the long-term, however, women granted access to contraception independently reported lower subjective well-being, indicating a potential psychosocial drawback of making contraceptives more discreet. These results show a trade-off between privately enhancing a woman's set of choices, which could lead to outcomes related to the use of contraceptives that could benefit her and her child's welfare, and decreasing the conjugal value of the marriage, which could lead to a loss of well-being [72].

Although we aimed to address key topics related to maternal, reproductive, and sexual health in women, our review did not cover menstrual health and menopause. The literature on these subjects is

limited, though interest is growing, particularly regarding menopause's impact on women's health and employment. A recent UK study found that early natural menopause (before age 45) reduces months worked in women's 50 s, with psychological symptoms significantly lowering employment rates—by 1–2 percentage points for each additional symptom, and 2–4 percentage points if the symptoms are particularly severe [73]. As the first study of its kind, we hope it will encourage further research to inform government and employer policies, helping to address the challenges women face in the workplace due to menopause and contributing to gender equality through improved health outcomes.

Recognizing that gender intersects with other social identities when formulating health policies is very important to understand the complex interplay between health and women's empowerment. For example, a woman's bargaining power within household decision-making is considered to be a very important factor in women's economic empowerment but there is no consensus on how to measure the latter [47]. Consequently, there are no empirical studies to explore the causal link between health and/or health policy and women's intra-house bargaining power. Furthermore, while healthcare is important to women's labour market participation and fertility autonomy, social mechanisms and welfare infrastructures are also necessary to ensure women's empowerment. A recent cross-sectional study in Nepal found that women's exposure to media, improved socio-economic status, and increased age had an influence on their autonomy to make decisions about sexual and reproductive health rights. This latter was defined as the ability of women aged 15 to 49 to exercise their rights to sexual and reproductive health and it was assessed using a survey [26]. An experimental study in rural India found that facilitating women to attend clinics together with other women not only bolstered social connections and peer involvement but also boosted clinic attendance and contraceptive utilization. Furthermore, this approach proved more impactful in enhancing women's reproductive autonomy, especially among those encountering significant resistance within their households, compared to interventions solely focused on enhancing individual access to clinics [6].

5. Conclusion

To achieve gender equality and empower girls and women, it's crucial to grasp how enhancements in maternal, reproductive, and sexual health influence women's economic empowerment. With this narrative review we gave a critical overview of the different mechanisms through which these can be achieved. Ensuring universal and independent access to contraception, abortion and advanced reproductive technologies will have a long-lasting positive impact on gender equality through fertility behaviour. Despite the limited empirical evidence, we believe that collaboration between the health sector and other sectors such as education and justice can further strengthen women's bargaining power and autonomy. Understanding, documenting, and tracking these co-benefits is crucial for shaping the future priorities of the health sector and advancing the global agenda of gender equality and sustainable development.

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CRediT authorship contribution statement

Yuxi Wang: Writing – original draft, Formal analysis, Data curation. **Aleksandra Torbica:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization.

Declaration of competing interest

Authors declare no conflict of interest.

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