



RESEARCH ARTICLE

Covariates of pregnancy and its Effects Towards Children's Health Among Young Adult in the US

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| ARTICLE INFO | ABSTRACT |
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| Received: Aug 24, 2024 | Many studies have found the connection between pregnancy and children's health, but there is not much recent research investigating pregnancy as a mediator between predictors and children's health. Pregnancy has been one of the most common issues in the modern world, contributing to the increase of the country's population, but the evolution of the world has raised many concerns among that society that negatively affect pregnancy results, which it may affect the children's health. The current study aims to investigate the mediating role of pregnancy in the relationship between each predictor (parent's health, romantic relationships, birth planning and education) and child health. The method used to conduct this research is to use a large data set from ICPSR (>90,000 sample size) and IBM SPSS Statistics 29.0 to perform the data cleaning workflow and data analysis. The results highlighted that parent health is significantly affect children's health and pregnancy, while pregnancy and education are significantly affect children's health, while romantic relationships and birth planning do not significantly affecting children health's and pregnancy, education also does not significantly affecting pregnancy. For the mediation analysis, pregnancy mediated the relationship between children's health, except romantic relationships and pregnancy. This research can help in public health departments develop targeted interventions to improve pregnancy outcomes and promote children's health while targeting its covariates. |
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| Keywords | |
| Parental health | |
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INTRODUCTION

To this day, pregnancy is an essential part of reproduction and passing down a generation. It is a part of life where a woman gets pregnant for 9 months and a new baby is born. The results of pregnancy can vary due to various factors which the parents should be concerned about. Same goes to children's health, it is one of the most concerning matters for a parent as their children are their everything and nothing concerns as the health of much as their own children. In this modern day, using per 1000

women aged 15-44 as sample, the overall pregnancy rate has been gradually decreasing from 97.3% in 2010 to 85.6% in 2019, approximately 12% of decline in pregnancy rate according to (*U.S. Pregnancy Rates Drop During Last Decade*, n.d.). The evolution of the world has raised many concerns among this society that negatively affect pregnancy outcomes. The proportion of women experiencing pregnancy loss is said to have changed bit by bit throughout four decades, still primarily influenced by the age of the woman. The pregnancy loss rate in women is increasing gradually with age from the age of 10 to 49 years (Lidegaard et al., 2020). On the other hand, children's health, including physical and mental health is one of the determining factors for their promising future and should be taken care of to ensure that children grow up healthily. However, there exist many factors that impact children and should be taken into account. The study has shown that between 2016 and 2020, there are significant increases in children diagnosed with anxiety and depression, decreased physical activity and emotional well-being, as well as to be coping with parents' excessive parental demands (Lebrun-Harris et al., 2022), which shows many signs of children's health deficiency and should be considered.

Among the concerning covariates that could affect pregnancy and children's health, this research would focus on discovering the impacts of parent health, education, romantic relationship, and birth planning. Many studies showed how important parent health can greatly affect pregnancy and child health outcome (De Buhr & Tannen, 2020a; Mehanovi et al., 2021b). Many studies have mainly focused on the consumption of harmful substances such as smoking, alcohol and drugs and its effects on pregnancy and children health Krist et al. (2021a), which shows that it is relatively imposing negative impacts that reduces the quality of pregnancy and children health. Meanwhile, although no significant and direct relation between romantic relationship and pregnancy is found, there is still a slight connection that slightly affects pregnancy, as the experience of pregnancy may vary based on the quality of a woman's romantic relationship. This is because women who rely on mental support throughout their pregnancy can help relieve stress when they have a better romantic relationship (Meaney et al., 2021). On the other hand, romantic relationships seem to be a major trait that can affect the child's overall health. There is research supporting that parental satisfaction with their romantic relationship is beneficial to the family and children's health (*APA PsycNet FullTextHTML Page*, n.d.). Next, a study proves that birth planning shows a positive effect on maternal fetal outcome with pregnancy (Soliman Abd El Aliem et al., 2020). Meanwhile, there is also a study that shows that birth planning can potentially improve child health outcomes and reduce adverse effects as birth planning helps prevent negative maternal experiences (Alidou, n.d.), but implementing birth planning helps lead to a higher rate of vaginal birth, early breastfeeding, and improved neonatal health (Mohaghegh et al., 2023). Furthermore, other studies are more linear in studying the impact of prenatal studies especially for mothers. Balasoiu et al. (2021a) which suggest that prenatal education promotes better pregnancy outcomes. In terms of children's health, studies have also shown that the relation of education and children's health exists although it is vague (Raghupathi & Raghupathi, 2020b; Vamos et al., 2020b). It is also mentioned that education is positively related to children's health because, through education, children would have the ability to take care of themselves. Lastly, there are also studies that show that pregnancy is one of the major factors that affects children's overall health (Raposo et al. 2022; Brichmann et al., 2023). Lower diet diversity and multiple pregnancies can increase the risk of anemia, which is a bad effect that could lead to low birth weight or even premature birth (Sundararajan et al., 2020). Looking from a nutrient intake perspective, it is crucially important to take in all kinds of nutrients especially vitamin D and folic acid, as it can help reduce preterm birth and prevent neural tube defects (Vestergaard et al., 2023, Killeen et al., 2023). With adequate nutrients intake during pregnancy, the health after birth would be much better.

After doing the literature review, this study decided to extend the research to discover the relationship between the covariates and child health and pregnancy as a mediator factor between predictors and children's health as no study had done before. Hence, this study will find out whether pregnancy affects the relationship between covariates and children's health indirectly or not to fill in

the research gap. The main objective of this research is to discover the relationship between the covariates, namely parent's health, romantic relationship and birth planning, and education with pregnancy. In addition to that, this research aims to extend the research to discovering the relationship of the covariates with children's health. Then later to determine and study whether the pregnancy mediates predictors and children's health.

The structure of this research report begins with abstract, then moving on to the introduction (1.0) then followed by research objectives (1.1), research questions (1.2), and research hypothesis (1.3) sequentially. Moving on to 2.0 would be the literature review section, followed by the table which is the summary of the covariates of pregnancy and child health of literature review (Table 1, Table 2) and conceptual framework (Figure 1). Next, in Section 3.0 will be the methodology section along with the data set (Table 3) and the data cleaning flow (Figure 2). In 4.0 will be the result and discussion. Then we will be looking at the conclusion (5.0) to summarize the research. Lastly, there are references (6.0) which list all the references that are used throughout the research for referencing.

2.0 REVIEW

Pregnancy and child health

Pregnancy is a major factor that affects the health of a child. From lifestyle to diets, many studies shows how maintaining a good lifestyle and diets helps the child's overall health (J.Zhang et al., 2022; Brichmann et al., 2023). The studies by J. Zhang et al. (2022) show that a low amount of diet diversity, having been through multiple pregnancies, will increase the chance of getting anaemia during pregnancy. Literature search conducted by Brinchmann et al. (2023) included the studies of tobacco used during pregnancy. It shows that during pregnancy tobacco use increased the risk of premature birth on an extreme and moderate scale. Absorbing a high amount of nutrients may be beneficial during pregnancy, as the finding from Oh et al. (2020) stated that "their finding showed vitamin D supplement has reduced the risk of preterm births by 36%". This is supported by the research of Vestergaard et al. (2023) state that 'higher doses of vitamin D would benefit the high-risk group who have a higher risk of adverse maternal and neonatal outcomes. However, the research from Killeen et al. (2023) strengthens the saying that replenishing nutrition is important to the child. Such as in the research state that "folic acid is a B vitamin that is naturally found in leafy green vegetables, citrus fruits, and liver. If the child has too little B vitamin it will put the child in risk of neural tube defects. Therefore, supplementation of 400µg per day, paired with a healthy balanced diet, is recommended in many countries (Killeen et al., 2023).

Parent's health and pregnancy

It is important for parents to look after their health as it relates and affects the outcome of pregnancy which involves their bad lifestyle, such as smoking, drinking alcohol or even consuming drugs (De Angelis et al., 2020; Krist et al., 2021b; Mehanovi et al., 2021b; Wouldes et al., 2021a). It is especially important that the mother takes note of this matter. According to research, smoking during pregnancy can increase the risk of numerous adverse pregnancy outcomes and complications in offspring (Krist et al., 2021b). Although it is said that women should avoid smoking to ensure a healthy pregnancy result, it is very important to avoid second-hand smoke. As recent reviews and analysis show that pregnant women exposed to second-hand smoke cause 40-60g lower birth weight of their offspring (Rogers, 2019). With this concern, many parents are advised not to consume harmful substances such as alcohol, drugs, or smoking. As a result of research, these substances that are used during pregnancy affect the outcomes at birth and 1 year of age (Brink et al., 2022a). Although consuming alcohol is fine, one should still take measures on their alcohol intake to not drink excessively, especially pregnant women. The findings indicated that consuming alcohol increases the risk of congenital problems, including fetal alcohol spectrum disorder (Popova et al., 2021) with the estimate of 4 drinks within 2 hours that are counted as excessive and fatal for pregnant women (Oei,

2020). However, it is safe to say that many pregnant women are aware of the harmful effects of alcohol on their offspring. In research, it is known that 70% to 87% of women would choose to give up taking alcohol when they find out they are pregnant (Okulicz-Kozaryn, 2022). In conclusion, the health plays an important role throughout the whole pregnancy cycle from the start until the end, especially mothers, should take extra care about their health to not impose further effects on their offspring when pregnant.

Parent's health and children's health

It is understood that the health is highly related to their parents' health as it is connected with their lifestyle and habits. There is also research that shows that the better the health knowledge and competencies of a parent, it can contribute to the improvement of children's health in particular aspects and areas (De Buhr & Tannen, 2020b). Parents who consume harmful substances such as alcohol and drugs impose negative effects on their children (Kuppens et al., 2020a; McKetta & Keyes, 2019). Studies showed that parents who abuse substances would cause them to have less supervision towards their children, which can potentially affect parents' ability to provide a safe and secure home environment (Kuppens et al., 2020a). It is said that harmful substances can distract parents from putting attention to their children which makes them ignore their children's well-being and health conditions. In addition to smoking, alcohol is also one of the common substances that parents like to take. Generally, studies have shown that men and women with children regardless of gender have found to be less willing to binge drinking than those of the same gender without children, but among women, women with children increased binge drinking compared to those who do not have children (McKetta & Keyes, 2019). This would likely affect children's health especially when parents are an alcoholic and may increase the chance of domestic violence that is bad for their children (Mayshak et al., 2020). The most common bad habits among parents are smoking, it is harmful for their children as they are exposed to second-hand smoke which may cause health problems towards the children (Muhammad & Tumin, 2024; Paraje & Valdés, 2021a). Research proved that parents who smoke have a higher probability of reporting that their children have a poorer health condition (Paraje & Valdés, 2021b). Studies also proved that in caregiver-reported data, children's health is typically provided by mothers (Muhammad & Tumin, 2024). This is relatable, as the majority of the children would spend more time with their mother instead of their father as they will be at work. Studies show that if the smoker is the mother, the effect on their children is stronger and that if the mother stops smoking, it will significantly bring a positive effect towards the children's health (Paraje & Valdés, 2021b). In conclusion, parents' health plays an important role in taking care of their children's health and should be the role model for their children to have a healthy lifestyle.

Romantic relationship and pregnancy

While a direct relation between romantic relationships and pregnancy may not be found. The quality of a relationship can significantly impact a woman's mental and emotional well-being during pregnancy. In a way, being able to indirectly influence pregnancy outcomes. The quality of a woman's romantic relationship can also be influenced by her experience of pregnancy (Meaney et al., 2022; Lanier et al., 2020; Duby et al., 2020). In an inconvenient state, pregnant women relied heavily on mental support from their partner to help release their stress, which is found in a study by Meaney et al. (2022). On the contrary, Lanier et al. (2020) discovered that couples with low relationship satisfaction and emotional expression have a higher chance of contracting sexually transmitted infections (STIs), potentially impacting fertility and pregnancy health (Lanier et al., 2021). Furthermore, the relationship between mental health of young pregnant women and sexual and reproductive health (SRH) outcomes is found significant by Duby et al. (2020) (p. 6). According to their research, it suggests that a lack of emotional support from partners can make people more susceptible to mental health problems and bad SRH experiences. Studies show that a woman's emotional condition during pregnancy may be influenced by her attachment style, which is shaped by her early childhood experiences (Zhang et al., 2021; Sacchi, 2021;). Zhang et al. (2021) found that

pregnant women with insecure attachment experience a higher rate of prenatal depression. This development further affects the total scores and quality compared to those women with a childhood experience (Zhang et al., 2021). According to Sacchi (2021), women who have stable attachment patterns typically develop stronger MFA and have reduced rates of depression (Sacchi et al., 2021).

Romantic relationship and child health

The romantic relationship is a major trait for a child parent and able to affect the child's overall health. A romantic relationship between parents is important to maintain (Frosch et al., 2019; Oh et al., 2020). This is because recent research shows that children gain social and emotional benefits when their fathers are more with their lives (Oh et al., 2020). According to Forsch et al. (2019) evidence shows that the quality of the father's relationship with the child's mother is shown with this example. It stated that 'mothers are prone to act as gatekeepers in families, limiting father's access to their children and the quantity and quality of father's interactions with their children' (Oh et al., 2020). This might also make parents feel accomplish in task of taking care that is show in this research. According to Weaver et al. (2020), they found that 'they usually understand completely what it takes to be a successful parent on their own terms'. To strengthen the importance of romantic relationships among parents (Ulferts et al., 2020; Brinchmann et al., 2023), the article by parents Ulferts et al. (2020) stated that neglectful parenting is harmful to children. Due of the type to parenting associated to negative outcomes across multiple domains including health (Brinchmann et al., 2023). Therefore, having a harmonious relationship in the family, the parent can focus on the child more to understand and help them in their struggles, which is supported by this article by Febriyanti et al. (2022). Lastly, this research supports all the above by stated that romantic relationship satisfaction is highly beneficial (Killeen et al., 2023).

Birth planning and pregnancy

Birth planning can significantly impact a woman's pregnancy experience (Soliman Abd El Aliem et al., 2020; Cortezzo et al., 2020; Aksoy Derya et al., 2021; Mohaghegh et al., 2022a; Shareef et al., 2023). Birth planning shows a positive effect on maternal and fetal outcomes that improves the implementation of tailored childbirth care (Soliman Abd El Aliem et al., 2020). The birth plan will enhance the awareness and empowerment by providing them with support in making decisions throughout the delivery process. (Soliman Abd El Aliem et al., 2020). From a study of perinatal planning care birth planning (Cortezzo et al., 2020), have shown that this method of birth planning may serve as a form of advance care planning, where families can decide the care that they wish to receive during labor and delivery. Furthermore, the study by Cortezzo et al. (2020) continues to show that perinatal palliative birth planning during complicated pregnancies will enhance support for families facing life-limiting circumstances. Pregnant women often face fear during pregnancy as they are concerned about having a child with physical or mental disabilities (AKSOY DERYA et al., 2021). Pregnant women's anxiety levels and prenatal distress are decreased through teleeducation, which is one of methods used in birth planning (Aksoy Derya et al., 2021). Research has shown that the experience of childbirth can be improved by doing birth during pregnancy. The birth plan is regarded as a helpful tool that can decrease medical interventions during labor that lead to better childbirth outcomes (Mohaghegh et al., 2022a).

Furthermore, the study of (Shareef et al., 2023) indicates that having birth planning not only improves communication between pregnant women and healthcare providers by sharing decision making based on the level of support offered by care providers. However, research by (Shareef et al., 2023) mentioned that having a simple possession birth plan is insufficient, as it must be aligned with the SDM principles (Shared Decision-Making) to enhance the women's childbirth experience.

Birth planning and child health

Although a direct relation between birth planning and child health may not be found, some methods of birth planning do show that it impacts children's health (Alidou, n.d.; Sunaina Dhingra, 2020; Chungkham et al., 2020; Mohaghegh et al., 2022b; Mohaghegh et al., 2023). The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) advise that breastfeeding for 2 years or more benefits the child's health. The spacing between children which is commonly planted during a birth plan, helps to improve the health, nutrition, and development of a child (Dhingra & Pingali, 2021). Additionally, there is another study that shows the significant impact of birth spacing as a form of birth planning on child health outcomes. The findings of (Chungkham et al., 2020) indicate that short birth intervals will increase the risk that a child will have underweight and undernutrition, which will affect the child's health. A study in Kenya shows that the use of modern contraceptives as a method of planning birth by mothers to avoid giving birth in the third quarter can potentially improve child health outcomes (Alidou, n.d.). Another study in Iran (Mohaghegh et al., 2022b) has shown that implementing birth plans resulted in a higher rate of vaginal childbirth and decreased the unnecessary use of medical interventions. This indicates that birth plans have a positive impact on the childbirth experience. Further research also shows that mothers who have planned to have a baby are more likely to have a baby earlier compared to those who do not have birth planning and their newborns were rarely admitted to the NICU. These studies have concluded that neonatal (newborn) outcomes will have a beneficial effect by having a birth plan (Mohaghegh et al., 2023).

Education and Pregnancy

In relation between education and pregnancy, there are studies that prove their relationship and what are the effects. However, talking about education, there are a few perspectives on how education affects pregnancy outcomes, and among these perspectives is that a woman's pregnancy life could be affected by prenatal education, which is important (Aksoy Derya et al., 2021; Balasoiu et al., 2021; Yikar & Nazik, 2019). According to a study, prenatal education is helpful that most women, approximately more than 90% that attended prenatal courses find it beneficial and more than half (55.6%) who did not attend the courses agreed too (Balasoiu et al., 2021b). Studies have also shown that prenatal education effectively helps pregnant women relieve anxiety related to labour and delivery related anxiety which is harmful for pregnancy outcomes (Balasoiu et al., 2021b; Ickovics et al., 2007). According to another study, they have also suggested that pregnant women who receive adequate prenatal education are able to decrease complaints while also increasing their quality of life during pregnancy (Yikar & Nazik, 2019a).

On the other hand, studies showed that education can also impose negative effects towards pregnancy, that is, that women who pursue education in prior would decrease their pregnancy outcome as they would delay their marriage, which indirectly reduces pregnancy outcome which can be relating with their age (Kefale et al., 2020; Marphatia et al., 2020a). In a study, it showed that educated women tend to have a greater possibility of delaying marriage since they would need to complete secondary education (Marphatia et al., 2020a). There is a study that showed how delaying marriage would reduce or affect the outcome of a woman's pregnancy, one of the factors behind it being age. According to Age and Fertility - Better Health Channel, n.d. a woman around the age of 20 has approximately 25 to 30 percent of changes from getting pregnant and fertility generally starts to slowly decline when a woman is in her 30s.

In summary, education plays multiple roles in affecting the pregnancy outcome of a woman, there are both sides of education that could affect the outcome. Women who receive prenatal education tend to have better pregnancy outcomes because they have the knowledge to know how to take care of themselves during pregnancy. However, women who pursue their education would also impose negative impacts due to their delayed marriage.

Education and Child Health

In relation to education with children's health, education is very important in their lives. This is because education is very essential for children to learn and have life knowledge of how to take care by themselves (Black et al., 2021; Raghupathi & Raghupathi, 2020a; Vamos et al., 2020a). According to a study, education can directly affect one's health by influencing a variety of competencies such as the ability to gather and interpret health-related information that influences coping abilities and decision making (Vamos et al., 2020a). Another study has also shown that education is able to make people develop a wide range of skills and knowledge, including problem-solving skills and personal control, which can lead towards better health outcomes (Raghupathi & Raghupathi, 2020a), especially for the children in their learning stage. Another supporting research (Black et al., 2021) stated that the decrease in child health inequalities should not be overlooked and prioritized as a concerning issue as there is evidence to show that the importance of the development of either knowledge or skills could help reduce health risk in children's daily life. To prove how important education is for children's health, a study has shown through telemedical asthma education provided to school-age children (Culmer et al., 2020a). Through this experiment on education effects, they managed to observe that the educational outcome for children is the improvement of quality of life, the enhancement in symptom management ability and reduced symptom burden of symptoms for children with asthma. With this aspect, it is deductible to know how education can increase children's ability to take care of themselves.

In another sense, education for parents about parenting also imposed a great influence as a result. Parents should participate in parenting education programs that address skills and practices on how to give proper education that can improve their children's development outcomes (Finders et al., 2016a). The summary of the covariates of pregnancy and children's health of the literature review are shown in Tables 1 and Table 2.

Table 1 Covariates of pregnancy in previous studies.

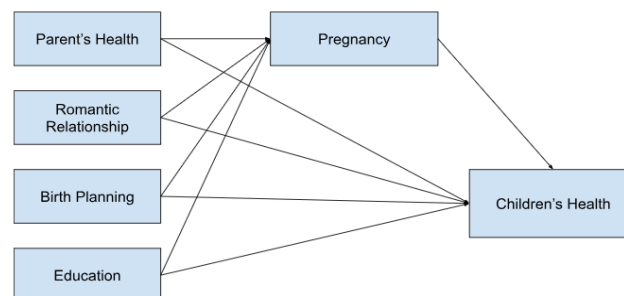
| Covariate | Detail variables | Type of pregnancy | Previous studies |
|--------------------------------|---|---|--|
| Self-efficacy | Acceptance of receiving a new baby | Good Practices in the Care of delivery and childbirth | Soliman Abd El Aliem et al. (2020) |
| | Participate in decision making about the palliative care birth plan | Ensure good communication with medical teams and prevent miscommunication | Cortezzo et al. (2020) |
| Childbirth | Childbirth experience | Reduces fear of delivery | Ahmadpour et al. (2022) |
| | Maternity care | Improve maternal outcome | Mohaghegh et al. (2022a) |
| Relational satisfaction | Maternal-foetal attachment | Pregnancy health | Sacchi et al. (2021) & Zhang et al. (2021) |
| | Relational quality | Sexual transmitted infections | Lainer et al. (2020) |
| Mental health | Mental health | Sexual reproductive health | Duby et al. (2020) |
| Prenatal Education | Tele-education | Anxiety control | Aksoy Derya et al. (2021b) & Yikar & Nazik (2019b) |
| Education pursues | Age | Delayed marriage | Marphatia et al. (2020b) |
| Parents lifestyle | Smoking | Foetal alcohol | Krist et al. (2021c) |
| | Alcohol | Foetal alcohol spectrum disorder | Brink et al. (2022b) |

Table 2 Covariates of children's health in previous studies.

| Covariate | Detail variables | Type of children's health | Previous studies |
|--------------------------------|------------------------|---------------------------|--|
| Birth plan | Birth spacing | Avoid low birth weight | Chungkham et al. (2020) & Reviewers et al. (2021a) |
| Parenting | Parenting style | Emotion | Forsch et al. (2019) & Ulferts et al. (2020) |
| | | Child health | Weaver et al. (2020) |
| Relational satisfaction | Age | Parent emotions | Butler et al. (2021) |
| Nutrition | Supplement consumption | Birthweight | Oh et al. (2020) |
| | Vitamin D consumption | Adverse pregnancy | Vestergaard et al. (2023) |
| Bad habits | Snus during pregnancy | Premature birth | Brichmann et al. (2023) |
| Children Development | Health literacy | Quality of Life | Vamos et al. (2020b) |
| | Telemedicine | Self-management | Culmer et al. (2020b) |
| Parent Education | Parenting Style | Child behaviour | Finders et al. (2016b) |
| Parents Health | Smoking | Second hand smoke | Paraje & Valdés (2021a) |
| | Alcohol | Domestic violence | Mayshak et al. (2020) |

Conceptual Framework

Based on the literature review, this study constructs a conceptual framework, as illustrated in Figure 1 to determine the relationship between covariates and children's health while pregnancy acts as a mediator.

**Figure 1: Conceptual framework for children's health covariates & mediator**

H1: There is a relationship between parent's health and Pregnancy

H2: There is a relationship between Parent's Health and Children's Health.

H3: Pregnancy mediates the relationship between Parent's health and Children's Health.

H4: There is a relationship between romantic relationship and Pregnancy.

H5: There is a relationship between Romantic relationships and children's health.

H6: Pregnancy mediates the relationship between romantic relationships and children's health.

H7: There is a relationship between birth planning and Pregnancy.

H8: There is a relationship between birth planning and Children's Health.

H9: Pregnancy mediates the relationship between birth planning and Children's Health.

H10: There is a relationship between education and Pregnancy.

H11: There is a relationship between education and Children's Health.

H12: Pregnancy mediates the relationship between education and children's health.

H13: There is a relationship between pregnancy and Children's Health.

3.0 METHODOLOGY

The methodology we used in this research is to use data sets which were originated from the Interuniversity Consortium for Political and Social Research (ICPSR). Also, IBM SPSS Statistics 29.0 has been used to merge and clean the data sets. Data cleaning and transformation are performed to overcome missing data as ICPSR is a longitudinal study for a huge number of populations. It might have the possibility of subject loss during the study. Hence, there is a reduction in the range of responses between waves. IBM SPSS Statistics 29.0 was also used to perform data analysis for Person's correlation analysis and PROCESS macro v4.2 mediation analysis. The demographic of this research paper uses descriptive statistics to calculate the quantitative variables. The bivariate function in the SPSS statistics software is then used to examine the Person correlation between IVs and DVs. Then, the direct effects (DEs) and indirect effects (IEs) in the mediation models are analyzed using Andrew F. Hayes PROCESS macro v4.2 with 5,000 bootstrap samples, model number 4, standardized effects, and 95% confidence interval. Asterisks are used to indicate the level of significance for each pair of mediation analysis.

Data sets used in this study are: DS8 demographic, DS11 relationship in details, DS12-completed pregnancies, and DS15 children and parenting. All these data sets are from wave III. The variables selected from the data sets are listed in Table 3.

Table 3: Dataset

| Variable name | Data set | Variable description | |
|---------------|----------|----------------------|---------------------------|
| Demographic | DS8 | BIO_SEX3 | BIOLOGICAL SEX-W3 |
| | DS11 | RRELNO | RELATIONSHIP NUMBER |
| | | H3RD40 | P'S LEVEL OF EDUCATION-W3 |
| | DS15 | BIRTHNO | PREGNANCY BIRTH NUMBER |
| | | H3KK1 | AGE OF CHILD-W3 |

| | | | |
|-------------|------|---------|-----------------------------------|
| CH | DS15 | H3KK8 | HOW IS CHILD'S HEALTH-W3 |
| | | H3KK9 | CHILD COND LIMIT ABILITY LEARN-W3 |
| | | H3KK10 | CHILD COND KEEPS OTHR ACTIVIT-W3 |
| | | H3KK11A | CHILD HAS HEARING PROBLEMS-W3 |
| | | H3KK11B | CHILD HAS SPEECH PROBLEM-W3 |
| PREG | DS12 | H3PG16 | PLACE OF PRENATAL CARE-W3 |
| | | H3PG8 | WANT CHILD BEFORE PREGNANCY-W3 |
| | | H3PG9 | WANT CHILD LATER-W3 |
| RR | DS8 | H3MR19 | MARRY/SCH PT OR FINISH SCHOOL-W3 |
| | DS11 | H3RD3 | A ROMANTIC RELATIONSHIP? -W3 |
| | | H3RD41 | VAGINAL INTERCOURSE (VI)? -W3 |
| | | H3RD42 | LENGTH ACQUAINT. PRE-VI-W3 |
| | | H3RD43 | VI ONCE OR MORE-W3 |
| | | H3RD48A | VI WITH P, NUMBER-W3 |
| | | H3RD58 | P PERFORMED ORAL SEX (POS)? -W3 |
| | | H3RD108 | P HAS CONCURRENT PARTNERS? -W3 |
| | | H3RD110 | FREQ. P VIOLENT TO R-W3 |
| | | H3RD112 | FREQ. P HIT R-W3 |
| | | H3RD113 | FREQ. R FORCED SEX ON P-W3 |
| | | H3RD115 | FREQ. R INJURED BY P-W3 |
| | | H3RD116 | FREQ. P INJURED BY R-W3 |
| | | H3RD120 | EXTENT OF R'S LOVE FOR P-W3 |
| EDU | DS8 | H3ED3 | HAS RECEIVED HS DIPLOMA-W3 |
| | | H3ED4 | HAS RECEIVED JR COL DEGREE-W3 |
| | | H3ED5 | HAS RECEIVED BACHELOR'S DEGREE-W3 |
| | | H3ED8 | HAS RECEIVED PROFESSIONAL DEG-W3 |
| | | H3ED31 | ATTENDED TRAINING 3 MONTH+-W3 |

| | | | |
|-----------|------|---------|------------------------------------|
| BP | DS8 | H3SE7 | PST 12 MTHS-USE BIRTH CONTROL-W3 |
| | | H3SE29A | PST 12 MTHS-BRTH CTRL PILL-W3 |
| | | H3SE29C | PST 12 MTHS-BRTH CTRL INJECT-W3 |
| | | H3SE29D | PST 12 MTHS-DIAPHRAGM-W3 |
| | | H3SE29E | PST 12 MTHS-EMERG CNTRCPTN-W3 |
| | | H3SE29F | PST 12 MTHS-NTRL FAM PLANNING-W3 |
| | | H3SE29G | PST 12 MTHS-FEMALE STRLZTN-W3 |
| | | H3SE30A | PST 12 MTHS-PTNR USED CONDOM-W3 |
| | | H3SE30B | PST 12 MTHS-PTNR MALE STRLZTN-W3 |
| | DS11 | H3RD49 | BIRTH CONTROL AT FIRST VI? -W3 |
| | | H3RD50A | CONDOM AT FIRST VI? -W3 |
| | | H3RD50B | WITHDRAWAL AT FIRST VI? -W3 |
| | | H3RD50C | RHYTHM AT FIRST VI? -W3 |
| | | H3RD50D | THE PILL AT FIRST VI? -W3 |
| | | H3RD50F | FOAM, ETC., AT FIRST VI?-W3 |
| | | H3RD50G | DIAPHRAGM AT FIRST VI?-W3 |
| | | H3RD50K | DEPO PROV. AT FIRST VI? -W3 |
| | | H3RD50L | FILM AT FIRST VI? -W3 |
| | | H3RD50M | OTHER METHOD AT FIRST VI? -W3 |
| | | H3RD53 | BIRTH CONTROL AT LATEST VI? -W3 |
| PH | DS12 | H3PG18 | PREG: HOW OFTEN DRANK ALCOHOL-W3 |
| | | H3PG19 | PREG: HOW OFTEN USED DRUGS-W3 |
| | | H3PG20 | PREG: HOW MANY CIGARETTES SMOKE-W3 |

There are a total of 55 variables and 933 cases are obtained after cleaning, transformation, and merging the data set. To conform the conceptual framework, the variables merge into six variables. This includes four independent variables (PH, parent's health, RR – romantic relationship, BP, birth planning, EDU – education), one mediator variable (PREG, pregnancy) and one dependent variable (CH, children's health).

The variables are cleaned and transformed according to the flow, as illustrated in Figure 2. This methodology is taken from the research by Ting et al. (2022) which applied the data set in ICPSR to

find the covariates of romantic relationships among young adults in the USA (Ting et al., 2022; Tin et al., 2024).

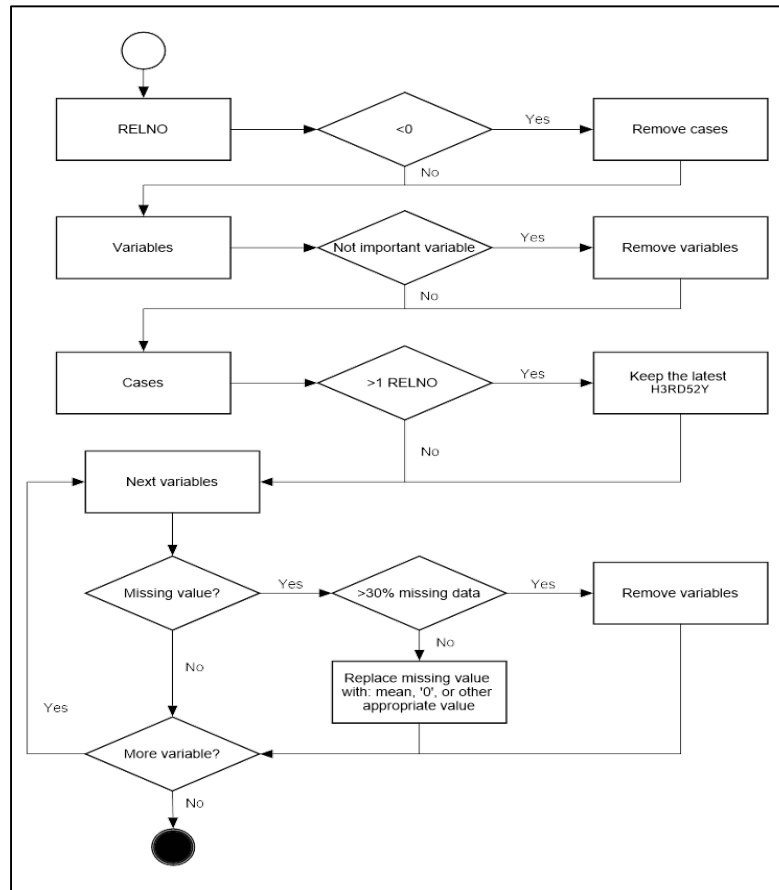


Figure 2: Data cleaning flow

When looking at the relationship number (RELNO) variable, if the case is less than zero, the cases are removed. If not, then if the variables is a not so important variable, the variable is removed. After doing the first round of data cleaning, if the cases have more than one RELNO, the cases will be kept according to the recent year of latest vaginal intercourse (H3RD52Y). If a variable has missing value greater than 30%, the variable is removed; otherwise replace the missing value with maximum, mean, '0' or other appropriate value.

4.0 RESULT & DISCUSSION

Table 4 shows the gender, relationship number, partner's education level, pregnancy birth number, and age of their child/children.

Table 4: Demographics of the respondents.

| | | Frequency | Percentage (%) |
|--------|--------|-----------|----------------|
| Gender | Male | 302 | 32.4 |
| | Female | 631 | 67.6 |

| | | | |
|-------------------------------------|--|-----|------|
| Relationship Number | 1 st relationship listed | 861 | 92.3 |
| | 2 nd relationship listed | 61 | 6.5 |
| | 3 rd relationship listed | 9 | 1.0 |
| | 4 th relationship listed | 2 | .2 |
| Partner's level of education | Never went to school | 9 | 1.0 |
| | 8 th grade or less | 10 | 1.1 |
| | > 8 th grade/didn't graduate high school | 184 | 19.7 |
| | Business/trade/voc. school instead of high school | 8 | .9 |
| | High school graduate | 444 | 47.6 |
| | Completed GED | 76 | 8.1 |
| | Business/trade/voc. school after high school | 38 | 4.1 |
| | College/didn't graduate | 86 | 9.2 |
| | Graduated from a 2-year college | 31 | 3.3 |
| | Graduate from a 4-year college/university | 39 | 4.2 |
| | Professional training beyond 4-year college/university | 8 | .9 |
| Pregnancy birth number | 1 st birth listed | 931 | 99.8 |
| | 2 nd birth listed | 2 | .2 |
| Age of child | 0y old | 199 | 21.3 |
| | 1y old | 151 | 16.2 |
| | 2y old | 186 | 19.9 |
| | 3y old | 133 | 14.3 |
| | 4y old | 101 | 10.8 |
| | 5y old | 77 | 8.3 |
| | 6y old | 54 | 5.8 |
| | 7y old | 17 | 1.8 |
| | 8y old | 10 | 1.1 |
| | 9y old | 2 | .2 |
| | 10y old | 3 | .3 |
| Total Respondents | | 933 | |

Pearson correlation analysis

The Pearson correlation analysis between IVs and children's health is put together with the Pearson's correlation analysis between IVs and pregnancy in Table 5. The results show that **H2**, **H11**, **H13** are accepted in which parental health, education, and pregnancy significantly affect children's health and **H1** is also accepted in which parent health significantly affects pregnancy. The result is consistent with the recent study by Kuppens et al. (2020b), which also shows the importance of the parent's health of the parents as one of the concerning covariates that affects the health which depends on it. Among the factors that can affect parent's health, a study has shown that substance abuse has the most impact to children's health, substances such as smoking, alcohol and drugs (Kuppens et al., 2020b). It is the right to choose to consume these substances if they know how to control and not overdose and try not to be around their children, such as smoking while not around the children to prevent inhaling second hand smoke. Additionally, Vamos et al. (2020b) mentioned that education imposes a positive relation with children's health, which happens to be that children's health can be significantly affected by education. With the help of education, children are able to develop knowledge and skills on the ability of taking care of themselves, which reduces children's health issues (Raghupathi & Raghupathi, 2020b). It is agreeable that children grow through education which

also helps them in understanding the importance of taking care of their own health. Furthermore, Vestergaard et al. (2023) also support the result. It found that having higher doses of vitamin D during pregnancy would benefit the child and the study by J. Zhang et al. (2022) revealed that low amounts of diversity in the diet during pregnancy will increase the chance of getting anemia. The studies by Zhang et al. (2022) and Vestergaard et al. (2023) reported that pregnancy imposes some positive relation with children's health, which means that children's health can be affected by pregnancy. Next, the studies of Mehanovi et al. (2021a), Krist et al. (2021a), and Wouldes et al. (2021b) are consistent with the result (Table 3) where the factors in harming a parent's health most is through the consumption of unhealthy substances such as smoking, alcohol, and drugs. In our opinion, pregnant women must be in their perfect health when having children to ensure that they would be born healthily and should avoid any harmful substances that could harm their health.

Table 5: Pearson's correlation analysis between covariates and children's health and pregnancy.

| Variable | M | SD | CH | PREG |
|----------|-------|-------|--------|--------|
| CH | 1.485 | .8306 | - | - |
| PREG | 1.851 | .3681 | -.080* | - |
| PH | .3408 | .8258 | .100** | -.073* |
| RR | 16.38 | 9.041 | .058 | -.018 |
| BP | 5.234 | 2.853 | -.039 | .058 |
| EDU | 1.089 | .7853 | -.080* | .016 |

Note: M: Median; SD: Standard deviation; *Sig. (2-tailed)<0.05; **Sig. (2-tailed)<0.01;

Meanwhile, Pearson's correlation analysis between IVs and children's health, which are romantic relationships and birth planning, did not affect significantly children's health, and all the IVs except parent's health also did not affect significantly pregnancy.

Therefore, **H4**, **H5**, **H7**, **H8**, and **H10** are rejected. The result is inconsistent with Lanier et al. (2020) and Zhang et al. (2021), who show that there is a relationship between romantic relationship and the ability and desire to be pregnant before and after the pregnancy. This contradiction might happen due to their report focus on study the illness that affect pregnancy and not a person wanting to be pregnant. Then Ulferts et al. (2020) revealed there is a relationship between the romantic relationship and child health. The contradiction happens because due to the report only study the parent willing to take care of the children health rather will the children health be affected by the romantic relationship. Similarly, the study by Soliman Abd El Aliem et al. (2020) found that the birth plan prioritizes ensuring favourable birth results through attentive care. This contradiction can be explained by the fact that the focus of this study is more on women's empowerment and decision-making than the pregnancy process itself. Cortezzo et al. (2020) revealed different results compared to this present study in which planning for palliative care during childbirth is highly crucial for preparing for the medical treatment of their child. The contradiction can be explained as the study primarily emphasizes pregnancies complicated by a life-limiting fetal diagnosis rather than focusing solely on typical pregnancies. Both studies are not correlated with the present study that the pregnancy variable is about the place of prenatal care, and both want children before pregnancy or later. Furthermore, Mohaghegh et al. (2022) and Alidou et al. (n.d.) revealed different results compared to this study in which implementing birth planning can decrease unnecessary medical interventions and potentially improve child health outcomes. This contradiction occurs because the study by Mohaghegh et al. (2022) only conducted with women who experienced vaginal childbirth while the study by Alidou et al. (n.d.) only conducted the test for pregnant women in Kenya. Furthermore, the study by Balasoio et al. (2021c) study found that there exists a possible relationship between education and pregnancy. This is mainly because the study by Balasoio et al. (2021c) mainly does research about prenatal education that affects pregnancy. Perhaps, if the scope

of the study was not limited to only prenatal education, there would be more relation between education and pregnancy.

Mediation Analysis

The result of the mediation analysis is shown in table 6. Through mediation analysis, pregnancy was found to be a significant mediator when predictors are parental health and education. Thus, **H3** and **H12** are accepted. There are studies that support the relationship between parent's health and pregnancy, showing that the consumption of unhealthy substances may lead to a lower quality pregnancy result (De Angelis et al., 2020). There are also studies that show that the relationship between parent health and children's health is linear and that the children's health would depend on their parents' health (Kuppens et al., 2020). However, there are no studies that discover and research pregnancy as the mediator for the relation between parent's health and child's health. Furthermore, although there are studies that help to prove that there exists a relation between education and pregnancy Aksoy Derya et al. (2021) and a study that showed that pregnancy is a major factor that can affect children's health (Raposo et al. 2022). While the analysis shows that the relationship between education and pregnancy, along with the relationship between pregnancy and children's health, is being significant and accepted (Table 5) but there is still no study or research done to observe or experiment on pregnancy as mediator between education and children's health. Therefore, the result can conclude that pregnancy indirectly affect the relationship between IVs (parent health and education) and children's health, since there have no previous studies done before.

Table 6: Direct & Indirect effects for mediation analysis.

| IV | Mediator | DV | DE | IE |
|-----|----------|----|--------|-----------------------|
| PH | PREG | CH | .0953* | .0053*(-.0014, .0159) |
| RR | PREG | CH | -.0052 | .0014(-.0084, .0098) |
| BP | PREG | CH | -.0100 | -.0045(-.0140, .0006) |
| EDU | PREG | CH | .0835* | .0012*(-.0080, .0040) |

Note: *p<0.05; IV: Independent variable; DV: Dependent variable; IE: Indirect effect; DE: Direct effect;

Meanwhile, pregnancy did not to be a significant mediator when predictors are romantic relationships and birth planning. Therefore, **H6** and **H9** are rejected. Sacchi et al. (2021) state that with care and support with people who are close, we are able to protect the pregnancy process. Bühler et al. (2021) state that romantic relationships between two parents affect a person's decision on how they are going to do certain things. Ulferts et al. (2020) state that a neglectful parenting style is harmful to a child's development. J,Zhang et al. (2022) show that a low amount of diet diversity and having multiple pregnancies will increase the chance of getting anaemia. If the mother has iron-deficient anemia, it will cause the toddler to prematurely during birth or low birth weight (Sundararajan & Rabe, 2020). However, in Table 6 it shows that pregnancy has no mediating effect between the romantic relationship and child health. Next, Mohaghegh et al. (2022a) discover that the birth plan can decrease the medical interventions which will lead to a better childbirth. Short birth intervals can lead to maternal depletion syndromes that will affect the health outcomes for mother and child (Chungkham et al., 2020). In contrast, in Table 6, the present study shows that pregnancy does not have a mediating effect on birth planning and Children's Health. This could be due to the variables that used in the study. The variable that represents 'Pregnancy' in this study is the willingness of women to get pregnant before and after their pregnancy, which it might be differ from other studies.

5.0 CONCLUSIONS

The results can be summarized that parent health is significantly affect children's health and pregnancy, while pregnancy and education are significantly affecting children's health, while romantic relationships and birth planning do not significantly affecting children health's and pregnancy, education also does not significantly affecting pregnancy. For the mediation analysis, pregnancy mediated the relationship between children's health, except romantic relationships and pregnancy. There are some limitations in this study. For example, the sample was only targeted on young adults in USA, which led to the result that is not accurate to apply to represent the population of other countries. Next, the variables in this study may not represent the actual term of the study intended to bring out or the different understanding of a variable like the variable 'Pregnancy' in this study is used to represent the women's desire to become pregnant before and after their pregnancy. Moreover, time management is also one of the limitations in this study as the time given to complete the research is only 11 weeks, which is not sufficient to deeply discover. Therefore, the finding might not be so complete and precise due to the short amount of time. In addition, the method used in this study for data collection is using ICPSR. The data set might be outdated and the questions in the questionnaire may not be enough to represent the variable. Further research can be done by adding more variables to measure the covariates so that the result can be more accurate. Then, using a different method of data collection can be also considered as it might produce a different result that can be generalized to other populations in other countries and ages. Lastly, extend this research by adding more covariates or mediator is welcomed as the policy makers can get more insight in the study.

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