‘Analyzing Factors that Influence Niger's Total Fertility Rate through Poisson Regression.’

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Abstract

Understanding and addressing the high Total Fertility Rate (TFR) in Niger is pivotal, given its global significance. To shed light on this issue, the study employs the Demographic Transition Theory and the Planned Behavior Theory, aiming to comprehend the evolving fertility patterns and the role of beliefs and norms in women's reproductive choices. The study's objective is to dissect how demographic, socio-economic factors, and attitudes, beliefs, and practices collectively contribute to Niger's high TFR.

Utilizing the 2012 Niger Demographic and Health Survey dataset, this study delves into the determinants of high TFR among women aged 15-49. Employing Poisson regression analysis with age groups as an offset, the study seeks to identify factors influencing Niger's TFR. Descriptive tables and Pearson's chi-squared tests facilitate the discussion of respondent characteristics and their association with TFR (p-value < 0.05).

Results spotlight socio-economic factors as pivotal contributors to high TFR. Notably, factors such as residential location, age at first cohabitation, attained education level, employment status, earnings types, child mortality rates (<1 and 1-5), and contraceptive usage exhibit statistically significant associations with the number of children ever born. However, child mortality rates (>5) and abortion lack significant statistical correlation with the TFR.

In conclusion, the study underscores the importance of strategic interventions. Recommendations include increased investments in education, integration of adolescent-friendly healthcare programs, women's empowerment initiatives, and enhanced male engagement in family planning and sexual and reproductive health programs. Tailoring family planning policies to cater to diverse age groups and geographical contexts is also advised. By addressing these multifaceted factors, policy makers and governments can contribute to a more sustainable demographic landscape in Niger.

Key words

Total fertility rate, Children ever born, Demographic transition, planned behavior, socio-economic, attitudes, beliefs and practices

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TFR	Total fertility rate
CEB	Children ever born
UNFPA	United Nations Population Fund
UN	United Nations
IUD	Intrauterine Device
WHO	World Health Organization
UBOS	Uganda Bureau of Statistics
DHS	Demographic health survey
SSA	Sub Saharan Africa

1.0 Introduction

The world's population is growing although the rates differ between high income and low-income countries. High income countries like the Netherlands, Japan, and Germany have increasingly older populations and if not for the migration of people from other countries, the population would decline. At the same time, countries like Niger, Uganda, and Mali have rapidly growing young populations, mainly because of high fertility rates (Mayaki and Kouabenan, 2015). The total fertility rate (TFR) is a crucial measure of fertility that reflects the average number of children a woman will give birth to over their lifetime. This rate is often collected from women aged 15-49, which is considered the reproductive age. Central Africa (5.59) is the region with the highest TFR followed by West Africa (5.38) then East Africa (4.74) and South Africa (3.18). Low-income Sub-Saharan African countries have been marked by a substantial Total Fertility Rate (TFR) of 5.45, underlining a significant demographic challenge. This is closely followed by low-middle-income Sub-Saharan African countries at 4.70, and finally, high-middle-income countries in the region at 3.80, as noted by Tesfa in 2023. Such disparity in TFR across income levels suggests a compelling association between economic conditions and population dynamics within Sub-Saharan Africa.

The contrast is stark when we consider that Sub-Saharan Africa as a whole exhibited an average of 5.1 births per woman between 2005 and 2010, a figure notably exceeding the replacement level of 2.1 children required to maintain a stable population. This dissonance between actual fertility rates and replacement levels underscores a complex reproductive landscape that warrants deeper exploration.

Interestingly, despite the manifestly high fertility rates characterizing the Sub-Saharan African region, studies highlight an intriguing narrative of stability and even decline in fertility trends. This shift has been attributed to the postponement of births and the elongation of birth intervals, as observed by Casterline and Agyei-Mensah in 2017. Such nuanced trends speak to evolving reproductive behaviors within the region, possibly influenced by factors like changing societal norms, increased access to family planning, and a broader recognition of the advantages of spacing births.

However, it's crucial to recognize the significant difference in fertility patterns across the Sub-Saharan African landscape. Notably, countries such as Nigeria, Benin, Burkina Faso, Mali, and Chad exhibit distinctive TFR averages of 5.2, 5.0, 4.8, 6.0, and 6.3 children, respectively (*World Bank Open Data*, 2021). This spectrum of fertility rates underscores the intricate interplay of factors that shape demographic outcomes, including cultural practices, economic conditions, and access to education and healthcare.

According to recent data from the World Bank (2023), on average, women in Niger in the age group 15-49 in 2020 had given birth to 6.9 children. Despite sharing similar cultural, religious, and societal norms with other African countries, Niger's TFR remains the highest in the West region of Africa. The population of Niger is expected to grow rapidly, from 23 million in 2019 to 30 million by 2030 and 70

million by 2050, with a growth rate of 3.8% which is the highest in the world (Razafimandimby & Swaroop, 2020). This growth is fuelled by the fact that almost half of the population is 15 or younger, meaning that more people are entering the reproductive period (Potts et al., 2011). However, the recent coup in Niger is having a significant impact on the country's population and economy. With people unable to work, healthcare is becoming unaffordable, leading to increased mortality rates. Additionally, access to reproductive health services has been severely disrupted, resulting in a rise in fertility rates. It is important to note that this study started before the coup and hence not much of its effects will be considered.

Furthermore in 2003, the African Union adopted the African Union Protocol on the Rights of Women in Africa, also known as the Maputo Protocol, with the aim of promoting and safeguarding women's rights in Africa. Niger demonstrated its commitment to this cause by signing and ratifying the protocol in 2004 and 2005, respectively, as reported by Ngozi, Iyioha and Durojaye in 2018. The Maputo Protocol covers a range of issues related to women's rights, including violence against women, discrimination, political participation, and health. It calls for the elimination of all forms of violence against women, including female genital mutilation and early marriage, and recognizes women's right to control their own bodies, including the right to access safe and legal abortion in certain circumstances (Geng, 2019). The protocol acknowledges the importance of women's political participation and calls for equal representation of women in elected and appointed positions. It also recognizes the right of women to participate in the economic, social, and cultural development of their countries (Abdulmelik and Belay, 2019). The protocol has been hailed as a significant milestone in the fight for women's rights in Africa, but its implementation has been uneven across the continent. In Niger, women continue to face significant challenges in accessing education, healthcare, and economic opportunities, and gender-based violence remains a pervasive issue. Despite these challenges, the ratification of the Maputo Protocol by Niger is a step towards achieving gender equality and empowering women in the country.

Despite ongoing efforts to reduce the total fertility rate (TFR) in Niger, the rate remains persistently high. Startling statistics reveal that 76% of women aged 20 to 24 in Niger enter their first marriage before the age of 18, and shockingly, one in four individuals in the country get married before the age of 15 (Save the Children UK, 2022). These figures emphasize the urgent necessity to comprehend the underlying reasons contributing to Niger's high TFR, particularly when considering that other African nations sharing similar cultural, religious, and societal norms have witnessed a lower TFR. The overarching objective is to gain a comprehensive understanding of the various factors that contribute to Niger’s high TFR and how these factors are interrelated. By examining demographic and socio-economic factors, as well as attitudes and beliefs, it becomes possible to explore their intricate interactions and their collective impact on the total fertility rate.

Moreover, child marriage and unmet need for contraception are interconnected issues affecting the reproductive health and rights of women and girls. These issues include limited autonomy and agency, early and unintended pregnancies, barriers to access, health risks, empowerment and education, and cycles of poverty. Addressing these issues requires comprehensive policies and programs, focusing on ending child marriage, promoting education, and increasing access to contraceptive methods and reproductive health services. Transforming social norms is essential, as efforts to reduce child marriage and promote contraception must challenge traditional gender roles and harmful practices that limit girls' autonomy and reproductive rights. Holistic approaches are needed to safeguard the reproductive rights, health, and well-being of girls and women.

With 76% of women being married by 18 years in 2019, 20.7% of women in Niger had an unmet need for contraception, which could be a factor contributing to the high TFR. Overall, the use of contraceptives is 18% with 14% in urban areas and 4% in rural areas (Mayaki and Kouabenan, 2015). Niger has been trying to address this issue by signing two international agreements, the 1989 United Nations Convention on the Rights of the Child (CRC) and the 1990 African Charter on the Rights and Wealth of the Child (ACRWC), which aim to protect child rights and end child marriages. However, the legal age for marriage in Niger is still relatively low, with boys being able to marry at 18 and girls at 15, with parental consent (Maswikwa et al., 2015).

1.1 Other objectives

- To how assess demographic factors are associated with the total fertility rate.
- To explore how socio-economic factors are associated with the total fertility rate.
- To determine how attitudes and practices associated with the total fertility rate.
- To investigate how the interrelationship of the factors influences total fertility rate.

1.2 Study area and target population

Niger is a landlocked country located in West Africa, with a population of approximately 24 million people. It is bordered by Nigeria, Libya, Chad, Mali, Algeria Benin and Burkina Faso (‘Niger’, 2023). The population is young, with 49.2% under the age of 15 (World Bank, 2021). The country is predominantly Muslim, with over 99% of the population following Islam (Mensch et al., 2016). In terms of ethnic composition, the two primary ethnic groups are the Hausa, who make up approximately 53% of the population, and the Zarma/Songhai, who make up approximately 21% (Institut National de la Statistique, 2013). Other ethnic groups include the Tuareg, Fulani, Kanuri, and Toubou, among others with Hausa as the most spoken language followed by Songhai. One-fifth of the population lives in towns while nomads and sedentary people live the rural areas.

Niger is one of the poorest countries in the world, with a Gross Domestic Product (GDP) per capita of $551 in 2020 (World Bank, 2021) and more than 60% of its population living below the poverty line (P. Nyoni & A. Chihoho, 2021).

Gender inequality is prevalent in Niger, with women having lower levels of education and lower socio-economic status than men. The Ministry of National Education is responsible for providing free education but very few children attend school. Niger has the lowest adult education in West Africa. Only 14% of women in Niger are considered literate, compared to 42% of men, and 64% of women have never been to school compared to 37% of men (Institut National de la Statistique, 2013).

The cultural context of Niger is strongly influenced by Islam, with traditional gender roles and norms prevalent in society. Family and community are highly valued, and extended families often live together in compounds (Izugbara & Wekesah, 2019). The practice of polygamy is also common, with up to one-third of married men having more than one wife. Having many children is seen as validation by society because there is a belief that every child is a blessing being well established (Mayaki and Kouabenan, 2015). Women in polygamous marriages are likely to desire more children and are less likely to use family planning. It has been found that women in West Africa may fall victim of this because of the competition between co wives for the husband's emotional fulfilment and access to resources (*Millogo & Greenbaum, 2022*).

2.0 Theoretical & Research Background

This chapter contains the theoretical framework (demographic transition model and planned behaviors theory), literature review of work by different authors that have been written about the relationship between demographic factors, socio-economic factors, attitudes, beliefs, practices, and total fertility rate. It also contains the conceptual framework and hypotheses.

2.1 Theoretical framework

The demographic transition theory proposes four stages of demographic change:

1. Stage 1: Pre-transition: In this stage, both birth rates and death rates are high, resulting in a slow population growth rate (Caldwell, 1976). This stage is characterized by low life expectancy due to poor healthcare, inadequate nutrition, and high infant mortality.
2. Stage 2: Early transition: In this stage, death rates begin to decline due to improvements in healthcare and sanitation, while birth rates remain high. This results in a rapid population growth rate. This stage is characterized by a decrease in infant mortality and an increase in life expectancy.
3. Stage 3: Late transition: In this stage, birth rates begin to decline due to increased access to education, employment opportunities, and healthcare, as well as changing attitudes and values about family size and childbearing. Death rates continue to decline, resulting in a slower population growth rate (Dai, 2016).
4. Stage 4: Post-transition: In this stage, both birth rates and death rates are low, resulting in a stable population growth rate. This stage is characterized by high life expectancy and a low infant mortality rate.

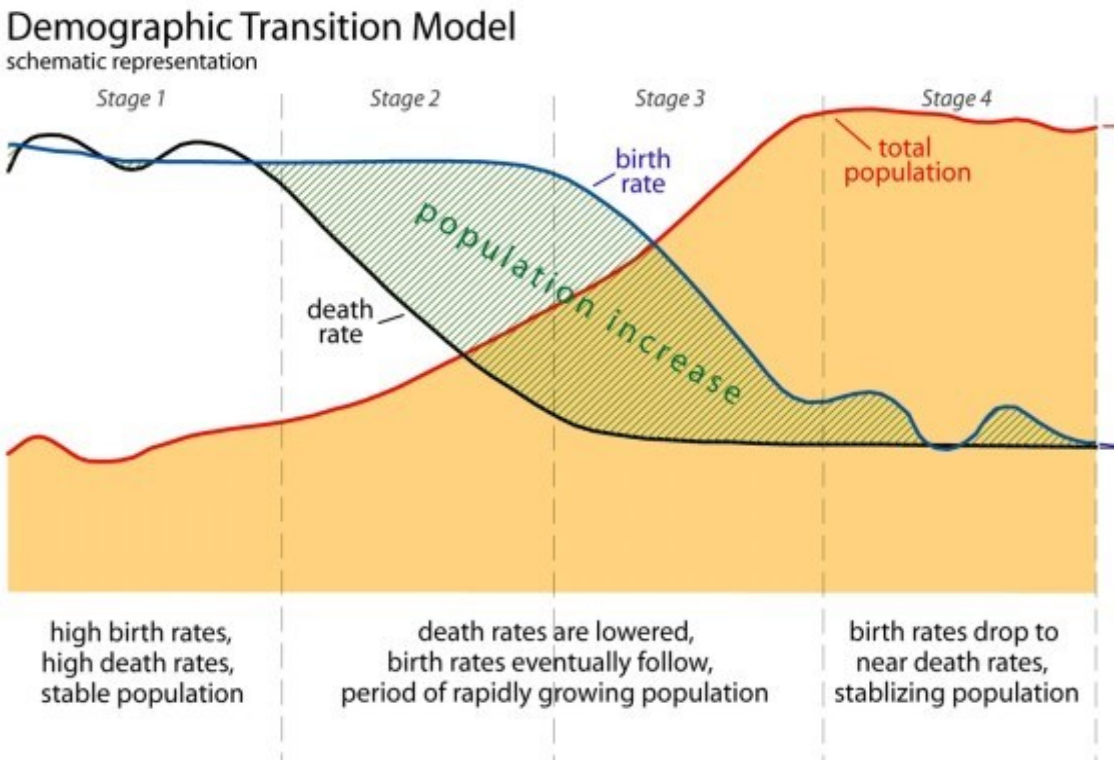

Figure 1: Demographic transition model;UNEP Grid-Sioux Falls

This research study adopts the theoretical framework of the demographic transition theory, which elucidates the dynamics of population growth rates as nations undergo economic and social development. According to this theory, as a country progresses economically and socially, a transition occurs from high to low fertility rates and from high to low mortality rates. This transformative shift can be attributed to modifications in socioeconomic and cultural factors that shape individuals' decisions regarding fertility and mortality (Kirk, 1996). Using the demographic transition theory enables the study to uncover how socio-economic, cultural and demographic factors drive the TFR in Niger.

Niger's positioning in the early stages of the demographic transition is unmistakable, primarily due to its persistently high fertility rates and relatively high child mortality rates. These factors align with the characteristic features of Stage 2 of the Demographic Transition Theory, where societies witness a decline in death rates due to advancements in healthcare and sanitation, leading to rapid population growth propelled by elevated birth rates. However, the nuances of demographic transitions should not be overlooked, as they often unfold as gradual processes with complexities and variations that extend beyond a nation's aggregate statistics. The assertion that Niger solely rests in a single demographic stage oversimplifies the intricate interplay of factors shaping population dynamics. Countries, including Niger, can harbor regional and socio-economic disparities that influence their demographic trajectories. Varied rates of urbanization, access to education, healthcare, and family planning, as well as cultural practices, can lead to distinct population patterns within a nation.

Furthermore, applying the Theory of Planned Behavior within the context of demographic transition could provide insights into the motivations and factors influencing fertility decisions across different stages of demographic change. Icek Ajzen established the Theory of Planned Behaviour (TPB). The planned behavior theory is a social psychology theory that explains how attitudes, subjective norms, and perceived behavioral control influence an individual's intention to perform a particular behavior (Ajzen, 2011). It has been widely used in various fields such as health promotion, environmental conservation, and consumer behavior. However, it has also been criticized by other researchers who suggest that behavior of a person is determined by unconscious mental processes and implicit attitudes (Sniehotta, Presseau and Araújo-Soares, 2014). Despite the criticism, the theory of planned behavior has been proven to be effective in predicting and influencing behavior change in many practical applications (Alhamad and Donyai, 2021). It provides a useful framework for understanding the factors that influence human behavior and can inform the development of effective interventions. According to the TPB, a person's desire to do a behaviour is the primary determinant of behaviour, and that intention is controlled by three factors:

Attitude towards the behaviour: A person's positive or negative judgement of the behaviour is referred to as their attitude towards the behaviour.

Subjective norms: This refers to the perceived social pressure to perform or refrain from doing a behaviour, which includes the impact of family, friends, and cultural values.

Perceived behavioural control: This relates to a person's perceived capacity to do a behaviour, which includes characteristics such as resource availability, knowledge, and abilities (Ajzen, 2002). Utilizing the theory of planned behaviour, this study delves into the impact of attitudes, beliefs and practices on TFR in Niger.

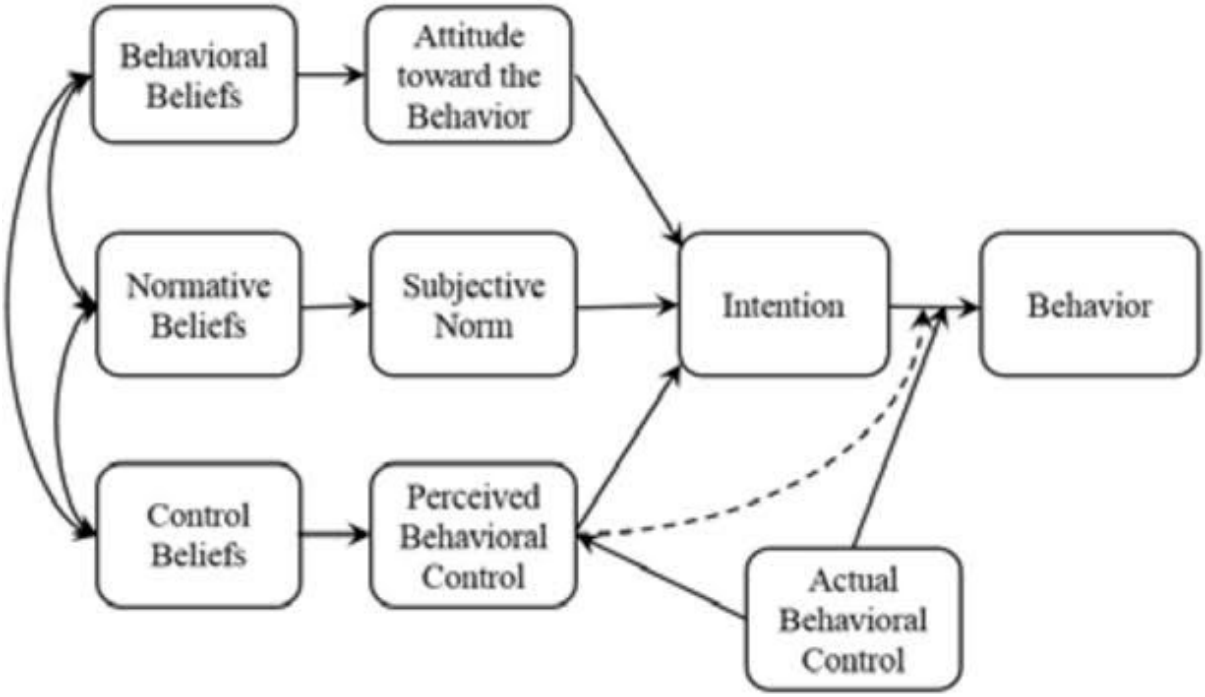

Figure 2: The theory of planned behavior by Ajzen 2015

2.2 Literature review

This contains literature review of work by different authors that have written about the relationship between demographic factors, socio-economic factors and attitudes, beliefs and practices and total fertility rate. However, it is important to note that many of the variables in this study are interrelated and this may come across in the literature, but each variable is analyzed individually.

2.2.1 Demographic factors

In the following section, I analyse the impact of the mother's age, mortality, and age at first cohabitation on fertility.

Marriage has historically been a prerequisite for starting a family and having children (Brown, 2010). However, contemporary society has seen a more varied relationship between marriage and first birth due to changing social norms, educational pursuits, career aspirations, and access to contraception. The age at first birth is closely related, with early marriage often occurring soon after marriage (Doss *et al.*, 2009). Family planning and reproductive health services have given individuals more control over the timing of their first birth. Economic stability and financial readiness can influence the timing of marriage and first birth. Personal choices about when to marry and when to have the first child are influenced by values, goals, preferences, and circumstances. The relationship between marriage and first birth varies widely across cultures, societies, and individual circumstances, and as societal norms and individual choices evolve, the relationship between marriage and childbearing will continue to diversify. Specifically in Niger, the median age for marriage among women is 15.5 years, while the

median age for first birth is 17.9 years. As a result, this child brides quickly become young mothers as evidenced with 186 births per 1000 adolescent aged 15-19 (Shakya *et al.*, 2020). This early age for marriage and childbirth leaves many years in the reproductive period, increasing the chances of a woman bearing many children (Potts et al., 2011). In African societies, women are expected to start bearing children a few months after marriage, leading to early childbirth and having many children by the time they are 49 years old (Maswikwa et al., 2015). The age at first marriage can be influenced by the socioeconomic position of individuals. People with low socioeconomic status are at a high risk of having a lower age at first marriage, which can be attributed to the economic benefits that come along with marriage, such as bride price (A. Kabir, 2001).

Women who get married at an early age are more likely to give birth to more children than those who marry later in life. Nahar et al. (2013) found that increasing the age at first marriage by one year postponed the age at first birth by 0.728 years. Previous research has shown that infant mortality rates tend to increase with birth order, with the exception of a decline observed between the first and second births. In Niger, specifically, the mortality rate for children under the age of 5 exhibited a downward trend from 226 to 128 deaths per 1000 live births between the periods of 1998 and 2009. A study conducted by Haines (1998) further identified a strong inverse relationship between infant mortality and birth interval, indicating that a smaller spacing between births was associated with a higher likelihood of infant mortality compared to longer birth intervals.

2.2.2 Socio economic factors

In the following section, I analyse how education, employment, income, location, and number of prior abortions impact fertility.

Internationally, programs have been put across to help with the empowerment of women for example Convention of the Elimination of All forms of Discrimination against Women (CEDAW) which came in force in 1981. Empowerment of women is aimed at equality of women in aspects of politics, education, employment among others (actionaid 2000). Women organizations are mainly forced on income generating activities with mayor emphasis on agricultural projects and handcrafts and this is because not much capital is needed to start these business and hence it can include most of the women (Nabacwa 1997, United Nations Systems in Uganda 2000), (Nabacwa, 2001). "Investing in women's capabilities and empowering them to economic growth and over all development (United Nations, 1995). “Women’s wage employment is negatively correlated with total fertility rates and unmet need for family planning and positively correlated with modern contraceptive use in every major world region. Nonetheless, evidence suggests that these findings hold for non-agricultural employment only.”(Behrman and Gonalons-Pons, 2020).

Furthermore, the impact of female education on fertility has been a subject of study for many years. While education does not affect fertility directly, it affects the age at first marriage and first birth. The

longer a girl stays in school the long it takes for her to start cohabiting (Thornton, Axinn and Teachman, 1995). Most girls are unable to continue with school after they start cohabiting because the decision is no longer their alone, but it is also for the partners. After the start of cohabiting, women take on responsibilities of taking care of the house and giving birth to children (bearing and rearing) which is more of what the society believes that women were created to do (Ganle *et al.*, 2015). According to Becker and Barro (1988), Willis (1973), and Livi-Baci (1997), female education lowers fertility through an increase in the opportunity cost of women's time. Women with primary education tend to have 0-30% fewer children than women with no education. Women with secondary education tend to have 10-50% fewer children than women with primary education (World of Labour, 2022). In Uganda, women with no education have 2.8 more children than women with more than secondary education (6.4 versus 3.6) (Uganda DHS, 2016). A higher or longer stay in the education system reduces the possibility of a girl getting pregnant. Education changes childbearing decisions. More and longer education can bring about the empowerment of women, later marriage, later onset of childbearing, smaller family size, and hence a lower number of children ever born (Götmark and Andersson, 2020).

Subsequently, it has been observed that women who are employed tend to have higher wages and income, leading to better access to contraceptives and reduced fertility rates. However, a surprising finding from the Uganda DHS reports in 2006 and 2016 revealed that currently employed rural women had a 15% higher fertility rate compared to non-working rural women. Interestingly, the fertility rate of the first and middle class decreases faster than that of the poor (Dribe, Hacker & Scalone, 2015). This is because when income per capita increases, people tend to prioritize having fewer children but with better quality of life, which can be achieved through education and good health (Götmark and Andersson, 2020).

Furthermore, high fertility affects women's labor participation negatively in that those women who have just given birth need time to attend to their babies and hence women that want to stay employed and earn income prefer a smaller number of children than those that are not employed (Bernhardt, 1993). However, this effect on the women's labor participation tends to change as the children grow older because they need less attention from their mothers compared to when they were younger (Bernhardt, 1993). Furthermore, with the introduction of childcare enrollment and childcare services there maybe increase in fertility because women are able to give birth and also work and the reason being that someone will be taking care of the child as the mother is working and hence introducing a positive relationship between childcare enrollment and fertility. This also reduces the labor force exit among women with young children (Hilgeman and Butts, 2009).

Geographic location is also a factor that affects fertility. According to Kulu, Vikat, and Andersson (2007), variations in fertility may have decreased over time in urban-rural areas, but significant differences between variation types of settlement persist (Kulu, Boyle, and Andersson, 2009). For

instance, fertility levels are relatively low in large cities and relatively high in rural areas and small towns in the U.S (Glusker et al., 2000). According to the 2016 demographic survey of Uganda, there is a difference in fertility rates between women in rural and urban areas. The Karamoja region has the highest rates, while the lowest rates were found in Kampala. This is notable as Uganda and Niger share similar contexts being in Sub-Saharan Africa.

There is a negative relationship between abortion and fertility whereby the more abortions a woman carries out the less children she has. Abortions can sometimes lead to complications in the woman's reproductive system, for example when carrying out a medical abortion and the uterus is damaged which may affect the woman's ability to conceive in the future. Women are also advised to avoid sexual intercourses for some time after abortion which decreases their chances of getting pregnant (*Rachel Nall*, 2020). The Guttmacher institute states that between the year 2015 and 2019 there were 121 million unintended pregnancies around the world. 61% of those pregnancies ended up in abortions. However, there are safe abortions (Safe abortions are those conducted under medical supervision in a controlled and hygienic environment by trained healthcare professionals) and unsafe abortions (Unsafe abortions occur when individuals resort to methods that are not medically approved or conducted by untrained individuals, often in environments lacking appropriate medical facilities and hygiene standards) and in 2021, WHO stated that 45% of abortions are unsafe in the world , and these usually end up in complications that may later bring about infertility. Safe abortions may or may not lead to infertility. In America it is said that 0.23% of safe abortions end up in complications and this gives women more confidence in performing abortions (Broster, no date).

2.2.3 Attitudes, beliefs, and practices

In the following section, the focus is on exploring the impact of attitudes, beliefs, and practices regarding contraceptive use, abortions, and religion on fertility.

Traditional cultural beliefs and values are still dominant in Niger, and this has significant implications for fertility. Many women were found to believe that bearing children is their primary role in life, and they may face social and cultural pressure to have large families. This belief is reinforced by cultural norms that emphasize the importance of children in providing security for the elderly and ensuring a family's continuity (Barden-O'Fallon et al., 2021).

The introduction of family planning was in the early years but between the years 1991 and 2004, the contraceptive usage rate was only 0.6% in Niger (Potts *et al.*, 2011). This means that not many people in the country use family planning or contraceptives. In 2002, contraceptives were made free for the whole country and national televisions and radio stations advertised them but surprising, in 2009 only 11% of married women were using contraceptives and 5% of the 11% were on modern contraception of IUDs and oral contraceptives (pills). The population will continue growing unless the number of modern contraceptive users increases by more than 10 times for there to be 55% usage by 2025 (Potts

et al., 2011). Despite the high fertility rate in Niger, the use of family planning methods remains low. According to the Niger Demographic and Health Survey (DHS) of 2012, only 13.5% of women use any modern contraceptive method. The same survey also found that the main reasons for not using family planning methods were fear of side effects, opposition from partners or family members, and religious beliefs.

A more recent study, which was published in French, surveyed women aged 15-49 and found that religious women in Niger tended to rely on male religious leaders or their husbands to form their attitudes about birth control (Fleming *et al.*, 2019). In addition, religious beliefs also play a significant role in shaping attitudes towards fertility in Niger. Islam is the dominant religion in the country, and as such, Islamic teachings on reproduction and family planning have influenced reproductive behaviors. However, having many wives does not affect fertility because TFR focuses on women and not men. For instance, a study in Nigeria, in 2008, the percentage of Muslims and followers of traditional religion who had knowledge of and used contraceptives was less than half of that of Catholics and other Christians. Specifically, 5.6% of Muslims reported using contraceptives compared to 19% of Catholics. Traditional methods of contraception were found to be the most commonly used across all religious groups surveyed over the years (Gotmark & Turner, 2022). Additionally, religion is associated with marriage and coital frequency. Coital frequency is high among the married (Rao and Demaris, 1995). When the number of married people is high, it means that fertility is going to be high (Ahinkorah *et al.*, 2021).

Moreover, studies have shown that postpartum abstinence is widely practiced in Niger (ranging from 40 days up to three months), with a prevalence ranging from 80% to 99% (Barden-O'Fallon et al., 2014; Lawan et al., 2015). The practice is deeply rooted in cultural and religious beliefs, with many people believing that having sex during this period can harm the mother and child's health and bring bad luck to the family (Haws et al., 2013; Kaler, 2001). Additionally, women who do not adhere to postpartum abstinence may be stigmatized and ostracized from their communities (Barden-O'Fallon et al., 2014). Despite the widespread practice of postpartum abstinence, it has been observed that certain women disregard the recommended six-week period of abstaining from sexual activity following childbirth, which significantly lowers the possibility of becoming pregnant. This phenomenon has been noticed in Zinder, Niger, where a mere 56% of women reported following the abstinence period after giving birth (Barden-O'Fallon et al., 2014).

Some researchers have suggested that postpartum abstinence may have negative implications for women's reproductive health. A study conducted in Ghana found that women who practiced postpartum abstinence had a higher risk of experiencing secondary infertility compared to women who did not practice postpartum abstinence (Kumi-Kyereme et al., 2012). However, it is important to note that the

study did not examine the specific cultural and religious beliefs surrounding postpartum abstinence in Ghana, and it is possible that the findings may not be generalizable to Niger.

However, limited research has been conducted in Niger on the interplay between gender norms and family planning, with only a few studies touching on this topic. Gender norms can influence women's ability to access reproductive health services, including family planning and maternal care. Societies that restrict women's mobility or decision-making power might limit their access to contraception and maternal healthcare, leading to higher fertility rates. One study analyzed data from the 2006 Niger DHS women's survey and focused on sexually active women who were breastfeeding and using some form of modern or traditional contraception. It found that 52% of women relied on lactational amenorrhea as their primary contraceptive method and were less likely to discuss family planning with their partners. Another study surveyed 200 adult women in Niger and discovered that subjective norms relating to contraceptive use were significantly linked to its use among women with no formal education but did not collect data from men (Fleming *et al.*, 2019).

Results have also shown that subjective norms have a significant impact on the timing of fertility intentions for both childless individuals and parents. However, it is noteworthy that this study was in Norway a country with different context from Niger. In this study, individuals who feel supported by their families and friends showed that they are more likely to want a child now rather than later. Positive attitudes also play a significant role for parents in intending to have a child now. Perceived behavioral control is a determining factor for both groups, as individuals who believe they can cope well with having a child are more likely to want one now (Dommermuth, Klobas and Lappegård, 2011).

Moreover, a study conducted in the Democratic Republic of the Congo (DRC) using the planned behavior theory found a positive association between education, perceived control, intention to use family planning (FP), and actual use of FP. However, subjective norms were negatively associated with the intention to use FP (Bapolisi, Bisimwa and Merten, 2023). Furthermore, in Uganda, 57% of women expressed high intentions to use contraception based on the theory of planned behaviour. Attitudes towards contraceptive use were mostly positive, as the majority of women (63.5%) scored high on the attitude scale. Perceived behavioral control, which refers to the perception of being able to use contraception effectively, was also high, with 41.3% reporting maximum perceived control. Subjective norms, which reflect the perception of social support for contraceptive use, were fairly supportive. However, despite positive attitudes, high intentions, and perceived behavioral control, the actual contraceptive use rate was low, with only 26.2% of women reporting current or past use of effective contraception (Kiene *et al.*, 2014). Uganda being in almost the same context as Niger this emphasizes the importance of addressing attitudes, beliefs and practices surrounding fertility in order to promote safe and healthy family planning.

2.3 Conceptual model

The conceptual model for the study on the determinants of the high TFR in Niger provided a framework for examining the complex relationships between various factors that contribute to high fertility rates in the country. It guided the selection of variables to be included in the analysis and helped identify potential policy interventions to address the high TFR.

I used the theory of planned behaviour to construct the relationship between the background factors, beliefs and the final behaviour.

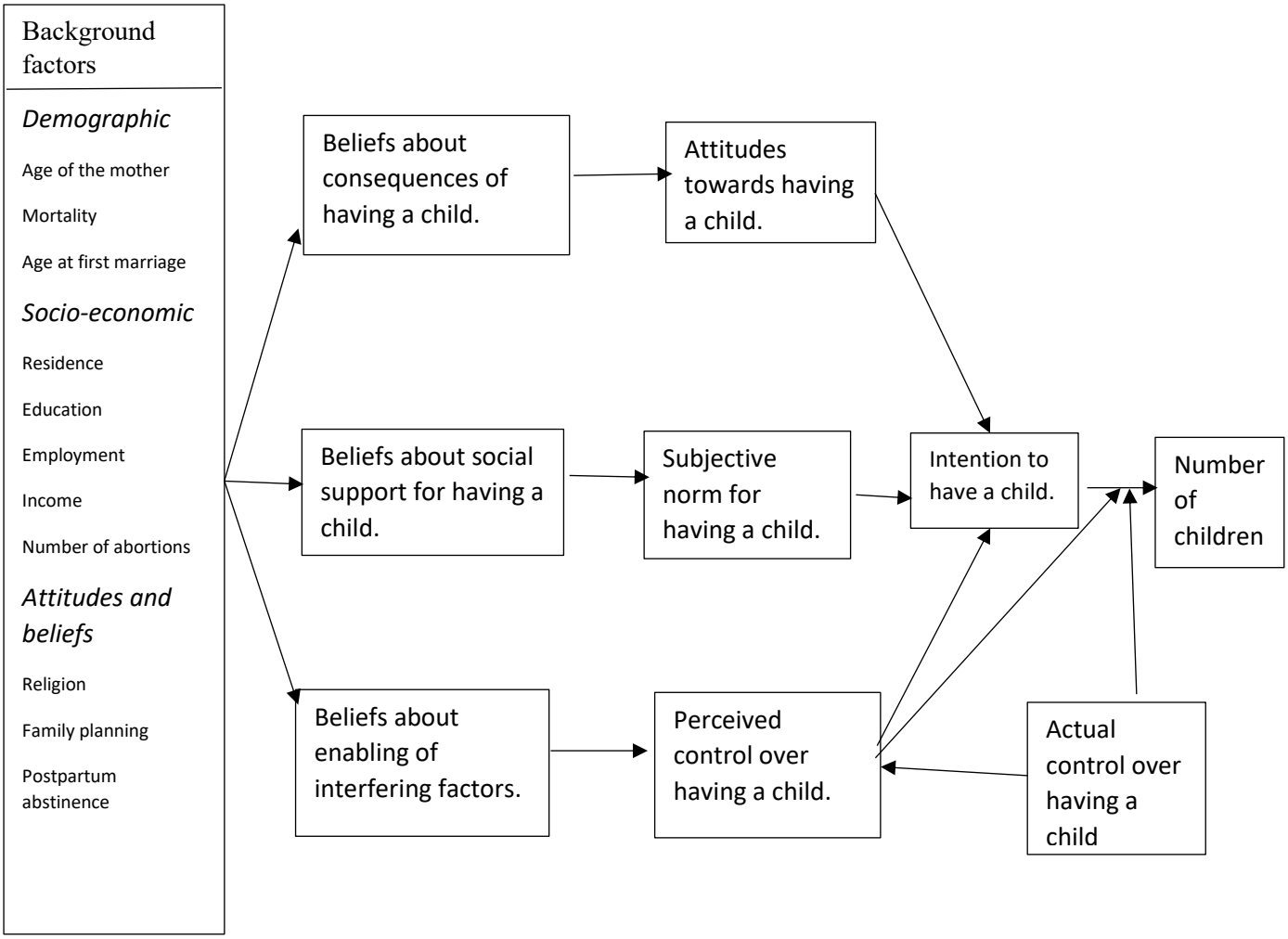

Figure 3: Conceptual model

2.4 Hypothesis

For demographic factors

- Women who get married at an early age are likely to have more children than those that get married at a later age.
- Women that have had children die as infant are likely to have more children than those that have not.

For socio-economic factors

- Women who reside in rural areas are likely to have more children than their counterparts in urban areas.
- The highly educated are likely to have fewer children than the lower educated.
- Employed women are likely to have fewer children than unemployed women.
- Women with relatively high income are likely to have less children than those with relatively low income.
- Women who have never had any abortions are more likely to have more children than those that have had abortions.
- The rich are more likely to afford contraceptives and fewer children as compared to their counterparts the poor.

For attitudes and beliefs

- Women who use modern and traditional contraceptives are likely to have less children than their counterparts that don't use contraceptives.
- Women that follow a longer postpartum abstinence period are likely to have fewer children than those that follow a shorter postpartum abstinence period.

3.0 Methodology

This chapter covers the methodology that was used in the study. It includes the data source, ethical considerations, study variables and data analysis.

3.1 Source of data

The study used the Niger Demographic health survey dataset 2012. The main purpose of the DHS is to provide the data needed for analysing the population, health, and nutrition programs regularly. The DHS covers household and respondent characteristics, fertility and family planning, infant and child health and mortality, maternal health and maternal and adult mortality, child and adult nutrition, malaria, HIV/AIDS, disability, road traffic accidents, child discipline, early childhood development, and domestic violence.

The target population for this study was women of reproductive age (15-49 years old) who are residents of Niger. This population was particularly relevant as they are the group most likely to be affected by the factors that contribute to the high TFR in Niger. The sample was selected using a stratified two-stage cluster technique to ensure that the selected population is representative of the entire population of women of reproductive age in Niger. The first stage of the sampling process involved identifying Enumeration Areas (EAs), which are typically drawn from census records. In the second stage, a representative sample of households was selected from an updated list of households within each identified EA.

3.2 Ethical consideration

Before using the dataset from DHS, I obtained consent from the DHS program website https://dhsprogram.com/data/available-datasets.cfm to use DHS datasets. This involved explaining the purpose of the research, the procedures involved, and any potential risks or benefits. The datasets that were used in this study are available in the public domain upon registration and approval. There was secure methods of data storage and transmission to prevent unauthorized access or disclosure.

3.3 Outcome and variables

The outcome of the study investigating the determinants of the high Total Fertility Rate (TFR) in Niger was to identify the various factors that contribute to the high fertility rate in the country. The study aims to provide insights into the reasons why Niger has one of the highest TFRs in the world and to determine what policies and interventions could be put in place to reduce the rate.

Variables of interest:

Dependent variable: The dependent variable in this study is total fertility rate. This variable is a count variable. It was measured by observing the children ever born to women aged 15-49 at the time of the survey.

Demographic factors: These variables represent the demographic characteristics of the population in Niger. The analysis was done on data of mortality, respondent's current age and age at first cohabitation.

- For mortality, women were asked if they had lost any child and how old the child was when they died? The age of death was denoted in days if the child died in less than one month and months if the child died in less than 2 years or years. These were grouped into four categories i.e. child alive (never lost a child), lost a child below one year, lost a child between 1 and 5 years old and those who lost a child older than 5 years.
- For the current age, the respondents were asked how old they were at their last birthday and the ages were grouped in five-year age groups making it 7 categories.
- For age at first cohabitation, respondents were asked how old they were when they first started living with a man? It was given in single years and during this study it was grouped into 3 categories i.e. 9-14, 15-21 and >22.

Socio economic factors: These variables represent the economic status of women and households in Niger. The analysis was done on data of type of place of residence, highest level of education attained, respondent is currently working, type of earnings for respondent and if the respondent has ever had a terminated pregnancy.

- For type of place of residence, the respondents were asked where they live and according to the name of the place given, they were coded in binary as rural (1) or urban (0).
- For education, the respondents were asked what was the highest-level of school they attended and the answers were coded into three categories ie primary, secondary and higher.
- For currently working, respondents were if they had done any work in the last 12 months and the answers were coded as (1) yes or no (0).
- For type of earning, respondents were asked if they are paid in cash or kind for the work or are not paid at all? There were four categories to this question ie cash only, cash and in kind, in kind only and not paid.
- For ever terminated a pregnancy, respondents were asked if they have ever had any miscarriages, abortions, or stillbirths? The answers were coded in binary ie yes (1) or no (0).

Attitudes and beliefs: These variables represent the social and cultural norms, beliefs, and attitudes that influence fertility behaviour in Niger. The analysis was done on data of postpartum, and contraceptive use and intention.

- For contraception use and intention, respondents were asked if they are currently doing or using any method to delay or avoid getting pregnant? They were furthermore asked which method they were using? The answers they gave were categorised into using modern method, using traditional method, does not use intends to use later and does not intend to use.

- For postpartum, the respondents were asked if the reason for not using contraception was because of postpartum abstinence? The answers were coded in binary as yes (1) and no (0).

3.4 Data analysis

The study used quantitative methods to analyze data from surveys and other sources, such as demographic health surveys on fertility rates and demographic factors. The study conducted descriptive statistics to examine the frequency and distribution of demographic, attitudes and beliefs and socioeconomic factors.

In this study, Poisson regression was the chosen analysis method. Poisson regression is highly recommended for non-negative integer outcomes that follow a Poisson distribution. It is the perfect choice for modeling count data that occur within a set unit of time or space, such as total fertility rate. When dealing with count variables, it is common to observe an inconsistent variance in the results. This means that certain values of X and Y may yield a larger range of outcomes, while others may have smaller ones. Additionally, the dependent variable's distribution may not be normal and could have low values, but it will not have negative ones. To linearize this non-normal distribution, Poisson regression can be utilized.

Before conducting the Poisson regression analysis, I performed initial data exploration, including examining the distribution of variables, detecting outliers, and addressing missing data. Furthermore, I evaluated the presence of excessive zeros, which could indicate potential issues such as underreporting.

To estimate the Poisson regression model, I employed maximum likelihood estimation (MLE) to obtain the coefficient estimates and assess their statistical significance. The model specification was as follows:

$$\log(TFR) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_p X_p + \log(\text{offset}),$$

where log(TFR) represents the natural logarithm of the TFR, and β_0, β_1, β_2, ..., β_p denote the coefficients associated with the independent variables X_1, X_2, ..., X_p, respectively. The log(offset) term was incorporated to control for the variation in exposure time across different age groups.

Following the estimation of the model, I assessed the goodness-of-fit of the model using appropriate measures. Additionally, I calculated the log-likelihood and compared it to a null model to determine the overall significance of the model.

To interpret the results, I analyzed the signs and magnitudes of the coefficients. A positive coefficient indicated a positive relationship between the independent variable and the TFR, while a negative coefficient suggested a negative relationship. The statistical significance of the coefficients, as indicated by p-values and confidence intervals, allowed me to determine the strength of the relationships.

I also conducted sensitivity analyses to examine the robustness of the findings, including testing alternative model specifications, considering interaction terms, or controlling for additional relevant variables.

4.0 Results

This chapter presents the results obtained from the STATA analysis. It includes the interpretation of the tables, with a focus on the noteworthy findings. Specifically, Table 4.2 features the key results that were selected for interpretation, ensuring that there is no unnecessary repetition of information already present in the table.

4.1 Descriptive statistics

The data consisted of 43,690 respondents i.e., women in the reproductive age from Niger.

Table 4.1: Respondent characteristics

VARIABLE	FREQUENCY	PERCENTAGE
Children Ever Born		
1	1,131	2.59
2	2,512	5.75
3	3,549	8.12
4	4,436	10.15
5	5,155	11.80
6	5,580	12.77
7	5,523	12.64
8	4,808	11.00
9	4,050	9.27
10	2,790	6.39
11	2,002	4.58
12	1,536	3.52
13	299	0.68
14	182	0.42
15	105	0.24
16	32	0.07
Agegroup		
15-19	715	1.64
20-24	3,573	8.18
25-29	8,007	18.33
30-34	9,299	21.28
35-39	9,005	20.61
40-44	7,132	16.32
45-49	5,959	13.64

Residence		
Urban	9,697	22.20
Rural	33,993	77.80
Childmort1		
Child alive	35,775	81.88
<1	4,265	9.76
1-5	2,848	6.52
>5	802	1.84
Ageatcohab (age at first cohabitation)		
9-14	14,239	32.59
15-21	27,843	63.73
>22	1,555	3.56
.	53	0.12
Education		
No education	37,604	86.07
Primary	4,121	9.43
Secondary	1,791	4.10
Higher	174	0.40
Working		
No	30,077	68.84
Yes	13,613	31.16
Earnings		
Not paid	665	1.52
Cash only	13,384	30.63
Cash and in kind	1,451	3.32
In kind only	278	0.64
.	27,912	63.89
Aborted		
No	35,161	80.48
Yes	8,529	19.52
Contraception		
Using modern method	5,885	13.47
Using traditional method	764	1.75
Non-user- intends to use later	13,403	30.68

Does not intend to use	23,638	54.10
Postpartum		
No	12,540	28.70
Yes	3,721	8.52
.	27,429	62.78
TOTAL	43,690	100

Table 4.1 summarises each of the factors used in this investigation. In terms of fertility, little more than 12% of respondents had 6 children. More women in the 30-34 and 35-39 age groups have been captured in the dataset. The vast majority of responders (77.80%) lived in rural areas. Many of those interviewed had never experienced the loss of a child. Between the ages of 15 and 21, about 64% of the women began cohabiting. A large percentage of the respondents (86.07%) had no formal education. With more than half of respondents not working (68.84%), the majority of respondents (63.89%) reported a missing value for earnings information. Many of the respondents had never had a pregnancy terminated. Surprisingly, 54.10% of respondents stated that they had no intention of using contraception. Furthermore, when asked regarding postpartum, the majority of responders (62.78%) reported missing values.

Table 4.2 shows the results that were obtained from STATA using Poisson regression indicating the relationship between children ever born and respondents' characteristics. In the table one can see that age group was used as an offset while running the analysis for it to balance off the differences between the different age groups. This is because children ever born is usually calculated for women that are at the end or have finished their reproductive period. Hence forth, women in the older age groups are more likely to have more children ever born. Also postpartum was dropped in the analysis because it had severe multicollinearity with contraception.

The interaction variable between higher education and the category 9-14 (ageatcohab) had the coefficient "0" which in this case meant that there were no observations for this interaction in the sample. And for the interaction between higher education and ageatcohab(>22) was omitted from the analysis because of collinearity.

The difference in observation count between the regression and the total sample in the respondents' characteristics table is due to the presence of missing values. Stata, in its automated process, excludes these missing values, leading to the discrepancy.

4.2 Poisson regression

Table 4.2: Poisson regression results

Number of obs=15,743 LR chi2(50)=22404.59		

Prob> chi2=0.0000 Pseudo R2=0.1213 Log likelihood=-81127.861		
Variable	**Coefficient**	**P> |z|**
Residence (reference: Urban)		
Rural	0.35	0.00
Childmort1 (reference: child alive)		
<1	0.18	0.00
1-5	0.07	0.05
>5	-0.06	0.38
Ageatcohab (reference: 9-14)		
15-21	-0.16	0.00
>22	-0.95	0.00
Education (reference: No education)		
Primary	-0.18	0.00
Secondary	-0.62	0.00
Higher	1.79	0.00
Working (reference: No)		
Yes	-0.11	0.00
Earnings (reference: Not paid)		
Cash only	-0.24	0.00
Cash and in-kind	-0.09	0.00
In-kind only	-0.08	0.01
Aborted (reference: No)		
Yes	-0.01	0.51
Contraception (reference: using modern method)		
Using traditional method	0.17	0.01
Non-user intends to use later	-0.22	0.00
Does not intend to use	-1.07	0.00

The model's pseudo R-squared value is 0.1213, indicating that approximately 12.13% of the variance in the risk for childbearing can be explained by the independent variables included in the analysis.

Demographic factors

Both infant and child mortality have a positive effect on CEB. As the number of infant and child mortality increases, the risk of having more children increases (P<0.05). However, losing a child older than 5 has a negative relationship with CEB. Individuals with child mortality greater than 5 compared to those who have never lost a child is -0.06. The relationship is not statistically significant (p > 0.05). There is no significant difference in the number of children ever born for individuals who have lose children aged >5.

Socio-economic factors

Compared to individuals with no formal education, those with primary education have a negative expected log count of -0.18, suggesting that higher levels of education are associated with a lower CEB. Similarly, individuals with secondary education (-0.62) also exhibit negative expected log count. Surprisingly, the log count of CEB for individuals with higher education compared to those with no education is 1.79. It is statistically significant (p<0.05). individuals with higher education tend to have a significantly higher risk of having a greater number of children ever born.

Attitudes, beliefs and practices

The log count of CEB for individuals using traditional contraceptive method compared to using modern contraceptive method is 0.17 (p<0.05) hence individuals using traditional contraception tend to have a higher number of children ever born. Compared to women using modern contraception, the log counts for those who are non-users but intend to use later and those that don't intend to use later are -0.22 (p<0.05) and -1.07 (p<0.05) respectively and hence have a significantly lower number of children ever born.

Table 4.3: Poisson regression analysis including the interaction variables.

Variable	**Coefficient**	**P> |z|**
Education#contraception (reference: noeducation#using modern method)		
Primary#usingtraditional method	-0.43	0.00
Primary#non user intends to use later	0.25	0.00

Primary#does not intend to use	-0.04	0.13
Secondary#using traditional method	-1.16	0.00
Secondary#non user intends to use later	-0.11	0.01
Secondary#does not intend to use	-0.34	0.00
Higher#usingtraditional method	-0.70	0.00
Higher#non user intends to use later	1.03	0.00
Higher#does not intend to use	-0.07	0.49
Childmort1#contraception (reference: child alive#using modern method)		
<1# using traditional method	-0.25	0.00
<1# non-user intends to use later	-0.16	0.00
<1#does not intend to use	-0.25	0.00
1-5#using traditional method	-0.02	0.81
1-5# non-user intends to use later	-0.25	0.00
1-5#does not intend to use	-0.21	0.00
>5#using traditional method	-0.18	0.29
>5# non-user intends to use later	-0.12	0.11
>5#does not intend to use	-0.14	0.03
Residence#working (reference: urban#no)		
Rural#yes	-0.13	0.00
Education#working (reference: noeducation#no)		
Primary#yes	0.01	0.68
Secondary#yes	0.65	0.00
Higher#yes	-2.03	0.00

Education#ageatcohab (reference: noeducation#9-14)		
Primary#15-21	0.18	0.00
Primary#>22	0.94	0.00
Secondary#15-21	0.12	0.03
Secondary#>22	0.49	0.00
Higher#15-21	-0.36	0.00
Working#contraception (reference: no#using modern method)		
Yes#using traditional method	0.70	0.00
Yes# non-user intends to use later	0.07	0.02
Yes#does not intend to use	0.31	0.00
Contraception#aborted (reference: using modern method#no)		
Using traditional method#yes	-0.98	0.00
Non-user intends to use later#yes	-0.13	0.00
Does not intend to use#yes	-0.20	0.00
_cons	-2.90	0.00
agegroup	1	(offset)

All the associations between child mortality and contraception have a negative effect on children ever born and hence there is a decrease in CEB by approximately 0.02 children (<1# using traditional method), 0.16 children (<1 #nonuser intends to use later), 0.25 children (<1# does not intend to use), 0.02 children (1-5 #using traditional method), 0.25 children (1-5 #non user intends to use later), 0.21 children (1-5 #does not intend to use), 0.18 children (>5 #using traditional method), 0.12 children (>5 #non user intends to use later) and 0.14 children (>5 #does not intend to use) as compared to having children alive and using modern contraception. Most of the associations are statistically significant at 95% CI however, 1-5# using traditional method, >5 #using traditional method and >5# nonuser intends to use later are not statistically significant.

The impact of various factors on the number of children ever born (CEB) is explored, highlighting interactions with education and contraception usage. Notably, using traditional contraception methods, in contrast to modern ones, alongside having primary education instead of no education, is associated with a reduction of about 0.40 children in CEB, with strong statistical significance at the 95% confidence interval. Similarly, among non-users with intentions to use contraception later, compared to modern contraception users, and with primary education compared to no education, there's an increase of around 0.25 children in CEB, also statistically significant at the 95% confidence interval. While there's a slight decrease in CEB associated with a lack of contraception intention and primary education compared to using modern contraception, the statistical significance is not strong ($p = 0.13$). In contrast, using traditional contraception alongside secondary education shows a significant decrease in CEB. Non-users intending to use contraception later with secondary education also experience a notable reduction in CEB ($p < 0.05$). Moreover, a significant decrease in CEB is observed for women not intending to use contraception with secondary education ($p = 0.00$). Higher education shows a strong correlation with reduced CEB for both traditional and later-intended contraception users ($p < 0.05$). On the other hand, while the decrease in CEB is modest for highly educated women not intending to use contraception, the statistical significance is weak ($p = 0.49$).

The negative coefficient (-0.13) suggests that the interaction between residence (rural) as compared to urban and working (yes) as compared to not working, there is an associated decrease in the expected count of children ever born. The low pvalue (0.00) indicates that the interaction is statistically significant.

Working and having a primary or secondary education is associated with an increase in CEB by approximately 0.01 and 0.65 children compared to not working and having no education. However, working and having a primary education is not statistically significant ($p<0.05$) and working and having a secondary education is statistically significant ($p<0.05$). Furthermore, working and having higher education is associated with a decrease in CEB by approximately 2.03 children as compared to not working and having no education and is statistically significant ($p<0.05$).

Women having primary education and had started cohabiting at ages 15-21 or >22 are associated with an increase in CEB by approximately 0.18 ($p<0.05$) and 0.94 ($p<0.05$) children respectively as compared to having no education and women who had started cohabiting at 9-14 years. Women with secondary education and had started cohabiting at ages 15-21 or >22 are associated with an increase in CEB by approximately 0.12 and 0.49 children respectively as compared to those with no education and had started cohabiting at ages 9-14. These associations are statistically significant ($p<0.05$). However, having higher education as compared to no education and starting to cohabit at ages 15-21 as compared to 9-14 is associated with a decrease in CEB by approximately 0.36 children. It is statistically significant ($p<0.05$).

All the associations between working and contraception have a positive effect on children ever born and hence there is an increase in CEB by approximately 0.70 children (working #using traditional method), 0.07 children (working #nonuser intends to use later) and 0.31 children (working# does not intend to use) as compared to not working and using modern contraception. The associations are statistically significant at 95% CI.

Having aborted before as compared to having not aborted before and using traditional method of contraception, being a non-user who intends to use later and having no intention of using contraception as compared to using modern contraception is associated with a decrease in CEB by approximately 0.98 children, 0.13 children and 0.20 children respectively. The associations are statistically significant at 95% CI.

5.0 Discussion and conclusion

This chapter presents the discussion of the results based on the hypthoses presented in chapter two, conclusions based on the study results, recommendations, and areas for future research most especially to policymakers.

5.1 Summary

The study's primary objective was investigating the factors that contribute to Niger's high TFR. The research question at hand was: "What factors influence Niger's high TFR, and how do they relate to one another?" To answer this question, the study explored three distinct dimensions: demographic, socio-economic, and attitudes, beliefs, and practices. By implementing a Poisson regression model, the study aims to provide a comprehensive answer to the research question. The purpose of this research was to enhance the knowledge on fertility by exploring the interrelatedness among the three dimensions, which has been somewhat restricted in previous studies. The study has proven that socioeconomic factors have a stronger association with fertility than others. The sample in the study also showed that most of the respondents had 6-7 children, were aged 30-34 years, lived in rural areas, had not lost a child, started cohabiting between 15-21 years old, had no education, were not working, were paid in cash only, had not terminated a pregnancy before, did not intend to use contraception and were not practicing postpartum abstinence.

5.2 Results discussion

5.2.1 For demographic factors

- Hypothesis 1- Women who get married at an early age are likely to have more children than those that get married at a later age.

Individuals who began cohabiting between the ages of 15-21 and over 22 years old had fewer children and a negative correlation with the total number of children ever born compared to those who began cohabiting between 9 and 14 years old. This negative association can be attributed to the decrease in the reproductive period of women. When a woman waits longer to cohabit, her chances of becoming pregnant decrease (Rao and Demaris, 1995). This confirms earlier research which has found that women who stared cohabiting at later ages of 15-21 and over 22 years had fewer children as compared to those whose started at ages 9-14.

- Hypothesis 2- Women that have had children die as infant are likely to have more children than those that have not.

According to the three measures of child mortality, two of them are significant determinants of children ever born. The unsignificant relationship between losing a child who is older than 5 years is also an observation worth noting. The regression suggests that only losing a child who is aged below 1 year and losing a child aged 1-5 plays a significant role in the number of children ever born. This finding is

in line with the argument of (Doepke, 2005) which indicates that women who are afraid of losing their children <1 or 1-5 or live in areas where child and infant mortality are high tend to have more children because of the belief that if some die then they will have the remaining children. However, losing a child that is >5 years is different because they may die at an older age where the parents cannot give birth anymore or they already reached their desired number of children. Losing a child who is older than five years old can also bring a unique set of challenges as the parents have likely invested more time and emotional energy into their development (Keesee, Currier and Neimeyer, 2008). Moreover, losing a child aged <1 or between 1 and 5 years impacts family dynamics and future plans differently than losing an infant. The finding that women tend to have more children after such a loss supports hypothesis 2.

5.2.2 For socio-economic factors

- Hypothesis 3- Women who reside in rural areas are likely to have more children than their counterparts in urban areas.

Women in rural areas were found to have an association with a higher number of children ever born as compared to those in urban areas. A study conducted in Uganda found that majority of women in rural areas had knowledge about family planning but were not using any family planning method (Ariho and Nzabona, 2019). A study conducted in Coastal Ghana found that women in urban regions had 11% lower fertility rates than women in rural areas because living in urban areas leads to increased costs of rising children and urban residents may have better access to family planning which further supports the results in this study of women in rural areas having more children (WHITE *et al.*, 2008). Henceforth this supports the third hypothesis of women in rural areas having more children than those in urban areas.

- Hypothrsis 4- The highly educated are likely to have fewer children than the lower educated.

The study indicated that primary and secondary education was associated with having lower number of children ever born. This because education helps reduce the reproductive period of girls so the more they study the more their reproductive period reduces (Mugabe, 2019). The husband's education also counts in the CEB because they have a different attitude towards the number of children ever born and they may also have known about family planning (Kiser and Hossain, 2018). In Kenya, the cost of school uniforms determined their access to secondary education (Mutegi, 2018). High costs of school fees and school utilities led to the drop out of many children especially girls because the parents could not afford. Increasing one year of education in Nigeria reduced early fertility by 0.26 births (Elina .P.,2015).

However, the results also show that higher education is associated with a higher number of children ever born. This can be because of higher education being associated with higher survival rates of

children (Browne and Barrett, 1991). A study showed the between 1970 and 2009, 51.2% reduction in child mortality was attributed to the attainment of higher education within women of reproductive age. Women with a higher level of education have better health and economic prospects for their children's survival (Gakidou *et al.*, 2010). Overall, partial support for the fourth hypothesis formulated by this study is found which stated 'the highly educated are likely to have fewer children than those with low education.' Women with primary and secondary education are at risk of having fewer children than those with no education is observed leading to partial support hypothesis 4. Nonetheless, women with higher education compared to those with no education were found to be at risk of having more children which provides no support for hypothesis 4.

- Hypothesis 5- Employed women are likely to have fewer children than unemployed women.

The results show that employed women were found to have fewer children as compared unemployed women. The findings reveal that economic considerations play a significant role in shaping fertility decisions among employed women, with financial stability and career opportunities often leading to delayed childbearing and smaller family sizes. Moreover, higher education and empowerment from employment enable women to prioritize their careers over early family formation, while better access to family planning resources allows for more informed and effective family planning practices (Pollak, 1985). Becker also argued about the opportunity cost of time where employed women have to choice between working and bearing children and hence leading to many women that choice to invest in their careers to have fewer children (Lee, 2015). Additionally, urbanization and lifestyle changes associated with employment tend to offer incentives for reduced family size (WHITE *et al.*, 2008). This supports the fifth hypothesis that employed women are likely to have fewer children.

- Hypothesis 6- Women with relatively high income are likely to have less children than those with relatively low income.

The relationship between earnings and number of children ever born was found to be negative and significant compared to women who had no earnings. The fact that women are engaged in income generating activities makes the opportunity cost of childrearing activities very high (Lee, 2015). Women that earn are also more likely to be able to afford contraceptives and hence having fewer children than those that don't earn anything. This can contribute to a decrease in the desired number of children for financially independent women. Moreover, access to education and career opportunities for women can empower them to make informed decisions about family planning, leading to a greater emphasis on personal and professional goals rather than solely focusing on childbearing (Banerjee, Benabou and Mookherjee, 2006). This supports the sixth hypothesis as women who earn an income are able to afford contraceptives and focus on their career.

- Hypothesis 7- Women who have never had any abortions are more likely to have more children than those that have had abortions.

Participants who had undergone prior pregnancy terminations exhibited an adverse correlation with the overall count of offspring. This phenomenon can be elucidated by the observation that women who undergo multiple abortions are predisposed to a reduced fecundity due to the termination of pregnancies, resulting in a diminished total number of children born. Additionally, access to comprehensive reproductive healthcare, including contraception and safe abortion services, can contribute to a woman's ability to control her reproductive choices (Bongaarts, 1982). This can further support women in pursuing their desired career paths and achieving their personal aspirations without the fear of unplanned pregnancies. Ultimately, empowering women with these options promotes gender equality and allows them to actively participate in shaping their own futures. This confirms the hypothesis that women who have never had any abortions were at more risk of having more children.

5.2.3 For attitudes and beliefs

- Hypothesis 8- Women who use modern and traditional contraceptives are likely to have less children than their counterparts that don't use contraceptives.

Respondents who were using traditional contraceptive methods were found to have more children compared those the use modern contraceptives. Usually, it would be expected that the ones using modern contraceptives would have fewer children and hence the statistical significancy of the association. Some women prefer to use traditional contraceptives before of the fear of the side effects associated with modern contraceptives (Ajayi, Adeniyi and Akpan, 2018). The cultural beliefs and practices of married or cohabiting women may influence their decisions regarding contraception (Kabagenyi *et al.*, 2016). This further partially supports hypothesis 8 because as we have a further look we find out that women that don't use contraception but intend to use later and those that don't intend to use have fewer children than those that use modern contraception which shows no support for hypothesis 8.

The interaction between education and contraceptives has shown that there is significancy between most of the interactions apart from the one that had respondents who had primary education and do not intend to use contraception and also for those with higher education and don't intend to use contraception. This can be attributed to the reproductive health education that is provided in schools and it helps the girls understand the importance of contraception, how they work and the type that are there. Furthermore, this education also addresses common misconceptions and cultural barriers surrounding contraceptives, empowering girls to make informed decisions about their reproductive health. A study overall the world showed that women with low education had a low use of contraception (D'Souza *et al.*, 2022). Education can also influence the kind of job that women get when they are older which affects their ability to afford contraceptives.

The correlation between child mortality and contraception is mostly negative and significant. Contraception empowers women to take control of their unintended pregnancies, manage and space out their births, and dedicate more time to caring for their children. Proper spacing of children can significantly improve maternal health, reducing complications during pregnancies and childbirth, and ultimately allowing for better care for their children (Maïga *et al.*, 2015). A study in Kenya found that having a short interval between children in their early childhood and infancy increased their risk of dying and hence supporting the results shown in the table of significancy.

Examining the outcomes of the interplay between education and employment on fertility reveals noteworthy patterns. Specifically, women who had attained primary and secondary education and were engaged in the workforce tended to have a higher number of children in contrast to their counterparts who had no education and were not employed. Conversely, women with higher educational attainment who were part of the workforce exhibited a trend of having fewer children compared to those without education who were not employed. This hints at the possibility that education and employment exert distinct influences on fertility rates. This could be attributed to the potential benefits that educated and employed women enjoy, such as enhanced access to valuable resources and quality healthcare (Shao *et al.*, 2022). These advantages may substantially contribute to their deliberation in opting for a smaller family size. Women with higher levels of education are often positioned to secure more lucrative employment opportunities compared to those with limited or no educational background (Chen and Wu, 2007). This discrepancy in job prospects directly impacts their financial capacity to access contraceptives. Educated women tend to possess a deeper understanding of contraceptive methods and their effective utilization (Asiimwe *et al.*, 2014). Furthermore, their participation in the workforce boosts their financial resources, enabling them to comfortably afford family planning measures. This synergy between education, employment, and accessible family planning contributes to the potential realization of a more modest family size.

5.3 Strength and limitations of the study

Like any research endeavor, this study encountered certain limitations and challenges. Firstly, the application of the Poisson regression technique, being a novel approach for me, extended the time required for data analysis. The learning curve for interpreting results and ensuring compliance with assumptions contributed to this extended timeframe, impacting the analysis phase due to the time constraints of the project.

Additionally, the utilization of secondary data presented a series of hurdles. The presence of missing data prompted an investigation into the extent and reasons for its absence, thus delaying the progression. Furthermore, the nature of secondary data sources, such as the DHS data, occasionally fails to capture the entirety of real-world scenarios due to limited reporting and information gaps. Throughout the

methodology and discussion chapters of the thesis, several issues emerged in relation to variables, their measurement, and availability. These intricacies further underscored the challenges inherent in working with secondary data.

However, this study provides a significant insight into the intricate interplay between demographic factors, socio-economic factors, attitudes, beliefs, and practices, and their collective impact on the total fertility rate. Historically, much of the scholarly work has examined these factors in isolation, focusing on their individual effects on the total fertility rate. Consequently, due to the dearth of comprehensive research exploring how these factors intertwine and collectively influence the total fertility rate, this study presents a unique vantage point on this subject.

Furthermore, despite potential concerns about utilizing the Poisson regression approach for the first analysis, this approach also possesses strengths. It enables the incorporation of age groups as an offset, a step that not only enhances result accuracy but also safeguards against potential biases and inconsistencies in the findings. In this sense, the utilization of the Poisson regression methodology both addresses limitations and bolsters the study's methodology.

5.4 Recommendations

I recommend the government to focus on investing more in education to increase the number of years in school for girl children. This can be done through promoting universal primary education and universal secondary education in the rural areas, paying teachers for their services, providing scholastic materials to children, and improving the state of the school structures with the transportation systems that help the children get to school. Integrating sexual education and reproductive health programs at all levels of education informs young people about the dangers of being teenage parents and also provide them with the information that is needed in case one becomes sexually active.

Health care centers should provide teenage friendly environments where young people can go and seek for help without feeling like they are being judged or they should input programs like focus groups discussions and seminars that look at the problems faced by the young people and the solutions to those problems.

More effort should be put in empowerment of women. Empowerment can be done through keeping girls in school, women forming groups for both businesses and support (emotional, physical), supporting women-run businesses, and educating the societies about the misbeliefs that they have about women for example women being considered the weaker sex and being told that they cannot do what men can do. Through empowerment women can involve themselves in decision making instead of the men deciding everything for them.

I recommend the government and policy makers to involve men in the programs that are structured to help reduce the number of children ever born. This is because men take or play part in the reproduction

process so by including them in the family planning programs and sexual and reproductive health it helps improve their knowledge of modern contraceptive and also support their wives.

5.4.1 Areas for future research

An exploration into the changing population dynamics after and during the coup de tat has the potential to be an interesting avenue for Niger's total fertility rate. The introduction of men's characteristics has the potential to impact fertility levels in some way because of the tradition of men being the decision makers in most families in Niger. Additionally, as mentioned in the limitations, the exploration into factors like religion (that had missing values in this study) proves to be an exciting avenue for future research.

Finally, when talking about total fertility, it would be interesting for a retrospective study to be done and understand more the underlying reasons for the desired number of children and the actual number of children that women at the end of the reproductive age have.

5.5 Conclusions

In conclusion, this study provides some insightful results regarding the role of demographic factors, socio- economic factors and attitudes, beliefs and practices play in the total fertility rate of Niger and how they interrelate. Generally, the study hypotheses of women who get married at an early age are more likely to have more children than those that get married at a later age, women that have had children die as infant are more likely to have more children than those that have not, women who reside in rural areas are more likely to have more children than their counterparts in urban areas and women who have had no abortions are more likely to have more children than those that have had abortions were proven to be true.

Surprising, women with higher education, do not use contraception but intend to use later and those that do not use contraception do not show the relationship that most people expected. In most cases, women that are not using any form of contraception are expected to have more children than those that use contraception which is presented the other way round in this study. However, in the same way women with higher education are expected to have fewer children because of the knowledge about contraceptives, fewer reproductive gap left after school and more opportunities to be able to afford contraceptives which is not the case in this study. Overall, from the available data, it can be deduced that every aspect contributes to determining the overall fertility rate in Niger.

6.0 References

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7.0 Appendix

The two following models were run to test for goodness of fit and choosing which model was a better model.

The first model is the complex model which includes all the variables present in the study and at the end one can see an Akaike (AIC) and Bayesian information criterion (BIC). Both AIC and BIC values are used to determine which model is a better fit. The model with lower values of both is considered better.

The second model is a simple version, featuring reduced variables that do not take earnings into account. Additionally, it incorporates AIC and BIC tests.

```
. poisson CEB i.residence i.childmort1 i.ageatcohab i.education i.working i.earnings i.aborted i.contraception i.education## i.contrac
> eption i.childmort1##i.contraception i.residence##i.working i.education##i.working i.education##i.ageatcohab i.working##i.contracept
> ion i.contraception##i.aborted, offset(agegroup) robust
note: 3.education#0.ageatcohab identifies no observations in the sample.
note: 3.education#2.ageatcohab omitted because of collinearity.

Iteration 0:   log pseudolikelihood = -81148.721
Iteration 1:   log pseudolikelihood =  -81127.88
Iteration 2:   log pseudolikelihood = -81127.861
Iteration 3:   log pseudolikelihood = -81127.861

Poisson regression                              Number of obs = 15,743
                                                Wald chi2(49) =      .
                                                Prob > chi2   =      .
Log pseudolikelihood = -81127.861               Pseudo R2     = 0.1213
```

CEB	Coefficient	Robust std. err.	z	P>|z|	[95% conf.	interval]
residence						
Rural	.3454944	.0601287	5.75	0.000	.2276443	.4633444
childmort1						
<1	.1838461	.0899953	2.04	0.041	.0074585	.3602336
1-5	.0698149	.1023341	0.68	0.495	-.1307563	.270386
>5	-.0550348	.1475287	-0.37	0.709	-.3441857	.2341161
ageatcohab						
15-21	-.1551849	.0193214	-8.03	0.000	-.1930542	-.1173155
>22	-.9501995	.0503728	-18.86	0.000	-1.048928	-.8514707
education						
Primary	-.1752335	.1050107	-1.67	0.095	-.3810506	.0305836
Secondary	-.6152453	.1647671	-3.73	0.000	-.9381829	-.2923078
Higher	1.785484	.0815235	21.90	0.000	1.625701	1.945267
working						
Yes	-.1106081	.0741044	-1.49	0.136	-.25585	.0346337
earnings						
Cash only	-.2390162	.0415084	-5.76	0.000	-.3203713	-.1576612
Cash and in-kind	-.0873801	.0478926	-1.82	0.068	-.1812479	.0064876
In-kind only	-.0815813	.0931684	-0.88	0.381	-.2641881	.1010254
aborted						
Yes	-.013804	.0637376	-0.22	0.829	-.1387274	.1111194
contraception						
Using traditional method	.16954	.0995704	1.70	0.089	-.0256144	.3646945
Non-user - intends to use later	-.2184067	.0742687	-2.94	0.003	-.3639706	-.0728428
Does not intend to use	-1.074833	.0588532	-18.26	0.000	-1.190183	-.9594825
education#contraception						
Primary#Using traditional method	-.4038077	.1284503	-3.14	0.002	-.6555657	-.1520497
Primary#Non-user - intends to use later	.2504704	.0870338	2.88	0.004	.0798873	.4210535
Primary#Does not intend to use	-.0422175	.0762107	-0.55	0.580	-.1915877	.1071528
Secondary#Using traditional method	-1.164021	.1407691	-8.27	0.000	-1.439924	-.8881187
Secondary#Non-user - intends to use later	-.1070283	.132056	-0.81	0.418	-.3658533	.1517968
Secondary#Does not intend to use	-.3437085	.0966252	-3.56	0.000	-.5330904	-.1543266
Higher#Using traditional method	-.7007747	.1979973	-3.54	0.000	-1.088842	-.3127071
Higher#Non-user - intends to use later	1.033675	.1843064	5.61	0.000	.6724413	1.394909
Higher#Does not intend to use	-.0720574	.1785174	-0.40	0.686	-.4219451	.2778304
childmort1#contraception						
<1#Using traditional method	-.2467669	.1329056	-1.86	0.063	-.5072572	.0137233
<1#Non-user - intends to use later	-.1582578	.1068289	-1.48	0.138	-.3676386	.0511229
<1#Does not intend to use	-.2460664	.0944148	-2.61	0.009	-.4311161	-.0610167
1-5#Using traditional method	-.0206874	.1547218	-0.13	0.894	-.3239366	.2825618
1-5#Non-user - intends to use later	-.2464812	.1227801	-2.01	0.045	-.4871257	-.0058366
1-5#Does not intend to use	-.2094101	.1073359	-1.95	0.051	-.4197845	.0009644
>5#Using traditional method	-.1826017	.3107501	-0.59	0.557	-.7916606	.4264573
>5#Non-user - intends to use later	-.1235527	.184107	-0.67	0.502	-.4843959	.2372904
>5#Does not intend to use	-.1421688	.1546686	-0.92	0.358	-.4453136	.1609761
residence#working						
Rural#Yes	-.1319362	.0632149	-2.09	0.037	-.2558352	-.0080372
education#working						
Primary#Yes	.0122773	.0843942	0.15	0.884	-.1531322	.1776869
Secondary#Yes	.6479491	.1088793	5.95	0.000	.4345496	.8613485
Higher#Yes	-2.026687	.1877978	-10.79	0.000	-2.394764	-1.65861
education#ageatcohab						
Primary#15-21	.177827	.0641646	2.77	0.006	.0520667	.3035873
Primary#>22	.9381712	.1010818	9.28	0.000	.7400546	1.136288
Secondary#15-21	.1229457	.1353388	0.91	0.364	-.1423134	.3882049
Secondary#>22	.4880124	.1588633	3.07	0.002	.176646	.7993787
Higher#9-14	0	(empty)				
Higher#15-21	-.3581742	.1864477	-1.92	0.055	-.723605	.0072566
Higher#>22	0	(omitted)				
working#contraception						
Yes#Using traditional method	.7024971	.1117047	6.29	0.000	.4835601	.9214342
Yes#Non-user - intends to use later	.0713235	.0774216	0.92	0.357	-.0804202	.2230671
Yes#Does not intend to use	.3050773	.0625323	4.88	0.000	.1825162	.4276385
contraception#aborted						
Using traditional method#Yes	-.9751918	.1158675	-8.42	0.000	-1.202288	-.7480957
Non-user - intends to use later#Yes	-.1272136	.0753453	-1.69	0.091	-.2748877	.0204605
Does not intend to use#Yes	-.1954435	.0670005	-2.92	0.004	-.3267621	-.064125
_cons	-2.903122	.0810975	-35.80	0.000	-3.06207	-2.744173
agegroup	1	(offset)				

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Akaike's information criterion and Bayesian information criterion
```

Model	N	ll(null)	ll(model)	df	AIC	BIC
.	15,743	-92330.16	-81127.86	50	162355.7	162738.9

Note: BIC uses N = number of observations. See **[R] BIC note**.

```
. poisson CEB i.residence i.childmort1 i.ageatcohab i.education i.working i.aborted i.contraception i.education## i.contraception i.ch
> ildmort1##i.contraception i.residence##i.working i.education##i.working i.education##i.ageatcohab i.working##i.contraception i.contr
> aception##i.aborted, offset(agegroup)

Iteration 0:   log likelihood = -235645.79
Iteration 1:   log likelihood = -235562.34
Iteration 2:   log likelihood = -235562.21
Iteration 3:   log likelihood = -235562.21

Poisson regression                              Number of obs =   43,637
                                                LR chi2(48)   = 51972.45
                                                Prob > chi2   =   0.0000
Log likelihood = -235562.21                     Pseudo R2     =   0.0994
```

CEB	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
residence						
Rural	.1984227	.0066643	29.77	0.000	.1853609	.2114845
childmort1						
<1	.1500794	.0191711	7.83	0.000	.1125047	.1876541
1-5	.0317974	.0236166	1.35	0.178	-.0144902	.078085
>5	-.2228064	.0436822	-5.10	0.000	-.308422	-.1371909
ageatcohab						
15-21	-.1693583	.0041825	-40.49	0.000	-.1775558	-.1611608
>22	-.9589157	.0149471	-64.15	0.000	-.9882114	-.92962
education						
Primary	.0780224	.0204321	3.82	0.000	.0379763	.1180685
Secondary	.2001489	.0454898	4.40	0.000	.1109906	.2893072
Higher	.7865198	.5093452	1.54	0.123	-.2117785	1.784818
working						
Yes	-.0071375	.0137684	-0.52	0.604	-.034123	.0198479
aborted						
Yes	-.1246632	.0135105	-9.23	0.000	-.1511433	-.0981831
contraception						
Using traditional method	.1964763	.0243476	8.07	0.000	.148756	.2441967
Non-user - intends to use later	.1096181	.009679	11.33	0.000	.0906476	.1285886
Does not intend to use	-.6441469	.0089217	-72.20	0.000	-.6616332	-.6266606
education#contraception						
Primary#Using traditional method	-.6800551	.0411324	-16.53	0.000	-.7606732	-.599437
Primary#Non-user - intends to use later	.0712263	.020178	3.53	0.000	.0316781	.1107745
Primary#Does not intend to use	-.0899828	.0189986	-4.74	0.000	-.1272193	-.0527463
Secondary#Using traditional method	-1.162249	.0676873	-17.17	0.000	-1.294914	-1.029585
Secondary#Non-user - intends to use later	.1695756	.0309973	5.47	0.000	.1088219	.2303292
Secondary#Does not intend to use	-.2418379	.0281304	-8.60	0.000	-.2969724	-.1867034
Higher#Using traditional method	-.7638923	.1945711	-3.93	0.000	-1.145245	-.38254
Higher#Non-user - intends to use later	.4474099	.1366774	3.27	0.001	.179527	.7152927
Higher#Does not intend to use	-.0658568	.0968473	-0.68	0.497	-.2556741	.1239604
childmort1#contraception						
<1#Using traditional method	-.2635694	.0568331	-4.64	0.000	-.3749602	-.1521786
<1#Non-user - intends to use later	-.1693544	.0220954	-7.66	0.000	-.2126606	-.1260481
<1#Does not intend to use	-.2018975	.0206723	-9.77	0.000	-.2424144	-.1613806
1-5#Using traditional method	-.0105121	.061707	-0.17	0.865	-.1314556	.1104315
1-5#Non-user - intends to use later	-.2386653	.0271294	-8.80	0.000	-.2918379	-.1854926
1-5#Does not intend to use	-.1895617	.0252892	-7.50	0.000	-.2391276	-.1399958
>5#Using traditional method	.0297412	.1309208	0.23	0.820	-.2268588	.2863412
>5#Non-user - intends to use later	.0268944	.0531854	0.51	0.613	-.0773471	.1311358
>5#Does not intend to use	-.0946295	.046034	-2.06	0.040	-.1848544	-.0044046
residence#working						
Rural#Yes	.0197517	.0104659	1.89	0.059	-.0007611	.0402645
education#working						
Primary#Yes	-.0783316	.0143903	-5.44	0.000	-.106536	-.0501272
Secondary#Yes	.0499914	.0244958	2.04	0.041	.0019806	.0980023
Higher#Yes	.053448	.1258226	0.42	0.671	-.1931597	.3000557
education#ageatcohab						
Primary#15-21	.0646696	.0155064	4.17	0.000	.0342776	.0950615
Primary#>22	.6428211	.0363567	17.68	0.000	.5715632	.714079
Secondary#15-21	-.2404602	.0416306	-5.78	0.000	-.3220547	-.1588657
Secondary#>22	.0211813	.0518268	0.41	0.683	-.0803973	.12276
Higher#15-21	-1.534363	.5117576	-3.00	0.003	-2.537389	-.5313365
Higher#>22	-.9470055	.5208771	-1.82	0.069	-1.967906	.0738949
working#contraception						
Yes#Using traditional method	.5905798	.0323221	18.27	0.000	.5272297	.6539299
Yes#Non-user - intends to use later	-.2457763	.0138585	-17.73	0.000	-.2729385	-.2186141
Yes#Does not intend to use	-.1557853	.0126446	-12.32	0.000	-.1805683	-.1310023
contraception#aborted						
Using traditional method#Yes	-.5368225	.0360241	-14.90	0.000	-.6074285	-.4662165
Non-user - intends to use later#Yes	-.1077864	.0158843	-6.79	0.000	-.138919	-.0766537
Does not intend to use#Yes	-.0661233	.0148728	-4.45	0.000	-.0952736	-.0369731
_cons	-3.192582	.0097541	-327.31	0.000	-3.2117	-3.173465
agegroup	1	(offset)				

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Akaike's information criterion and Bayesian information criterion
```

Model	N	ll(null)	ll(model)	df	AIC	BIC
.	43,637	-261548.4	-235562.2	49	471222.4	471647.9

Note: BIC uses N = number of observations. See **[R] BIC note**.

Budget for the study

Not a very big budget was needed for the study because it is quantitative and hence it will use secondary data for analysis. Other costs needed are;-

Printing thesis: 40 euros

Stationary: 20 euros

Stata: free (using University licence)

Obtaining data: free because I'm a university student.

Miscellaneous: 50 euros

The total expected expenditure on the study is 110 euros.

Time plan

Task	March	April	May	June	July	August
Proposal						
Presentation						
Gain access to the data						
Review the data						
Literature review						
Methodology						
Prepare the data for analysis						
Analysis						
Work on results						
Discussion and conclusion						
Discuss the first final draft with supervisor						
Final report						