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Unachieved Fertility Desire in Indonesia: Which couples are overachieving in their desire?

Master's Thesis

MSc. Population Studies 2022/2023

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Abstract

In Indonesia, research has been conducted to investigate the influence of socioeconomic status on a couple's fertility outcome. However, the focus of this research has primarily been reducing fertility rates to replacement levels or below without considering the importance of reproductive justice and a couple's desire for children. It is essential to recognise that a couple's fertility aspirations are shaped by various factors, including their personal circumstances, values, and aspirations.

Objective: To better understand the socioeconomic background of couples unable to achieve their desired fertility with a focus on excess fertility.

Methods: This study employs the capability approach framework by Sen (1985, 1992, 1999, 2009) as a theoretical framework and uses quantitative methods, utilising data from the Indonesia Demographics and Health Survey 2017. Descriptive statistics and binomial logistic regression analysis was employed to identify the socioeconomic characteristics of couples overachieving their fertility desire.

Results: From the univariate analysis, within the endowment factors, women's age at birth explained the variability of excess fertility best among married women aged 40-49 in Indonesia, while within the conversion factors, it was a dyadic preference conflict. The binary logistic regression results show that among the endowment factors, women's education level, age at first birth, household wealth status, spousal age gap, and women's empowerment level significantly affect excess fertility. The conversion factors tested in this study, which were negative attitude towards family planning, unexposed by media to family planning messages, dyadic preference conflict, and living in rural areas, significantly affected achieving desired fertility.

Conclusion: The capability approach framework helped to provide an initial understanding of the endowments and conversion factors that affect the ability to achieve fertility desire. The characteristics of couples overachieving in their fertility desire, constructed from the endowment factors, are who live in urban areas, have higher education, give birth at a younger age, have a wife younger than five years than the husband, and have an unempowered wife. Meanwhile, characteristics found to be barriers to achieving desired fertility, constructed from conversion factors, are residing in urban areas, having unmet needs, being exposed to the media, and having dyadic conflict on fertility desire.

Keywords: Capability approach, fertility desire, unwanted fertility, unachieved fertility, excess fertility, binary logistic regression

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Abbreviations

AIC	:	Akaike Information Creation
BKKBN	:	Badan Kependudukan dan Keluarga Berencana Nasional (National Population and Family Planning Board)
BPS	:	Badan Pusat Statistics (Statistics Indonesia)
CA	:	Capability Approach
IDHS	:	Indonesian Demographic and Health Survey
MoH	:	Ministry of Health
TFR	:	Total Fertility Rate

Chapter 1. Introduction

1.1 Background

As the world's fourth most populous country, Indonesia is home to over 270 million people across thousands of islands. Indonesia's population diversity encompasses various ethnic groups, languages, cultures, and religions (Statistic Indonesia, 2023a). This geographic diversity presents opportunities to explore regional variations and understand how different contexts influence social, economic, and cultural dynamics. The diversity of Indonesia's population also manifests in socioeconomic disparities. While the country has made significant progress in controlling the population, bringing fertility to the replacement level remains challenging.

The government of Indonesia has a target to lower the nation's fertility level to the replacement level, or lower, by 2024, as stated in their Medium-Term National Development Plan (Ministry of National Development Planning, 2020). Although the decreasing trend is seen in their fertility level in the past decades, their latest population census shows that their current fertility level is still at 2,18, which is still above the replacement level of 2,10 (Statistics Indonesia, 2023b). The conventional view is that low fertility and slower population growth will lead to many improvements in the economic situations of the nations (Kelley and Schmidt, 1995; Chesnais et al., 2001; Bloom et al., 2003; Lee, 2003). However, even if Indonesia can bring its fertility level to the replacement level or even lower, it can bring other significant social, economic, and demographic implications, as it seems that in countries that already have low fertility levels, fertility levels below the replacement level resulted in an ageing population, which poses challenges for labour markets, social welfare systems, and economic productivity (Lee and Mason, 2010; Bloom and Canning, 2008; Galor and Weil, 2000).

Balancing fertility levels in a nation is a complex undertaking, as it presents challenges whether the levels are below or above the replacement level. Enforcing family planning or population control policies to regulate fertility can infringe on people's reproductive rights and autonomy. It is essential to honor individuals' choices and decisions concerning their fertility preferences. Fertility regulation is a sensitive issue that warrants thoughtful consideration.

Individual and couple autonomy refers to the ability of individuals and couples to make their own decisions regarding their reproductive choices, including the desired number of children and the timing of childbirth. It emphasises respecting and upholding individuals' rights to make informed choices about their reproductive health without undue interference or coercion. Having control over one's own reproductive choices is essential to achieve the desired level of fertility (Elwan & Raidoo, 2020; Miller et al., 2010; Grace & Anderson, 2016). It entails respecting the autonomy of individuals and couples regarding reproductive decisions, which means acknowledging their right to choose whether or not to have children, when to have them, and how many to have. This also includes the freedom to choose from different methods of contraception, access family planning services, or utilise reproductive technologies if desired. Additionally, individuals and couples have the right to choose not to have children or explore alternatives to traditional parenthood, such as adoption or surrogacy. Autonomy in reproductive decision-making is rooted in personal freedom, bodily autonomy, and self-determination. It recognises that individuals and couples are best

positioned to understand their circumstances, preferences, and aspirations regarding their reproductive choices. By respecting their autonomy, we acknowledge that individuals and couples are able to make informed decisions about their lives and bodies.

Fertility desire, which describes how many children a woman would want to have during her reproductive life, is higher in developing countries than in developed countries (Baizán et al., 2016; Günther and Harttgen, 2016). In Indonesia, approximately 11% of currently married women aged 15-49 reported that they could not achieve their fertility desire. The trend of unachieved fertility in Indonesia over a decade shows that fertility is higher than desired even though relatively stable over the years, around 2,0 to 2,2—see Figure 1 (Indonesian DHS, 2017). This desired fertility trend parallels the government's goal for the national fertility level, which means achieving the couples' desired fertility would also aim for a more extensive scale to accomplish the national goal and lower the current actual fertility level. The capability approach, developed by Amartya Sen and Martha Nussbaum, provides a framework for assessing and promoting individual well-being and agency. When applied to the context of achieving fertility desires, the capability approach emphasises the importance of enabling individuals and couples to have the freedom and resources to make informed choices about their reproductive lives. The capability approach is a valuable framework for studying fertility desire because it focuses on the broader context in which individuals make reproductive decisions, as it emphasises the importance of individual agency and freedom in making reproductive decisions and recognises the influence of broader social, economic, and cultural factors on reproductive outcomes. (Santos, 2011; Minichiello, 2018).

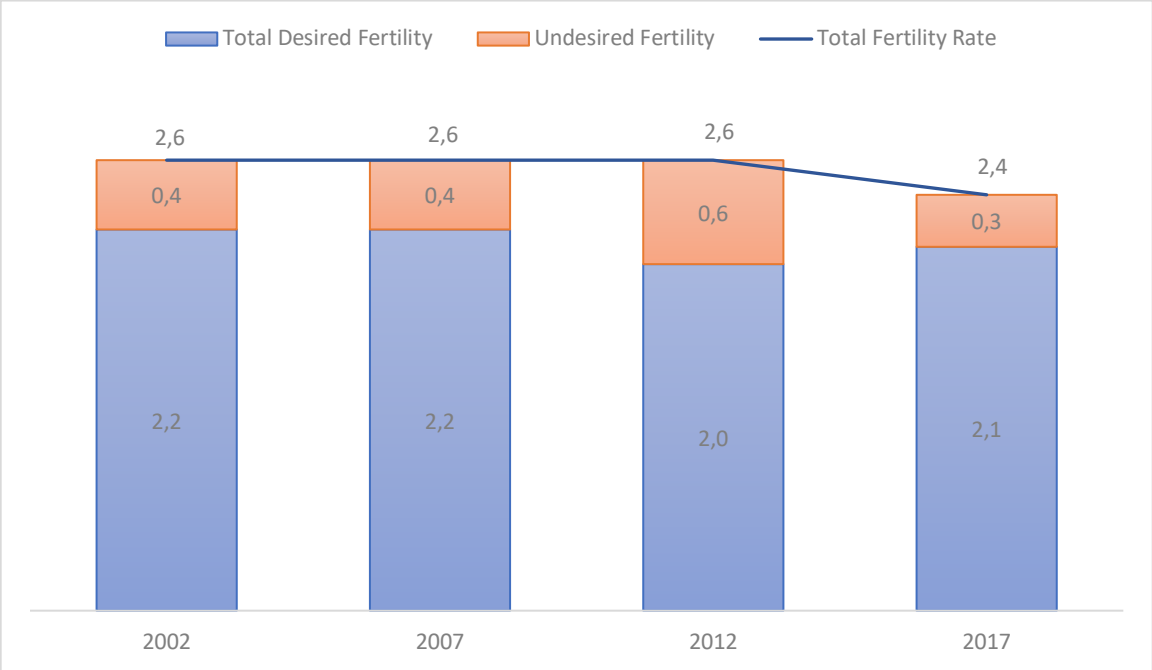

Figure 1. Undesired Fertility in Indonesia, 2002-2017 (Indonesia DHS Report, 2018)

Understanding the determinants of unachieved fertility desire can help policymakers design interventions and programs to support individuals in achieving their desired fertility and mitigate the negative consequences of unachieved fertility. In the context of Indonesia, achieving people's desire for fertility can also mean achieving a national goal, which is bringing the national fertility level to the replacement level.

This study uses the quantitative method using Indonesia Demography and Health Survey 2017 (phase-VII) is used because this survey offers the advantages of large sample and national-level coverage as Indonesia does not have a systematic register data on reproductive behaviour and outcomes. Another benefit of this survey is that it is standardised and held in 90 countries. This ensures comparability across different populations and over time, facilitating the examination of trends and comparisons between regions or groups. We aim for a married couple with a wife aged 40-49, and the couple is limited only to a monogamous relationship and in their first marriage. The reason for choosing so is that women at the end of their reproductive period have already completed their plan for childbearing. The likelihood of unwanted fertility is minimum in this age group, and choosing the monogamous dyad and first marriage is to remove the bias of having a child outside the current marriage. The availability of partners and their willingness to have children at a particular time may influence individual fertility desires differently compared to monogamous marriage, where only one partner is available for childbearing (Agadjanian & Ezeh, 2000).

1.2 Problem Statement, Research Objectives and Research Questions

This thesis aims to understand the socioeconomic background of couples unable to achieve their desired fertility. There are two types of failure in achieving fertility desires, underachieving and overachieving. It has been found that many women are not able to achieve their low fertility preference leading to lower actual fertility outcomes. However, in developing countries, including Indonesia-refer to Figure 1, women's average achieved fertility exceeds their high fertility desire resulting in a higher overall total fertility rate (Adserà, 2006; Hagewen and Morgan, 2005).

Based on the problem statement, we aim to assess Indonesian couples' characteristics to overachieve their fertility desire. These traits are assessed using a capability approach framework and categorized as endowment and conversion factors. The research question of this paper is thus: 'What is the socioeconomic profile of the couple who are unable to achieve their fertility desire (have fertility gaps)?' The sub-questions that follow from this research question are: 'What endowment factors are associated with overachieving their fertility desire?' and 'What conversion factors are associated with overachieving their fertility desire?'.

1.3 The Scientific and Societal Relevance

The scientific relevance of this thesis is to contribute to the existing literature on desired fertility in Indonesia through a scientific approach. It will use the capability approach framework to evaluate unfulfilled fertility desires, a topic that previous researchers have yet to explore. Additionally, the thesis will identify the key characteristics of Indonesian couples that are crucial for achieving their desired fertility level by providing endowment and conversion factors.

The societal relevance of this thesis is to identify the factors contributing to Indonesian couples achieving their desired fertility and inhibiting overachieved fertility. Policymakers and the government can use this information to create appropriate laws that help families achieve their goals. Furthermore, by reducing the occurrence of excessive fertility, the country can work towards achieving its national target of fertility level, which is a Total Fertility Rate (TFR) of 2.1 or the replacement level by 2025.

1.4 Research Structure

This study comprises five chapters. The first chapter is the introduction. Chapter 2 lays out the theories and literature that serve as the basis for the study. In this study, Chapter 3 delves into the data and methods utilized. Chapter 4 presents the findings that address the research questions. Finally, Chapter 5 offers discussions, conclusions, and recommendations based on the results obtained.

Chapter 2. Theoretical and Conceptual Framework

2.1 The Capability Approach

The Capability Approach (CA) is a comprehensive analytical and normative framework that redefines the notions of human well-being and social development.t (Sen, 1985, 1992, 1999, 2009). The capability approach is a framework for assessing differences in well-being capabilities. It emphasizes the individual's ability to attain what they deem valuable. This approach differs from the utility approach, which only looks at achievements, and the resource-based approach, which does not consider that individuals can have varying abilities to turn resources into achievements.(Robeyns 2003).

This framework comprises of five essential elements. The first one is the concept of capability, which refers to an individual's potential to accomplish valuable actions and experiences in their daily routine. Both internal and external factors can influence this potential. (Nussbaum, 201, p.20). The second aspect is about functioning, which pertains to an individual's pursuits and achievements, such as maintaining good health, obtaining education, and engaging in productive activities. These accomplishments are a result of an individual's capabilities, which provide freedom and opportunities. The third crucial concept is agency, which means having the ability to pursue significant goals and bring about positive changes. This is essential for personal and societal development, which ultimately leads to greater freedoms (Sen, 1999, p.19-20). The fourth essential component of the concept of capability is individual endowments. These are the resources available to individuals, both in terms of quantity and quality, that contribute to their abilities and opportunities. Endowments can include biological and mental characteristics, personal assets such as income and physical possessions, as well as access to public goods and services. Other intangible resources such as political and social practices, cultural traditions, and shared values can also be considered endowments. The final key element of the capability approach is conversion factors, which refer to the relationship between a resource and the achievement of certain functions. Conversion factors capture the degree to which a person can transform a resource into a functioning. Human diversity affects a person's ability to access and convert resources, and treating everyone equally does not guarantee equality. It is important to consider their different conversion factors to ensure that everyone can achieve their goals and lead fulfilling lives. For example, two women with the same endowments (such as education level) may have different capability sets due to different cultural conversion factors (such as views on fertility control and childbearing) that affect their ability to achieve their desired fertility goals. Figure 2 represents the correlation between the five elements that make up the capability approach, which includes capabilities, functionings, agency, endowments, and conversion factors..

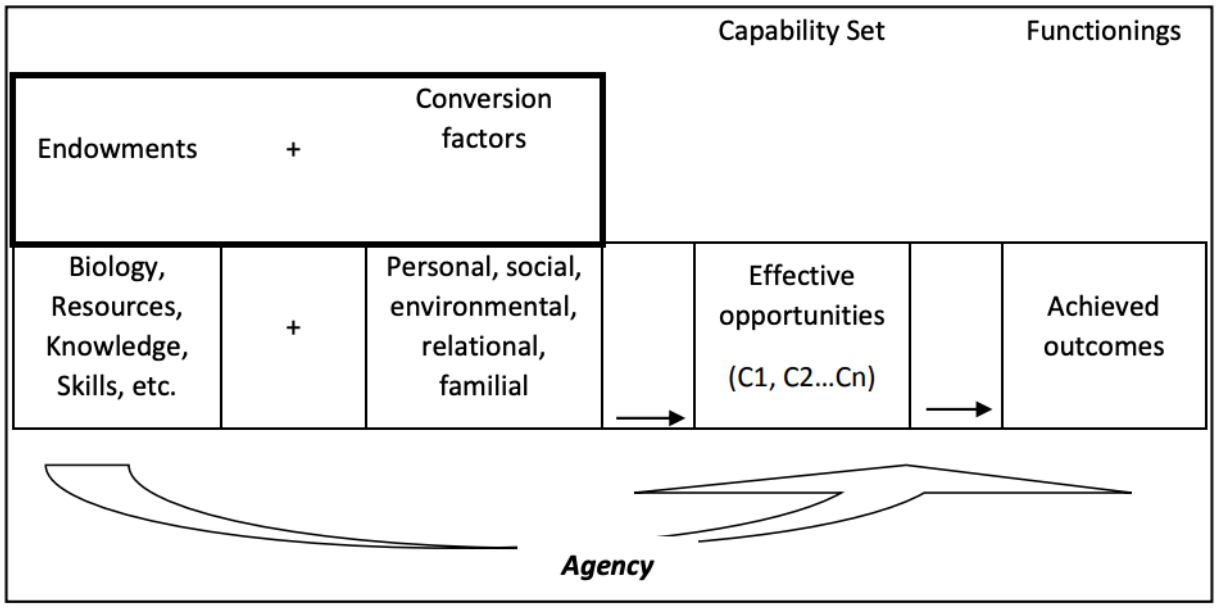

Figure 2. The Capability Approach Framework (Chiappero-Martinetti & Venkatapuram, 2014)

2.2 Fertility Desire and Fertility Outcome

Ryder and Westoff (1971) define fertility desires as subjective dimensions of fertility if one wishes to assess the extent to which childbearing outcomes satisfy individuals over a lifetime. Having the desire to have children or a childbearing intention, is an essential factor in predicting fertility behaviour and can be a dependable indicator of fertility outcomes (DaVanzo, et al., 2003; Kodzi et al., 2010; Akram et al., 2020). Childbearing intention predicts fertility behaviour better than other factors, including parity, birth interval, education, employment status, and religion (Liefbroer, 2009; Morgan and Rackin, 2010). The association of fertility desires and outcomes is found at the aggregate level (Lee 1980; Westoff 1990; Morgan and Rackin 2010) and the individual level (e.g. Westoff and Ryder 1977; Schoen et al. 1999).

However, many factors, such as individual, social and structural, affect the translation of fertility desires into reproductive outcomes (Bongaarts and Casterline, 2018). The expected-actual fertility gap is categorised into three groups as follows: (i) Underachieved. When the desired fertility is more than the actual fertility, in such a situation, the expected-actual fertility gap would be negative (gap<0) and indicate that women have unmet fertility desires; (ii) Achieved. When the desired family size equals the actual fertility, in this case, the expected-actual fertility gap would be zero (gap = 0), indicating that women's fertility desires have been met; (iii) Overachieved. When the desired family size is less than the actual fertility, it results in a positive gap between expected and desired fertility, indicating that women have overshot their fertility desires (Quesnel-Vallée & Morgan, 2003). Achieved fertility occurs if the desired number of children is the same as the number of surviving children. Unachieved fertility can be defined as the failure to reach fertility goals by women of late reproductive age. (Casterline and Agyei-Mensah, 2017; Casterline and Han, 2017).

Overachieved fertility is common in developing countries with a relatively high fertility rate, including Indonesia (Pritchett, 1994; Haider and Sharma, 2013; Bongaarts and Casterline, 2018). The determinant of the discrepancy between the desire and actual outcome of fertility is studied to be the prevalence of preference for specific sex of the kin (Assaf and Davis, 2022; Fayehun et al., 2020). Study in Bangladesh by Akram et. al., (2020) found that place of residence, wealth index, maternal age and education, and other empowerment-related indicators were significantly associated with unmet fertility desires. Other than social-economic factors of the couple, number of children and women's age at first birth are associated with unmet needs (Bongaarts and Han, 2017).

2.3 **Socio-economic Factors as Determinants of Fertility**

Determinants of fertility are categorised into two categories, proximate and background determinants. The relationship between the two is that the proximate determinants of fertility are the biological and behavioural factors through which the background determinants (social, economic, and environmental variables) affect fertility, while the distinguishing feature of the two is the proximate determinant is its direct connection to fertility outcome (Bongaarts, 1978; Bongaarts and Potter, 1983; Bongaarts 2015). The relationship of the two can be seen in Figure 3.

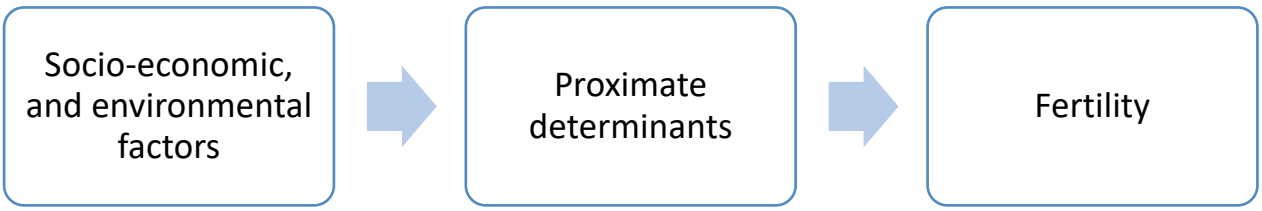

Figure 3. Relationship of fertility's determinants (Bongaarts 1978, Bongaarts and Potter 1983, Bongaarts 2015)

2.4 Literature Review

A study conducted by Fahlén in 2013 used the capability approach to investigate the impact of economic uncertainties and work-family reconciliation policies on women's short-term childbearing intentions in Europe. The study discovered that the connection between economic uncertainties and childbearing intentions varied depending on a woman's number of children, education level, and institutional context. Additionally, the study found that low support for work-family reconciliation, perceived job and income insecurity, and poor educational skills were associated with lower intentions to have children.

Doepke and Tertilt (2018) examined the documented preferences for childbearing in developing countries. Their findings revealed that men generally desire larger families than women. However, within countries, there is significant variation in desired family size among spouses, with differences of up to five children. This indicates that women's preferences should be considered when making fertility choices. Research has shown that women's empowerment and household bargaining are crucial in fertility decisions. Therefore, it is necessary to include these factors in fertility analyses.

Akram et al. (2020) analysed women's perception of the ideal number of children to determine the influencing factors of unmet fertility desires using Bangladesh Demographic and Health Survey 2014 data found that the perceived ideal number of children was significantly higher among women who were living in rural areas, from Sylhet division, Muslim, unemployed, and experienced child death and those who justified beating. Findings revealed that factors such as place of residence, geographic location, religion, wealth index, maternal age and education, partners' education, experiencing child death, and other empowerment-related indicators were significantly associated with unmet fertility desires.

Morgan and Rackin (2010) described the correspondence between intended family size and observed fertility for US men and women in the 1957-64 birth cohorts using the 1979 National Longitudinal Survey of Youth data. They focused on factors that predict which women and men will have fewer or more children than intended, using multinomial logistic methods to analyse the three-category dependent variable (completed fertility underachieved, achieved, or overachieved intentions at age 24. Consistent with life-course arguments, those unmarried, childless, or (for women) still in school at approximately age 24 were most likely to underachieve their intended parity (i.e., had fewer children than intended at age 24). We discuss how discrepancies between intentions and behaviour may generate sizable cross-group fertility differences.

2.5 Conceptual Model

The framework of the capability approach consists of five essential components: capabilities, functionings, agency, endowments, and conversion factors. The first component is the capability itself, which answers the question of what a person can do and be. The second is functionings, which are the actual achievements resulting from capabilities. Agency is the third crucial concept, referring to the ability to pursue valued goals. The fourth concept is endowments, meaning the resources available to individuals and couples to achieve their objectives. Lastly, conversion factors are the various personal, social, and environmental factors that affect a person's ability to effectively access and convert their resources into capabilities.

Unachieved fertility is a concept coming from fertility desire and fertility outcome, so we accumulate the concept of fertility desire translation into reproductive outcomes (Bongaarts and Casterline, 2018) and the framework of proximate determinants of fertility (Bongaarts, 1978; Bongaarts and Potter, 1983; Bongaarts 2015).

A conceptual model has been constructed from the theory and literature review, as seen in Figure 4. The conceptual model shows the main concepts of this thesis and how the concepts are related to each other. The socio-economic factors from Bongaarts' are constructed into a set of endowments and conversion factors for women to achieve functionings.

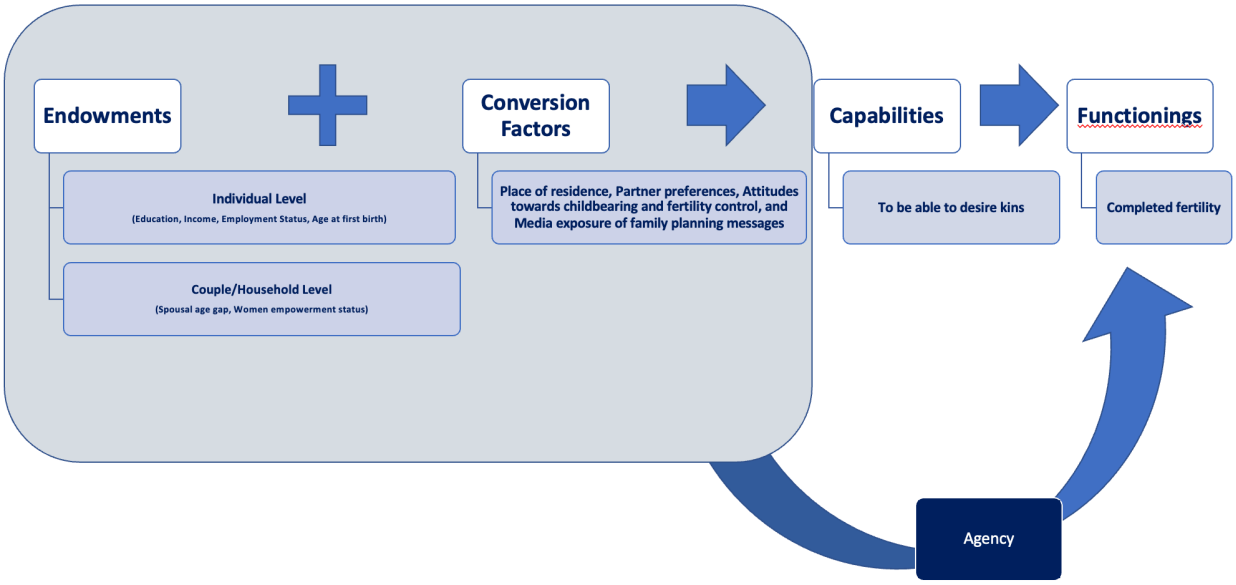

Figure 4. Conceptual Model

These socio-economic at individual level, such as education, income, working status, age of woman, and at couple or household level, such as place of residence, spousal age gap, women empowerment status, husband preferences, attitudes towards childbearing and fertility planning, access and exposure to family planning, work as both background determinants for fertility and factors affecting the translation of fertility desire into reproductive outcome. The construction of endowment and conversion factors from the independent variables used in the research are explained further in Chapter 3.

2.6 Research Hypotheses

Based on the literature reviews, the proposed hypotheses are listed as follows:

1. Socioeconomic profiles constructed as endowment factors are associated with overachieving their fertility desire. Those profiles are level of education, household wealth, women's employment status, women's age at her first birth, spousal age gap, and women's level of empowerment. Women with high education who live in wealthy households, are the same age or older as their husbands, have a first child at an older age, and are empowered are *more likely* to achieve fertility desire.
2. The barriers constructed as conversion factors are associated with overachieving their fertility desire. Those profiles are places of residence, women's attitudes towards family planning behaviour, media exposure of family planning messages and husbands' preference for a number of children. Women residing in rural areas have unmet needs, are unexposed to the media, and have a conflict with spouses regarding the number of children preferred. They are *less likely* to achieve fertility desire.

Chapter 3. Data and Methods

3.1 Data Source

The data source used in this study is 2017 Indonesia Demographic and Health Survey (IDHS). The survey was conducted by Statistics Indonesia (BPS) in partnership with the National Population and Family Planning Board (BKKBN) and the Ministry of Health (MoH) of Indonesia, with technical support from The DHS Program by ICF. The survey was also held in 90 countries worldwide. The IDHS data offers statistical information on demographic and health factors at both national and provincial levels. It collects data on fertility, family planning, maternal and child health, and HIV/AIDS.

Indonesia DHS 2017 used a sampling frame from 2010 Indonesia Population Census's master sample. The sampling design of this survey used two-stage-stratified sampling, in which the first step was selecting the 1,970 blocks census by systematic sampling proportional to size method, with implicit stratification by urban-rural areas and sorted by wealth index category. The second step was selecting the household by systematic sampling methods. From each block census, 25 ordinary households were selected from the updated household listing. Eight households were selected systematically to obtain a sample of married men, resulting in 49,250 households nationwide.

For the IDHS 2017 survey, the questionnaires were based on the standard DHS phase 7 questionnaires (2015 version). These included the Household Questionnaire, Woman's Questionnaire, Married Man's Questionnaire, and Never Married Man's Questionnaire (also used for asking never-married women). The questionnaires were adapted to suit the Indonesian context. The couple's data file from IDHS was used for analysis for this study. The study focused on the fertility behaviour of married women living with their husbands at the time of the interview. The couple dataset consists of one entry for each couple. It comprises information for both married or cohabiting men and women who have both confirmed that they are married and living together. The data is collected through individual questionnaires completed by both partners. The file was created by linking two separate files, one for married women and one for married men, based on their household identification.

3.2 Sample Selection

IDHS couple's dataset was used in this research that contained all married women aged 40–49. We excluded women in polygamous marriages and those not in their first marriage—the selection steps are visualised in Figure 5. The outcome of this selection was a dataset of women aged 40-49 who are currently married in their first and monogamous marriage. This dataset selection was based on a replication of an unrealised fertility study by Casterline and Han (2017).

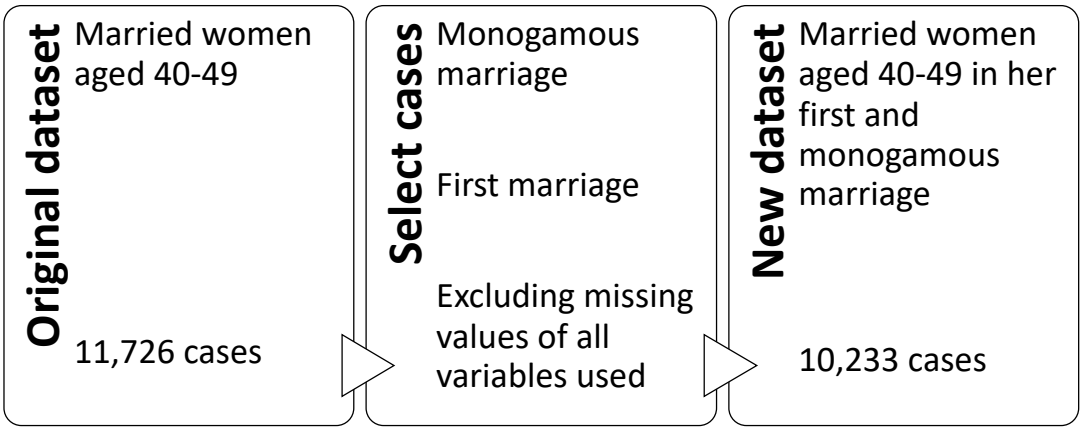

Figure 5. Dataset selection

3.3 Research Design

The study uses a descriptive and quantitative research design to answer the research question. This study describes fertility desire, fertility outcomes, and the difference between couples in Indonesia. It will also describe how to associate the couple's socio-economic status and ability to achieve fertility desire with a focus on excess fertility.

3.3.1 Descriptive statistics

In this research paper, we examine descriptive statistics including percentage distributions for categorical variables, means and standard deviations for continuous variables, and modes and total population for all variables. This gives us an overall understanding of the population and their fertility desire categories. These statistics can offer an initial overview of potential relationships before conducting further empirical testing.

3.3.2 Explanatory analysis: Binomial Logistic Regressions

Given that the dependent variable in the analysis (unachieved fertility desire) is a categorical variable for which the categories have two outputs, the best estimation of the ability to achieve fertility desire can be achieved using a binomial logistic regression model.

The objective of using this analysis method is similar to other statistical model-building techniques. The difference between logistic regression and the linear regression is that the outcome variable in logistic regression is dichotomous or binary. This difference is reflected in the choice of a parametric model and the assumptions (Hosmer and Lemeshow, 2000). It aims to identify the most appropriate and concise model that can effectively explain the connection between an outcome variable and a set of independent variables, also known as covariates or explanatory variables. The main interest of this type of analysis would be the relationship between overachieved fertility and the women’s endowment and conversion factors. The research questions will be answered based on the results of the explanatory analysis.

Mathematically, Binomial Logistic Regression uses the following function, which suggests that unachieved fertility [y] is determined by a constant [α], a vector of k number of covariates [$\sum_{i=1}^{k} \beta_i X_i$], and a disturbance term with a standard normal distribution [ε]:

$$y = \log\left(\frac{\pi}{1-\pi}\right) = \alpha + \sum_{i=1}^{k} \beta_i X_i + \varepsilon$$

Or for this research,

$$y = \log\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta_1 EduPrimary + \beta_2 EduSec + \beta_3 EduHigher + \beta_4 Rural + \beta_5 WealthPoorest + \beta_6 WealthPoorer + \beta_7 WealthRicher + \beta_8 WealthRichest + \beta_9 AgeFirstBirth + \beta_{10} Employed + \beta_{11} OlderWife5plus + \beta_{12} OlderWifeLess5 + \beta_{13} YoungerWife5plus + \beta_{14} YoungerWifeLess5 + \beta_{15} PreferenceConflict + \beta_{16} Empowered + \beta_{17} Exposed + \beta_{18} UnmetNeed + \varepsilon$$

3.4 Operationalisation of Variables

Each variable was carefully chosen to ensure that only relevant ones were included in the regression analysis. Including irrelevant variables could lead to less precise population estimations, while excluding relevant ones could result in incorrect conclusions due to unobserved spurious factors. The definition and operationalisation of each variable derived from the micro-level IDHS 2017 datasets are tabulated in Table 1.

Table 1. Definition of variables in the study and their operationalisation for the analysis

Concepts/variables	Definition	Operationalisations
Outcome variable:		
Unachieved fertility desire	Overachieved fertility = actual child born - desired family size	Recoded as a categorical bivariate with two options: 0: underachieved and achieved fertility (actual child born < desired family size; actual child born - desired family size). 1: overachieved fertility (actual child born > desired family size).

Concepts/variables	Definition	Operationalizations
Explanatory variables:		
Endowment factors		
Level of education	Highest attained level of women's education	Keep: Scale with 4 options: 1. No education 2. Primary 3. Secondary 4. Higher Recoded into dummy variables with no education as the reference category
Wealth Index	Household's income proxied by composite measure of a household's cumulative living standard	Keep: Scale with 5 options: 1. Poorest 2. Poorer 3. Middle 4. Richer 5. Richest Recoded into dummy variables with middle as the reference category
Age at first birth	Age of women have had their first child	
Employment status	Whether or not the respondent is currently working.	Keep: 0. No 1. Yes
Spousal age gap	Age difference between husband and wife	Recoded into five categorical option, with same age as the husband as the reference category: 1. Older wife >5 years 2. Older wife ≤5 years 3. Same age as husband 4. Younger wife ≤5 years 5. Younger wife >5 years
Women empowerment status	Participation in household decision-making: Women are considered to participate in household decisions if they make decisions alone or jointly with their husband in all three of the following areas: (1) their own health care	Recode to: 0. Unempowered (Did not participate in households' decision and/or justifying wife beating 1. Empowered (Participate in households' decisions

Concepts/variables	Definition	Operationalizations
	(2) major household purchases (3) visits to their family or relatives; Attitudes toward wife beating: Women are considered justifying wife beating if they say yes in at least one of the following five circumstances: (1) she burns the food; (2) she argues with him; (3) she goes out without telling him; (4) she neglects the children; (5) she refuses to have sexual intercourse with him.	and did not justify wife beating)
Conversion factors		
Type of place of residence	The place where the couples were living.	Recode to two categorical variable with urban as reference category 0. Urban 1. Rural
Media exposure and information on family planning	Women heard or saw a family planning message on radio, on television, or in a newspaper or magazine in the past few months	Recode to: 0. Unexposed (Did not heard or saw a family planning message on at least one of the media in the past few months) 1. Exposed (Heard or saw a family planning message on at least one of the media in the past few months)
Attitudes towards childbearing and fertility control	Women who experienced unmet need of contraception is women who (1) are not pregnant and not postpartum amenorrhoeic and are considered fecund and want to postpone their next birth for 2 or more years or stop	Recoded to: 0. Did not experience unmet need 1. Experienced unmet need.

Concepts/variables	Definition	Operationalizations
	childbearing altogether but are not using a contraceptive method, or (2) have a mistimed or unwanted current pregnancy, or (3) are postpartum amenorrhoeic and their last birth in the last 2 years was mistimed or unwanted.	
Partner preferences	Difference on desired family size with husband	Recoded into two categorical option: 0. No difference between husband and wife on desired family size Existence of difference between husband and wife on desired family size

3.5 Ethical considerations

The datasets from DHS can be used by the public, but users need to register and request access. They must provide details about their purpose to ensure that they adhere to ethical standards. These standards forbid users from sharing data without DHS consent and attempting to identify individuals or households from the sample data. (The DHS Program, 2022).

Chapter 4. Results

This chapter presents data results in three sections, summarising the results in the final section. In the first section, the sample's descriptive statistics, respondents' demographic and socioeconomic characteristics, and their excess fertility (background information) are provided. Additionally, the explanatory variables are cross-tabulated against the response variable in the analysis file. The second section presents the research findings through questions and hypotheses. The third section combines all the covariates to determine their influence on the couple's ability to achieve fertility desire. Finally, the last section summarizes the results.

4.1 Descriptive Statistics

4.1.1 Description of the current status of fertility among currently married women

Our study focuses on women who are presently married and residing with their partners (couples) within the age group of 40-49. This age bracket was selected as it marks the end of women's reproductive career and their fertility schedule. We have a sample size of 10,223 respondents, and in the following section, we will provide a detailed analysis of the demographic and socio-economic characteristics of the respondents, along with their excess fertility.

Table 2. Percentage of women ‘s excess fertility

Characteristics	Frequency	Percentages
Excess fertility		
Yes	2,313	22.63
No	7,910	77.37

Table 2 explains that 22.63 percent of married women aged 40-49 still had excess fertility, where their actual fertility exceeded what they desired. In comparison, the majority (77.37 percent) of the respondents achieved their fertility desire or underachieved.

The result in Table 3 reveals that the number of living children had the currently married women. With the mean of children being 2.91 children per woman, 27.62 percent of the respondents had four and more children, while the most minor proportion of women (3.36 percent) had no child. In addition, most respondents (59.54 percent) had 2-3 children. Many (55.81 percent) of the couple still have children more than the replacement level (2.1 children per woman).

Table 3. Percentage and frequency of number of living children of respondents

Number of Children	Frequency	Percentage
No child	344	3.36
1 child	969	9.48
2 children	3,205	31.35
3 children	2,882	28.19
4 and more children	2.823	27,62
Total	10,223	100.00

Women's desired fertility in this study is approximated using women's ideal number of children. The portion of women who gave a non-numerical response to the ideal number of children, even though it was small (12.26 percent), can not be disregarded as it was more significant than the cumulative proportion of women who wanted one child and less (2.69 percent) (see in Table 5). The non-numerical response to this question is when the woman answered 'up to God,' or another indecisive answer for the exact desired number. Almost half of the respondent (44.21 percent) desires three or more children in their family, which is larger than the replacement level and the government target of children per woman.

Table 4. Women's desire for children

Characteristics	Frequency	Percentages
Desire for children		
0 child	612	0.61
1 child	213	2.08
2 children	4,175	40.84
3 or more children	4,520	44.21
Non-numeric response	1,253	12.26

When the non-numeric response is dropped from the variable, the average number of women's desired children is 2.95 per woman. From the respondent's distribution is also known that the median number is three, which means, half of the women desired three or more children in the family. This desired fertility does not differ much from the actual children born. The mean and the median of those two, the desired and the actual children, are still above the replacement level of 2.1 children per woman.

Preference of women towards the number of children they desire compared to the husband, seen in Table 5, shows that most of the women (67.73 percent) desire the same number as their husbands. In comparison, the rest (32.27 percent) desire differently from their husbands, either less or more than their husbands' desires.

Table 5. Women's desire for children relative to their husband

Characteristics	Frequency	Percentages
Desire for children		
Both want same	6,375	67.73
Different wants	3,037	32.27

The range between the respondents on age, when they had their first birth, is quite wide (36 years), with a mean of 22.40. Figure 6 shows that the distribution is right-skewed, which shows that most respondents have their first birth early. The median age of the respondent's first birth is 22 years old; it means that half of the respondents had their first birth younger than 22 years old.

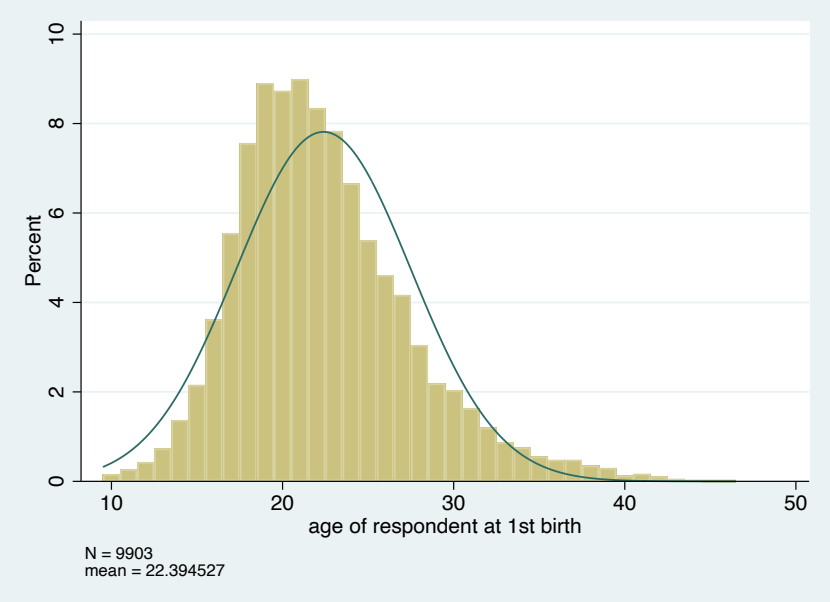

Figure 6. Distribution of women's age at first birth

4.1.2 Characteristics of the respondents

Figure 7 shows a histogram chart illustrating the age distribution of 10,223 women who were part of the sample. According to the chart, the average age of the women is 44.24 years, which represents the mean age of the sample. The median age of the sample is 44 years, indicating that half of the women are younger than 44 while the other half are older. The most frequent age among the respondents, or the mode, is 41 years old.

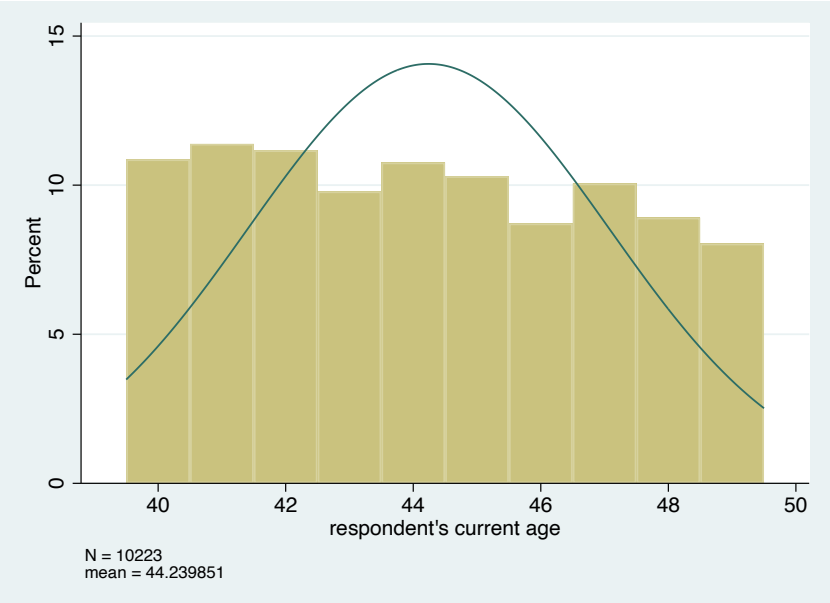

Figure 7. Age distribution of the respondents

The spousal age gap is computed from the husband's age minus the women's age. The positive difference in the gap means that the husband is older. Meanwhile, the negative difference shows otherwise. The data distribution in Figure 8. shows that the age gap ranges from -35 years (the wife is 35 years older than the husband) to 45 years (the husband is 45 years older), with a mean of 4.05 years. The median of four years means that half of the women have husbands more than four years older than them.

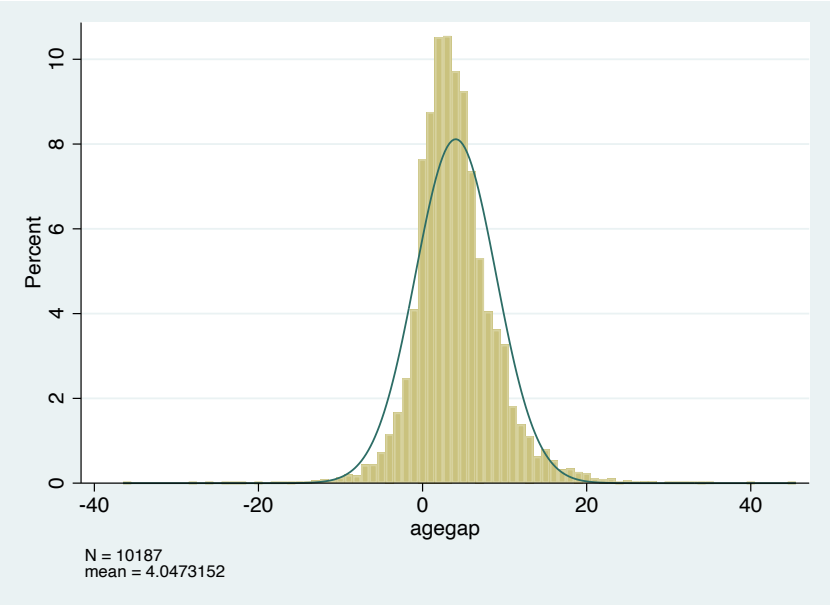

Figure 8. Distribution of spousal age gap

Table 6 shows the socio-economic characteristics of married women aged 40-49. More than half (53.04 percent) of the respondents lived in urban areas, while the rest lived in rural areas. Regarding the educational level, only minor parts (3.39 percent) of women have no education. In contrast, most women (84.60 percent) finished the primary and secondary levels of education. The rest of the women (12.01 percent) completed higher education. More than half (66.48 percent) of the respondents are currently working, but a big part (89.95 percent) earned less than their husbands.

Table 6. Socio-economic characteristics of the respondents

Characteristics	Frequency	Percentages
Place of residence		
Urban	5,422	53.04
Rural	4,801	46.96
Education		
No education	347	3.39
Primary	4,041	39.53
Secondary	4,607	45.07
Higher	1,228	12.01

Characteristics	Frequency	Percentages
Employment		
Employed	3,424	33.52
Not employed	6,792	66.48
Wealth Index		
Poorest	2,042	19.97
Poorer	1,824	17.84
Middle	1,877	18.36
Richer	2,052	20.07
Richest	2,428	23.75

Women's empowerment level in this study is defined by their participation in decision-making and their views of wife beating. Table 7 shows that the majority (71.70 percent) of the respondents decide alone or jointly with their husbands regarding their health care, visits to their family or relatives, and major household purchase. Over half (67.34 percent) of the women did not justify wife-beating in all five circumstances. Almost half (49.60 percent) of the respondents are empowered by combining those two categories.

Table 7. Frequency and percentage of respondents by empowerment indicators

Indicators	Frequency	Percentage
Decision-making		
(4) their own health care		
Yes	9,140	89.49
No	1,068	10.51
(5) major household purchases		
Yes	8,068	78.98
No	2,147	21,02
(6) visits to their family or relatives;		
Yes	9,092	89.06
No	1,117	10,94
On all three		
Yes	7,330	71.70
No	2,893	28,30
Views on wife-beating		
(6) she burns the food		
Yes	243	2.38
No	9,914	96.99
(7) she argues with him		
Yes	604	5.91
No	9,486	92.80

Indicators	Frequency	Percentage
(8) she goes out without telling him		
Yes	2,124	20,78
No	7,991	78,17
(9) she neglects the children;		
Yes	2,674	26,16
No	7,453	72,91
(10) she refuses to have sexual intercourse with him.		
Yes	647	6.33
No	9,424	92.22
On all five		
Yes	3,339	32.66
No	6,884	67.34
Women empowerment		
Empowered	5,071	49,60
Unempowered	5,152	50,40

The exposure of family planning messages to the respondent can be seen in Table 8. More than half (51.83 percent) of respondents were ever exposed to information on family planning in one of the media (radio, newspaper, television) in the last few months. Women mainly (49.71 percent) heard and saw family planning messages through television compared to any other media like radio (9.29 percent) or newspaper (11.62 percent).

Table 8. Exposure of family planning messages from media in last few months

Family planning messages exposure from media	Frequency	Percentages
1. radio		
Yes	949	9.29
No	9,268	90.71
2. television		
Yes	5,080	49.71
No	5,139	50.29
3. newspaper		
Yes	9,030	11.62
No	1,187	88.38

Regarding attitudes towards childbearing and fertility control of the respondents, almost all (92.10 percent) of the respondents are using contraceptives when it is needed, and only a tiny portion of them (7.90 percent) are experiencing unmet needs, as it seen on Table 9.

Table 9. Attitudes towards childbearing and fertility control of the respondents

Characteristics	Frequency	Percentages
Unmet need		
Yes	808	7.90
No	9,415	92.10

4.1.3 Relationships of all explanatory variables to the excess fertility

The details of the relationship of excess fertility to all of the independent variables, including the women's socio-economic characteristics, are in Table 10 below. The table shows the correlation of two categorical variables with chi-square significance. Percentage shows the total on the rows (on total of each category of the independent variable).

Table 10. Result of cross-tabulation for categorical explanatory variables in analysis and their relationship with excess fertility.

Cross-tabulation	Excess fertility			
Characteristics	% no	% yes	% total	Chi-square
Women empowerment				**0.000**
Unempowered	75.82	24.18	100.00	
Empowered	78.96	21.04	100.00	
Employment				**0.112**
Unemployed	76.43	23.57	100.00	
Employed	77.83	22.17	100.00	
Husband's desire for children				**0.000**
Both want same	80.39	19.61	100.00	
Different wants	74.55	25.45	100.00	
Wealth Index				**0.471**
Poorest	75.86	24.14	100.00	
Poor	77.52	22.48	100.00	
Middle	77.68	22.32	100.00	
Rich	77.68	22.32	100.00	
Richest	78.05	21.95	100.00	
Spousal age gap				**0.000**
Younger wife >5 years	81.77	18.23	100.00	
Younger wife ≤5 years	82.15	17.85	100.00	
Same age	78.31	21.69	100.00	
Older wife ≤5 years	77.27	22.73	100.00	
Older wife >5 years	75.53	24.47	100.00	
Place of residence				**0.139**
Urban	76.80	23.20	100.00	
Rural	78.03	21.97	100.00	
Attitudes on family planning				**0.000**
No unmet needs	77.83	22.17	100.00	
Unmet needs	72.03	27.97	100.00	

Cross-tabulation	Excess fertility			
Characteristics	% no	% yes	% total	Chi-square
Media exposure of family planning				**0.005**
Unexposed	78.57	21.43	100.00	
Exposed	76.26	23.74	100.00	
Highest education level completed				**0.000**
No education	82.13	17.87	100.00	
Primary	77.23	22.77	100.00	
Secondary	75.91	24.09	100.00	
Higher	82.00	18.00	100.00	

From Table 10, the percentage of excess fertility decreased by 3.12% as the women went empowered from unempowered. Excess fertility was also more prominent in unemployed women (23.57 percent) than employed women (22.17 percent). Excess fertility was observed to be the most prominent in the poorest category (24.14 percent) and the least in the richest category (21.95 percent). Excess fertility is seen the most in larger age gap categories for younger wives (18.23 percent) or older wives (24.47 percent). Older wives groups (22.73 percent and 24.47 percent) had more excess fertility compared to the couple with younger wives (18.23 percent and 17.85 percent) and the same-age couples (21.69 percent). The difference in desiring the number of children increases the proportion of excess fertility by 5.84 percent. The percentage of excess fertility in women wanting the same number of children as their husbands was 19.61 percent increased to 25.45 percent when they desired differently. Women residing in urban areas record a more considerable percentage of respondents (23.20 percent) than those in rural areas (21.97 percent).

Regarding the attitudes on family planning, women who do not want any more kin but do not use any contraceptives (unmet needs) have a higher proportion (27.97 percent) of excess fertility compared to those who are not having unmet needs (22.17 percent). Women exposed to family planning messages on at least one media had a more considerable proportion (23.74 percent) compared to those not exposed to the message (21.43 percent). Regarding the highest education level completed by women, the proportion of excess fertility increases as women complete higher levels of completed education. It increases from 17.87 percent for the women with no education to 22.77 percent for those who completed primary education as their highest level of education. Women who completed secondary education were recorded as having the most significant proportion of excess fertility (24.09 percent). Women who finished higher education (college and universities) have 18.00 percent of women who experienced excess fertility.

Table 10 shows the results of the chi-square test, which tests the statistical significance of the relationship between categorical independent variables and dependent variables. The variables of women's empowerment, husband's desire for children, attitudes on family planning, media exposure to family planning messages, and highest education level completed were found to be statistically significant at a 0.05 p-value significance level. However, there was no significant correlation found between women's employment, earnings, and place of residence and excess fertility, as the significance level was higher than 0.05.

Table 11. Correlation of ratio nominal explanatory variables to the excess fertility

Pearson's correlation	Excess fertility
Excess fertility	1.000
Women's age at first birth	-0.14
p-value	0.00

The Pearson product-moment correlation coefficient, often shortened to Pearson correlation or Pearson's correlation, measures the strength and direction of association between continuous variables. Table 11 shows that women's age at first birth has a negative relationship with excess fertility. It has a significant relationship with excess fertility on a p-value lower than 0.05.

4.2 Binary logistics regression analysis

The analysis adopts binary logistic regression for searching the association of response (dependent) and explanatory (independent) variables. The response variable has two outcomes coded as binary: 0= = no excess fertility and 1= = excess fertility. The regression coefficients are displayed as exponential coefficients, known as odd ratios (OR), for interpretation. An OR greater than 1 suggests that an increase in a variable is more likely to cause the event to occur, indicating a positive effect. An OR less than 1 indicates a decrease in probability as the variable increases, representing a negative effect. An OR of 1 indicates no effect at all.

4.2.1 Univariate regression of explanatory variables on excess fertility

This section elaborates on the univariate relationship of each endowment and conversion factors with the event of overachieved fertility in women. The table 12 shows that there was women's level of education, women's age at first birth, spousal age gap, women's empowerment level, women's attitude towards family planning, women's exposure to family planning messages, and spousal preference on the number of children preferred were variables that significantly affected the happening of excess fertility in Indonesia.

Table 12. The univariate analysis of independent variables with excess fertility in Indonesia

Explanatory	Odds ratio (exp(b))	CI 95%		Sig. (p.value≤0.05)	Nagelke's R-squared (%)
		Lower	Upper		
Endowments factors					
Education				0.00	0.4
No education	Reference			Reference	
Primary	1.35	1.02	1.80		
Secondary	1.46	1.10	1.94		
Higher	1.00	0.74	1.38		
Wealth index				0.48	0.1
Middle	Reference			Reference	
Poorest	1.11	0.95	1.61		
Poorer	1.00	0.86	1.18		
Richer	1.00	0.86	1.16		

Explanatory	Odds ratio (exp(b))	CI 95%		Sig. (p.value≤0.05)	Nagelke's R-squared (%)
		Lower	Upper		
Richest	0.98	0.84	1.13		
Employment status				0.11	0.0
Unemployed	Reference			Reference	
Employed	0.92	0.84	1.02		
Age at first birth	0.93	0.92	0.94	0.00	3.3
Spousal age gap				0.00	0.3
Same age	Reference			Reference	
Younger wife >5 years	0.80	0.53	1.22		
Younger wife ≤5 years	0.78	0.62	0.99		
Older wife ≤5 years	1.06	0.88	1.27		
Older wife >5 years	1.17	0.96	1.41		
Women's empowerment				0.00	0.2
Unempowered	Reference			Reference	
Empowered	0.84	0.76	0.92		
Conversion factors					
Place of residence				0.14	0.0
Urban	Reference			Reference	
Rural	0.93	0.85	1.02		
Attitude towards family planning				0.00	0.2
Met need	Reference			Reference	
Unmet need	1.36	1.16	1.60		
Media exposure				0.00	0.1
Unexposed	Reference			Reference	
Exposed	1.14	1.04	1.25		
Husband's preference				0.00	0.7
Same wants	Reference			Reference	
Different wants	1.40	1.26	1.55		

Doing univariate binary regression logistics to each independent variable with the dependent variable is to test their relationship, especially when a non-linear relationship is expected between them (Bursac et al., 2008). From all the characteristics conceptualised as endowment factors, women's age at birth gives the most significant variability to excess fertility, given the highest R-square (3.3%). Women's age at birth explained the excess fertility variability the most compared to the other variables constructed as endowment factors. Meanwhile, the husband's preference explained the excess variability the most (0.7%) compared to the other variables constructed as conversion factors.

4.2.2 Influence of socio-economics characteristics of women on excess fertility

The *first research question* of this paper is to find out *what endowment factors are associated with overachieving their fertility desire*. The characteristics tested in this research are women's level of education, household wealth, employment status, age at first birth, spousal age gap, and women's level of empowerment. These socio-economics profiles are conceptualised as women's endowment factors for achieving their fertility in Figure 4. It was hypothesised that women with high education, who are employed and living in a wealthy household, who have a high level of empowerment, and who have less age gap with their husbands are *more likely* to achieve fertility desire.

Table 13 shows the result of binomial logistic regression showing the odds and significance level of the women's excess fertility and their endowment factors as explanatory variables. All the endowment factors show a statistically significant effect on women's inability to achieve their fertility desire and overachieve it, except for women's employment status.

*T*able 13. The odds ratio of logistic regression on excess fertility of currently married women aged 40-49 for each endowment factor.

Endowment factors	**Odds ratio (exp(b))**	**CI 95%**		**Sig. (p.value≤0.05)**
		lower	upper	
Education				
No education	Reference			
Primary	1.47	1.09	1.98	0.01
Secondary	2.13	1.58	2.89	0.00
Higher	2.19	1.55	3.10	0.00
Wealth index				
Middle	Reference			
Poorest	1.18	1.01	1.38	0.04
Poorer	0.99	0.84	1.16	0.89
Richer	0.97	0.83	1.14	0.74
Richest	1.01	0.87	1.18	0.87
Employment status				
Unemployed	Reference			
Employed	0.93	0.84	1.03	0.18
Age at first birth	0.91	0.90	0.92	0.00
Spousal age gap				
Same age	Reference			
Younger wife >5 years	1.64	1.01	1.38	0.03
Younger wife ≤5 years	0.90	0.84	1.16	0.89
Older wife ≤5 years	0.88	0.83	1.14	0.74
Older wife >5 years	0.87	0.87	1.18	0.87

Endowment factors	Odds ratio (exp(b))	CI 95%		Sig. (p.value≤0.05)
		lower	upper	
Women's empowerment				
Unempowered	Reference			Reference
Empowered	0.87	0.79	0.96	0.00

Table 13 shows that education significantly impacts women's overachieving of their desire on a p-value of 0.05. We can see that the higher the level of education the women have completed, the more likely they will overachieve their fertility desire compared to those women who completed no education. Compared to those who did not complete any formal education, while holding all other variables constant, women who completed the primary level are 1.47 times more likely to overachieve their desire, and women who completed the secondary level are 2.13 times more likely to overachieve their fertility desire. Last, those who completed college and university are 2.19 more likely to overachieve their fertility desire. It contrasts with the hypothesis we proposed at the beginning, which states that the higher the education women complete, the more likely they can acquire their fertility desire.

The wealth index, the proxy variable for the household's economic status, shows that the wealth category does not significantly differ in the overachieved fertility for each wealth category. Except for the poorest category, the only category showing a significant difference in p-value of 0.05 compared to the middle category for overachieved fertility. Women in the poorest category household have higher odds (1.18 times) of experiencing excess fertility than those in the middle category while holding all other variables constant.

The age when the women first give birth significantly affects the excess fertility on the p-value of 0.05. The regression result shows, the later the women start their 'childbearing career,' the more likely they are to achieve their fertility desire. For increasing one year of women's age when they had their first birth while holding other variables constant, it is 0.91 less likely to overachieve their desire.

The age difference between the husbands and the women only shows significance in the category where the gap between the couple is that the husband is older than five years compared to the wife. This category has a significant impact at the p-value level of 0.05, having higher odds (1.64 times) on the happening of excess fertility compared to the same-aged couple while holding all the other variables constant.

Empowering women also has a significant effect at the p-value of 0.05 on the event of excess fertility in couples. Wives who are empowered are 0.87 less likely to experience excess fertility than those unempowered wives while holding all other variables constant.

To answer the *second research question*, we are searching *what endowment factors are associated with overachieving their fertility desire*. Table 12 is the result of binomial logistic regression showing the odds and significance level of the women's excess fertility with their endowment factors adjusted for their *conversion factors as explanatory variables.*

Table 14. Odds ratio of logistic regression on excess fertility of currently married women aged 40-49 for each endowment factors and conversion factors.

Explanatory	Odds ratio (exp(b))	CI 95%		Sig. (p.value≤0.05)
		Lower	Upper	
Endowments factors				
Education				
No education	Reference			Reference
Primary	1.39	1.03	1.88	0.03
Secondary	1.98	1.45	2.70	0.00
Higher	1.89	1.31	2.72	0.00
Wealth index				
Middle	Reference			Reference
Poorest	1.36	1.15	1.61	0.00
Poorer	1.04	0.88	1.23	0.63
Richer	0.99	0.84	1.17	0.92
Richest	0.95	0.80	1.13	0.57
Employment status				
Unemployed	Reference			Reference
Employed	0.94	0.85	1.05	0.29
Age at first birth	0.91	0.89	0.92	0.00
Spousal age gap				
Same age	Reference			Reference
Younger wife >5 years	1.69	1.05	2.72	0.03
Younger wife ≤5 years	0.95	0.74	1.28	0.73
Older wife ≤5 years	0.95	0.77	1.16	0.60
Older wife >5 years	0.94	0.76	1.16	0.56
Women's empowerment				
Unempowered	Reference			Reference
Empowered	0.86	0.77	0.95	0.00
Conversion factors				
Place of residence				
Urban	Reference			
Rural	0.82	0.72	0.92	0.00
Attitude towards family planning				
Met need	Reference			Reference
Unmet need	1.40	1.18	1.65	0.00
Media exposure				
Unexposed	Reference			Reference
Exposed	1.18	1.06	1.31	0.00
Husband's preference				
Same wants	Reference			Reference
Different wants	1.39	1.25	1.54	0.00

Adding the conversion factors into the model does not change the situation of the women's endowment factors. It does not change the significance of the variables and the relationship at the p-value of 0.05; it just slightly changes the magnitude of each variable. Adding the conversion factors improved the model as the log-likelihood in the initial model (-4622.25) was higher than in the improved model (-5214.39).

The conversion factors variable added to the model, place of residence, attitude on family planning, media exposure of family planning message, and husband's preference, all significantly impact the women's excess fertility, at the significance level of p-value 0.05. Holding all other variables at constant, women residing in rural areas are 0.82 times less likely to over-achieve their fertility than those living in urban areas. Women whose needs are unmet are 1.40 more likely to experience excess fertility than those whose needs are met. The media exposure of family planning messages also significantly impacts excess fertility events. Holding all other variables constant, those exposed to the media are 1.18 times more likely to over-achieve their desire than those who never heard or saw family planning messages. When there is a conflict between spouses on how many children they desire, the couple will have 1.39 times higher odds of overachieving their fertility desire than those who desire the same number of children. This finding of the place of residence and media exposure contrasts our proposed hypothesis that the unexposed are the ones who are more likely to overachieve their fertility desire.

The resume of each model constructed results in Table 15 to be compared. The table shows that from the two models built in this research, looking at the model's log-likelihood and pseudo-R-square, Model 2, which included all explanatory variables used (endowment and conversion factors), is the best model available.

Table 15. Resume of odds ratio on logistic regression model on excess fertility of currently married women

Explanatory	Odds ratio (exp(b))	
	Model 1	Model 2
Endowments factors		
Education		
No education	Reference	Reference
Primary	1.47***	1.39**
Secondary	2.13***	1.98***
Higher	2.19***	1.89***
Wealth index		
Middle	Reference	Reference
Poorest	1.18**	1.36***
Poorer	0.99	1.04
Richer	0.97	0.99
Richest	1.01	0.95
Employment status		
Unemployed	Reference	Reference
Employed	0.93	0.94
Age at first birth	0.91***	0.91***

Explanatory	Odds ratio (exp(b))	
	Model 1	Model 2
Spousal age gap		
Same age	Reference	Reference
Younger wife >5 years	1.64**	1.69**
Younger wife ≤5 years	0.90	0.95
Older wife ≤5 years	0.88	0.95
Older wife >5 years	0.87	0.94
Women's empowerment		
Unempowered	Reference	Reference
Empowered	0.87***	0.86***
Conversion factors		
Place of residence		
Urban		Reference
Rural		0.82***
Attitude towards family planning		
Met need		Reference
Unmet need		1.40***
Media exposure		
Unexposed		Reference
Exposed		1.18***
Husband's preference		
Same wants		Reference
Different wants		1.39***
Log likelihood	-5214.39	-4622.25
Pseudo R2	0.0276	0.0379
AIC	1.06	1.03

*Significant at p-value≤0.1 **significant at p-value≤0.05 ***significant at p-value≤0.01

4.3 Summary of the results.

The hypotheses we proposed at the beginning are listed as follows:

1. Socioeconomic profiles constructed as endowment factors are associated with overachieving their fertility desire. Those profiles are level of education, household wealth, women's employment status, women's age at her first birth, spousal age gap, and women's level of empowerment. Women with high education who live in wealthy households, are the same age or older as their husbands, have a first child at an older age, and are empowered are *more likely* to achieve fertility desire.
2. The barriers constructed as conversion factors are associated with overachieving their fertility desire. Those profiles are places of residence, women's attitudes towards family planning behaviour, media exposure of family planning messages, and husbands' preferred number of children. Women who reside in a rural area and have unmet needs, are

unexposed to the media, and have a conflict with spouses regarding the number of children preferred are *less likely* to achieve fertility desire.

From Table 14, it can be seen that socioeconomic profile attachments which are constructed as endowment factors, are associated with overachieving their fertility desire. Those profiles are level of education, household wealth, women's age at her first birth, spousal age gap, and women's level of empowerment. Women with no education who live in a wealthy household, are the same age as their husbands, have a first child at an older age, and are empowered are *more likely* to achieve fertility desire.

The results regarding conversion factors of women in achieving their fertility desire, the barriers are living in urban areas, having unmet needs, being exposed to media of family planning messages, and having preference conflict with their husband. It was slightly different from the hypothesis where it was proposed that living in urban areas and being unexposed to the media was one of the barriers to achieving fertility desire.

Chapter 5. Discussions and Conclusions

This chapter presents data results in three sections, with recommendations in the final section. The first section discusses the research's results, followed by the conclusion, including the limitations of the research in the following section.

5.1 Discussions of the result

This research examined the determinants of overachieved fertility for 10,223 currently married women aged 40-49 who are on their monogamous and first marriage. The data is retrieved from Indonesia Demographic and Health Survey (DHS) 2017. The capability approach framework determined the endowment and conversion factors affecting the overachieved fertility desire among Indonesian women. This research aims to understand how endowment and conversion factors impact achieving the goal of fulfilling fertility desires by analysing the underlying mechanisms of relevant variables.

It was found in this research that 22.63 percent of the respondents still need to achieve their fertility desire and overachieved. This percentage of people who failed to achieve their fertility desire was found to be the highest in the oldest age group. This age group also has the most stabilised response for fertility intention as it is closer to the end of a woman's fertility childbearing career, as her reproductive future is less uncertain as she ages (Kalamar and Hindin, 2015; Heiland et al., 2007).

This study aimed to gain insight into the socioeconomic background of couples unable to achieve their desired fertility, focusing on overachieving. The background attachments are assessed using a framework based on the capability approach and categorized into endowment and conversion factors. With this objective in mind, the following two sub-questions were formulated: 'What endowment factors are associated with overachieving their fertility desire?' and 'What conversion factors are associated with overachieving their fertility desire?'.

The univariate logistic regression result (see Table 12) reveals that the independent variables constructed as both endowment factors and conversion factors in this research only resulted in low variability (R-square) of the event overachieved fertility of women aged 40-49 in Indonesia. This kind of result is somewhat expected as it is the effect of the research only examining individual and couple-level traits, as that was the only data available; meanwhile, Indonesia is identic with its collectivist culture (Hofstede et al., 2010). Within the endowment factors, women's age at first birth contributes the highest to excess fertility variability (3.3%). Meanwhile, the congruence of the desire between couples contributed the highest (0.7%) to the excess fertility variable within conversion factors.

The multivariate binary logistic regression shows that through the capability approach framework built, socioeconomic profile attachment to women affects their excess fertility significantly. Among the endowment factors, women's education level, household wealth status, age at first birth, spousal age gap and women's empowerment level were found to define the event of overachieved fertility significantly. Previous research also found similar results (Kebede, 2022; Berrington, 2014; Morgan and Rackin, 2010; Akram et al., 2020; Hosseini et. al., 2021). Independent variables within the constructed conversion factors, place of residence, media exposure of family planning messages, attitude towards family planning, and dyadic conflict on

number of children, also significantly affected the overachieved fertility. Previous research also found this result (Babalola et al., 2017; Yeboah et al., 2021; Gebreselassie, 2008).

With regard to the first research question, it was found that endowment factors affecting the excess fertility are the level of women's education, household wealth status, women's age at first birth, women's spousal age gap, and respondent's level of empowerment variables found significant to the event of overachieved fertility while women's employment status is not. Thus, the specific characteristics of couples who overachieve their fertility desire, based on their endowment factors, are those *who live in urban areas, have higher education, give birth at a younger age, the wife being younger than five years than the husband, and have an unempowered wife*.

While still believing that living in urban areas and being educated will help women to achieve their fertility desire, as shown in previous research (Kebede et al., 2021; Kim 2016; Berrington and Pattaro, 2014), the analysis results showed otherwise. We suspect this was the effect of misreporting fertility preference from women with lower education and higher fertility. This phenomenon is found in a fertility preference study in China (Hermalin and Liu, 1990) and rural Latin America (Conning and de Jong, 1975). This misreports is described as usually underreport or rationalization, including the situation in which the respondent gives her own family size presumably to avoid acknowledging the difference between actual family size as 'excess' (Bongaarts and Casterline, 2018 ; Kuhnt et al., 2017) As Demographic and Health Survey is a cross-section survey and a sole source of fertility preference data in Indonesia, we are not able to see if the couple's fertility preference data is valid and consistent.

The analysis shows that the poorer the household is, the higher the odds of being overachieved. However, compared to the middle category, those women in the poorest wealth category are the only category significantly more vulnerable to excess fertility. This linkage between poverty and excess fertility also found in other developing nations (Shah and Chandra-Mouli, 2007; Gillespie et al., 2007)

Women who gave their first birth early have higher odds of overachieving their fertility desire. The younger the woman gives her first birth, the earlier they start their childbearing career. The earlier this career starts, it leads to higher fertility compared to those who start their childbearing career later, which may result in higher fertility outcomes than what they desire (Tomkison, 2019; Nitsche and Hayford, 2020).

The greater the age gap between the couple, the higher the odds they have overachieved fertility. The highest odds are spotted in younger wives with more than five years gap. The less age gap between the husband and the wife is often associated with greater control of women's fertility behaviour (Tilahun et. al., 2014; Ibisomi, 2014; Barbieri and Hetrich, 2005). The spousal age gap is also often used as a women's empowerment level proxy, where women with a significant age gap with their husbands are usually also associated as unempowered women (Abadian, 1996; Carmichael, 2011). Higher women's empowerment level is also associated with greater fertility behaviour control, thus the higher odds of achieving fertility desire (Upadhay and Karasek, 2014).

Continuing to the following research question, it was found that conversion factors affecting the excess fertility are place of residence, attitudes towards family planning, exposure to the media of

family planning messages and husband's preference. Based on the analysis results, the barriers of women, which are constructed from the conversion factors to achieving fertility desire, are *residing in urban areas, having unmet needs, being exposed to the media, and having dyadic conflict on fertility desire*. The unmet need for family planning points to the gap between women's reproductive desire to avoid pregnancy and contraceptive behaviour, thus leading to unintended fertility (Casterline et al., 2003; Machiyama et al., 2017; Akram et al., 2020). There are significant results on the success of achieving fertility desire when the couple is having conflict on the preference in the number of children preferred in the household. Dyadic conflict on preference results in behaviour that inhibits the couple from achieving the fertility desire (DeRose et al., 2002; Nitsche and Hayford, 2020; Yeatman et al., 2020).

This study found that exposure to the family planning messages media increased the odds of overachieving the fertility desire. Living in urban areas in a developing country, especially in Indonesia, is associated with better infrastructure with easier access to health care which means access to family planning and contraceptives leading to lower fertility (Chernichovsky et al., 1982; White et. al, 2008; Nugroho et al., 2022). While we still believe that living in urban and the individual's knowledge of family planning is essential in achieving their fertility desire, however, due to this study's limitation on examining determinants of overachieved fertility in women at individual and couple levels, this study was not able to catch the household or family level as a couple's post-marital living area is either matrilocal or patrilocal was more prevalent compared to live neolocal (Snopkowski et al., 2014), so it was expected to see the power dynamics between the couple's parents or family as conversion factors for them to achieve their fertility desire. As a country whose first verse of its national foundation is monotheism, religion permeates every aspect of Indonesian life at a higher level (Saragih, 2019), which is not captured in this research due to the IDHS data limitation.

5.2 Conclusion of the research

This study aims to understand the socioeconomic background, constructed as endowment and conversion factors of couples unable to achieve their desired fertility, focusing on overachieved fertility using the capability approach framework. The results of this research assessed endowment and conversion factors affecting overachieved fertility in Indonesia.

According to the results, women aged 40-49 years in Indonesia have a relatively low rate (22.63 percent) of overachieved fertility. Nevertheless, this percentage is the highest among all age groups. To address the research questions, bivariate logistic regressions were employed. The outcome of the analysis is presented below.

a. The endowment factors which had a significant and positive effect on overachieved fertility but had a negative effect on achieving desired fertility is education level.
b. The endowment factors which had significant and adverse effects on overachieved fertility but positively affected achieving desired fertility are women's age at first birth, household wealth status, spousal age gap, and women's empowerment level.
c. The conversion factors tested in this study, which were, negative attitude towards family planning, unexposed by media to family planning messages, dyadic preference conflict,

and living in rural areas, had a significant and positive effect on overachieved fertility but had a negative effect on achieving desired fertility.

However, even though some of the directions of the variables in both factors come differently than expected, it may result from misreporting the fertility desire due to rationalisation bias. The exclusion of factors outside the household level, such as religion, society, and governmental level in this study may change the direction and significance of variables tested here.

5.3 Limitations of the research

While the study has successfully answered the research questions and met its objectives, there are certain limitations that need to be taken into account.. The research partially limited the framework capability approach, as the IDHS 2017 dataset had limitations. The research could not evaluate the agency and capability sets in the capability approach framework. However, within this framework, we have provided an initial understanding of the endowments and conversion factors that affect the ability to achieve fertility desire. Additionally, due to the limited data in the IDHS 2017 dataset, we couldn't examine the reliability and consistency of the couple's fertility desire from both the husband's and wife's perspectives. Thus, our study only defined the couple's fertility desire based on their response during the time of interview.

5.4 Recommendations of the research

Based on the findings of this research, some recommendations could be offered:

a. To decrease the proportion of women overachieving their fertility desire, the government could increase the minimum age of marriage to delay the age of women's age at first birth, empowering wives to give them more authority to control their fertility behaviour and outcome, and easing access to contraceptives use so the couples in need could easily be provided.
b. Future researchers should consider alternative datasets to continue analysing fertility desire using the capability approach framework. We suggest using primary data as collecting primary data that not only validates and maintains consistency in respondents' fertility desires but also provides information on agency and capabilities that would better operationalise the capability approach. Using panel data could also be an alternative as this enumeration of the same respondents for some time could validate and maintain the respondent's response on fertility desire.

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