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Factors Affecting Fertility Behavior of Women in Karnali Province of Nepal

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Abstract

Fertility is a crucial aspect of understanding population growth particularly in developing countries, and is influenced by social and economic factors. This study examines 1.fertility behavior among women in Nepal's Karnali province using secondary data from the Nepal Demographic and Health Survey (NDHS). The findings show that Karnali province has a total fertility rate (TFR) of 2.6, which is higher than the national average of 2.0. The mean number of Children Ever Born (CEB) in the province is 2.64. While 16 percent of the women still want more children, a majority (64%) do not. Regarding ideal family size, 64 percent of women consider two children ideal, and 17 percent prefer three, indicating a general preference for smaller families. The study uses methods such as frequency tables, cross-tabulations, correlation analysis, and mean CEB calculations to examine fertility determinants. A strong and statistically significant negative correlation is found between educational attainment and fertility ($r = -0.519$, $p < 0.000$), suggesting that more educated women tend to have fewer children. The wealth index also shows a weak but significant negative correlation with fertility ($r = -0.178$, $p < 0.000$), indicating that women from wealthier households generally have lower fertility. Interestingly, CEB is lower among women who have never used contraceptives than among those who have ($r = 0.279$, $p < 0.000$), possibly because women with more children adopt contraception to limit further births. Additionally, older women tend to have higher CEB and are more likely to use contraceptives, reflecting their desire to stop childbearing after achieving their desired family size. These findings highlight the need for targeted education and reproductive health programs to manage fertility effectively.

Keywords: *Fertility behavior, CEB, fertility preference, desire of children, ideal no of children.*

1. Introduction

Children are symbol of wellbeing both socially and economically. A person's ability to conceive a child is known as fertility. The study of fertility is significantly important to population growth in developing countries. Fertility, mortality, and migration constitute the three demographic processes that determine the structure, distribution, and growth of the

population. Fertility is more complicated than other demographic processes, and it is influenced by multiple factors, including behavioral and biological.

Fertility is strongly related to level of development and family planning programme effort. Most of the least developed countries in Africa are facing the problems of high fertility, such as Niger 6.1, Mali 5.7, Angola 5.1, Burundi 4.9, Nigeria 4.5, and Congo 3.9 children per woman in 2024 (Population Reference Bureau, 2024). Similarly, some countries from South Asia, such as Afghanistan, Pakistan, and Bangladesh, still have high fertility (4.8, 3.6, and 2.2 children per woman, respectively) (PRB, 2024). The fertility rate has decreased over the year in developed countries; however, the current fertility rate for the world in 2024 is 2.2 births per woman, which has a 0.33 percent decline from 2023 (PRB, 2024).

Nepal, one of the developing countries in the South Asian region, had also been experienced high fertility rates past 10 years ago. Recently, it has fallen below the replacement level (3.1 and 2.0 per women according (MoHP, 2006 & 2022). In national level fertility has gradually declining however it has different in province level. Nepal demographic and health survey 2022 revealed that total fertility rate is highest in Madhesh Pradesh (2.7) and Karnali Pradesh (2.6) and lowest in Gandaki (1.4) and Bagmati Pradesh (1.6) (MoHP, 2022).

According to the Population and Housing Census 2022, 28 percent of women who have ever been married aged 15 - 49 have had two children ever born. Similarly, 19.6 percent of all married women between the ages of 15 - 49 have had three children ever born, while 2.1 percent of women aged 15-19 have had seven or more children ever born (National Statistical Office, 2022).

The new constitution of Nepal was adopted on September 20, 2015, and has established seven federal states, including Karnali state. Karnali Province was officially named as Karnali by the Provincial Assembly on February 25, 2018. Before that, it was known as Province no. 6. Karnali province is the largest province in Nepal in terms of area (19.74%) and the least populous province in Nepal in terms of population, with 5.93 in 2068 and 5.79 percent of the total population in 2021 (NSO, 2022). Similarly, annual population growth in Karnali province is 0.70 percent, and population density is lower (60 per sq km) than in other provinces. Regarding education, Karnali province has 76.1 percent literacy, while the female literacy rate is 69.4 percent. This total literacy rate is lower than the other provinces except Madhesh Province (63.5%). Largest number of population (69.8%) are engaged in agriculture sector. The information presented a picture of Karnali province lagging behind other regions of Nepal in terms of social and economic development. This disparity is further reflected in its fertility patterns. While the total fertility rate in Karnali is 2.19

children per woman, the crude birth rate stands at 18.7 per thousand population, and the child-woman ratio is 0.366. Notably, the mean age of childbearing in Karnali province is lower (26.9 years) compared to other provinces, which can have implications for both maternal and child health as well women's opportunities (NSO, 2081).

Fertility behavior encompasses the patterns and decisions related to childbearing among women or couples. It includes key aspects such as the number of children born, the timing and spacing of births, as well as related reproductive behaviors like marriage, cohabitation, and the use of contraception (Swicegood & Bean, 2001). It covers a range of factors influencing when, how often, and under what circumstances people choose to have children. Fertility behavior is shaped by a mix of individual, cultural, social, economic, and environmental factors. Understanding fertility behavior is crucial for fields like demography, public health, economics, and sociology, as it directly impacts population growth, family structure, and resource allocation. Davis and Blake (1956), has classified the factors affecting fertility behavior into two groups: intermediate or proximate variables and background variables. The proximate variables include those that directly affect fertility while the background variables include cultural, psychological, economic, social, health, and environmental factors (Jolly & Gribble, 1993).

2. Objective

This study aims to identify and analyze the factors that influence the number of children ever born to married women within the reproductive age group residing in Karnali province, Nepal.

3. Methodology

This study is based on a descriptive and analytical research design. The Nepal Demographic and Health Survey 2021 is a major source of data used in this study. This is a nationally representative survey that has been conducted every five years since 1996. The latest sixth round of the survey was conducted during 2021, covering 14,845 married women aged 15–19 years and 4,913 married men aged 15-49 years. The NDHS collected data from the following number of women in each province: Koshi (2,209), Bagmati (2,106), Gandaki (1,682), Lumbini (2,266), Karnali (1,978), and Sudurpaschim (2,105). However, this study focuses exclusively on Karnali province. After weighting, the analysis has included 909 women aged 15-49 for socioeconomic factors. A subset of 691 currently married women from this group has further analyzed fertility behavior, including children ever born, desire for more children, and ideal family size. Pearson's correlation coefficient has been used to assess the statistical significance level of 0.01 of the relationships between the dependent

variable (children ever born) and the following independent variables: place of residence, educational status, occupation, contraceptive use, wealth index, and caste/ethnicity.

4. Results and Discussion

Results

Table 1 presents the background characteristics of women aged 15 to 49 years in Karnali province. The largest proportion of women (41%) are within the 15–24 age group, followed by those aged 35 and above (31%). A majority (55.8%) reside in urban areas. In terms of education, approximately 41 percent have completed secondary or higher education, while 28 percent are illiterate. The agricultural sector employs the majority (68%) of women, whereas 13 percent work in non-agricultural sectors, and nearly 19 percent are not engaged in any work. Regarding caste/ethnicity, Brahmin/Chhetri make up 63 percent of the population, while Hill Dalits account for about 26 percent. Concerning contraceptive use, 57 percent of women have never used any contraception, while 36 percent use modern methods, and 7 percent use traditional methods. In terms of wealth index, belong to the poor wealth quintile, while 16.8 percent and 8.1 percent are all into the rich and middle wealth quintiles, respectively. Regarding marital status, approximately 76 percent of women are currently married, 20 percent have never married, and 2.5 percent are widowed.

Table 1: Background characteristics of women aged 15-49 years in Karnali province (N=909)

Age in 5-year groups	**Number**	**Percent**
15-24	373	41.1
25-34	252	27.8
35 and above	284	31.2
Place of Residence		
Urban	507	55.8
Rural	402	44.2
Educational Status		
Illiterate	256	28.2
Primary	282	31.0
Secondary and higher	371	40.8
Occupational Status		
Not working	170	18.6
Non-agriculture	122	13.4
Agriculture	618	68.0
Caste/Ethnicity		

Hill Bramhin / Chhetri	571	62.7
Hill dalits	233	25.7
Hill Janajati	102	11.2
Others	4	0.4
Use of contraception		
No method	522	57.4
Traditional method	65	7.1
Modern method	323	35.5
Wealth index		
Poor	683	75.1
Middle	73	8.1
Rich	153	16.8
Marital Status		
Never in union	186	20.4
Married	687	75.5
Living with partner	5	0.5
Widowed	23	2.5
No longer living together/separated	7	0.8
Total	**909**	**100.0**

Source: NDHS, 2022

Children ever born are the average number of children born alive to women in a certain age range and are defined as children born to women during that age range (Cherie et al., 2023). Table 2 presents the distribution of the number of children ever born (CEB) among currently married women in Karnali province, Nepal. According to, the most common number of children ever born (CEB) among currently married women in Karnali province is two, accounting for 27.5 percent of the women. This is followed by one child (19.0%) and three children (18.7%). A significant proportion of women (8.3%) have not yet given birth. The table also shows that 12 percent of women have had four children, 7.4 percent have had five, and 3.9 percent have had six. A smaller percentage of women have seven or more children. The average number of children ever born by currently married women in Karnali province is 2.64. This indicates that, on average, married women in this region have had more than two children. Which is a higher birth as compared to the national average 2.25 (MoHP, 2022).

Table 2: Total Children Ever Born (CEB) by currently married women in Karnali province (N=691)

Total children ever born	Number	Percent

0	57	8.3
1	131	19.0
2	190	27.5
3	129	18.7
4	83	12.0
5	51	7.4
6	27	3.9
7	12	1.8
8	5	0.7
9	3	0.5
10	2	0.3
Total	**691**	**100.0**
Mean CEB=2.64		

Source: NDHS, 2022

Fertility preference refers to an individual's or couple's expressed desires or intentions regarding the number of children they wish to have and the timing of childbirth. Table 3 shows the fertility preference of married women. More than half (59.4%) of women do not want any more children. Similarly, nearly one-fourth (23%) want another child. Likewise, 14 percent of women are sterilized, and 2 percent are infecund.

Table 3: Fertility preference by currently married women in Karnali province (N=691)

Fertility preference	Number	Percent
Have another	161	23.3
Undecided	12	1.7
No more	411	59.4
Sterilized (respondent or partner)	94	13.6
Declared infecund	14	2.0
Total	**691**	**100.0**

Source: NDHS, 2022

The ideal number of children is defined as the number of children that a woman or man would have if they could go back to the time when they did not have any children and could choose exactly the number of children to have in their whole life (DHS). Table 4 presents the ideal number of children of currently married women in Karnali province. The most common ideal number of children is two with 64 percent of married women in Karnali province, followed by 17 percent of women who prefer to have three children. Similarly, 10 percent of women preferred to have one child, while 6 percent preferred four children.

Table 4: Ideal number of children of married women in Karnali province (N=691)

Ideal number of children	Number	Percent
0	5	0.7

1	69	10.0
2	445	64.4
3	119	17.2
4	44	6.3
5	6	0.8
6	1	0.1
7	0	0.1
8	1	0.1
Non-numeric response	2	0.3
Total	**691**	**100.0**

Source: NDHS, 2022

The desire for children refers to an individual's or couple's preference or intention to have children. Table 5 presents the distribution of women based on their desire for more children. The majority (59.4%) of women do not desires any more children. About 16 percent of women desire more children after 2 years while 6 percent desire another child within 2 years. Similarly, 14 percent of women are sterilized.

Table 5: Desire for more children of married women in Karnali province

Desire for more children	Number	Percent
Wants within 2 years	44	6.4
Wants after 2+ years	112	16.2
Wants, unsure timing	4	0.6
Undecided	12	1.7
Wants no more	411	59.4
Sterilized (respondent or partner)	94	13.6
Declared infecund	14	2.0
Total	**691**	**100.0**

Source: NDHS, 2022

The average number of children born alive to women in a given age group is known as the children ever born (CEB). A woman's lifetime fertility experience up until the point at which the data are gathered is measured by the number of children she has ever had (UN, 2013). Table 6 presents the correlation coefficients between women's average CEB and various other socioeconomic characteristics. Women aged 35+ have an average CEB of 1.7766, while those aged 15-24 have an average of 0.7989. This strong positive correlation ($r = 0.617$, $p < 0.000$) is expected, as older women have had more time to have children. Women in rural areas tend to have slightly more children (average CEB 1.4747) than women in urban areas (average CEB 1.2963). This weak but statistically significant positive correlation ($r = 0.142$, $p < 0.000$) suggests that rural residence is associated with slightly higher fertility. Education has a strong inverse relationship with CEB. Women with no

education have the highest average CEB (1.7801), while those with secondary or higher education have the lowest (0.6681). This statistically significant negative correlation (r = -0.519, p < 0.000) indicates that as women's education levels increase, the number of children they have tends to decrease. Women working in agriculture have a higher average CEB (1.4523) compared to women in non-agricultural occupations (1.1367 and 1.1602). This weak but statistically significant positive correlation (r = 0.198, p<0.000) suggests that women in agriculture tend to have slightly more children. The data shows a very weak and statistically insignificant negative correlation (r = -0.026, p = 0.93) between caste/ethnicity and CEB. This suggests that caste/ethnicity has very little, if any, impact on the number of children a woman has. The data specifically mentions Hill Dalits having a CEB of 1.4111, but without comparison numbers for other groups, it's difficult to draw meaningful conclusions about differences. It's important to note that correlations don't imply causation, and other socioeconomic factors might be influencing these numbers. Women using modern contraceptive methods have a higher average CEB (1.5757) than those using traditional methods (1.2447) or no contraception (1.1981). This moderate positive correlation (r = 0.279, p < 0.000) is counterintuitive and requires further investigation. It might suggest that women who have already had more children are more likely to use modern contraception, rather than the other way around. Women in poorer households have a higher average CEB (1.4430) than those in middle-income (1.1621) or wealthy households (1.1683). This weak but statistically significant negative correlation (r = -0.178, p < 0.000) indicates that as wealth increases, the number of children tends to decrease.

Table 6: Mean CEB and correlation coefficients of children ever born by different socio- economic characteristics of women (N=691)

Variables	Mean CEB	Number	(r) value	P-value
Age group				
15-24	0.7989	189		
25-34	1.3625	239		
35 +	1.7766	259	0.617**	0.000
Place of Residence				
Urban	1.2963	378	0.142**	0.000
Rural	1.4747	309		
Educational Status				
No Education	1.7801	238		
Primary Education	1.0401	210		
Secondary and higher education	0.6681	239	-0.519**	0.000
Occupational status				
Not working	1.1367	79		
Non -agriculture	1.1602	93		
Agriculture	1.4523	515	0.198**	0.000

Caste/Ethnicity				
Hill Bramhin/ Chhetri	1.3803	414	-0.026	0.493
Hill Dalits	1.4111	186		
Hill Janajati	1.2647	84		
Others	1.3765	3		
Use of Contraception				
No method uses	1.1981	306	0.279**	0.000
Traditional Method use	1.2447	64		
Modern method uses	1.5757	317		
Wealth index				
Poor	1.4430	522	-0.178**	0.000
Middle	1.1621	58		
Rich	1.1683	107		
Total	1.3765	687		

Source: NDHS, 2022

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Discussions

Fertility is the process of giving birth. Several social, cultural, psychological, and economic factors were found to be responsible for determining fertility behavior (Bende & Kanitkaar, 1994). Age, occupational status, educational status, age at marriage, and use of contraceptives are the important factors that affect the fertility behavior of women. This study attempted to investigate the factors influencing the fertility behavior of currently married women in Karnali province of Nepal. This study has tried to establish a relationship between the women's mean CEB and their demographic and socioeconomic characteristics. The purpose of this study is to determine how respondents' demographic, socioeconomic, and geographic variables relate to fertility (CEB).

The study has found that women's age, place of residence, occupation, wealth index, and contraceptive use have positive correlations with women's fertility behavior, while some variables, such as educational status, have negative/inverse correlations, and ethnicity has negligible correlation or did not appear to have much impact on women's fertility behavior. Various studies have shown that the wealth of a family, occupation (agriculture and non-agriculture) caste ethnicity affect women's fertility behavior. The study in 45 different countries by Colleran and Snopkowski (2018) revealed that wealthier and higher-status people (particularly women) tend to have relatively lower fertility. Similarly, the study of the Bhote community in Nepal by Dhakal (2019) revealed that education enhances occupational status, implants ideas about the appropriate age for marriage, and reduces

fertility. Women involved in domestic work (agriculture) have higher fertility than service and business (non-agriculture) workers. However, this study has not found a strong correlation between the fertility behavior of women involved to be in agriculture and non-agriculture; they have a weak positive correlation and found statistically significant. That means the occupation does not significantly affect the fertility behavior of women. Similarly, the use of contraceptives has also been considered a determinant of fertility. The study of the fertility behavior of the Bhote community by Dhakal (2019) revealed that contraceptive non-users have a higher CEB (3.19) than contraceptive users (2.0) and a positive relationship between the use of contraception and the level of fertility. However, this study has found not so strong a positive correlation between the two variables. This study has found that those who used contraceptives had a slightly higher CEB than those who did not. Likewise, education is an important determinant of fertility. Education changes the health condition, fertility behavior, family well-being, and empowerment of women. The level of education has a direct or indirect effect on fertility trends. The mean CEB of those respondents whose education status is illiterate is 1.7801 while other higher-level education status has a low mean CEB of 0.6681. The correlation between education status and fertility is significantly negative. Its effect on fertility is also found statistically significant. This indicates that fertility in Karnali province can be reduced significantly by slightly increasing the educational status of women. This study has found the major six variables are statistically significant. Similarly, those six variables' impact on fertility is also significant.

5. Conclusions

Fertility behavior refers to the patterns and determinants of reproductive decisions and outcomes within a population. This study tries to establish a relationship between the currently married women in Karnali province's mean CEB and their demographic and socioeconomic characteristics. This study has revealed several correlations with women's fertility behavior. Positive correlations, where an increase in one variable corresponds to an increase in fertility, have been observed for women's age, place of residence, occupation, wealth index, and contraceptive use. In contrast, educational status has shown a negative or inverse correlation, meaning that higher education levels are associated with lower fertility. However, ethnicity has shown a negligible correlation with fertility behavior, suggesting that its influence is smaller than that of other variables. However, it can be said that the impact of caste/ethnicity in Karnali province on fertility depends on the specific cultural context because socio-economic factors are often linked to them. If a particular ethnic group has access to education or health care, that might have a greater impact on their fertility behavior. Surprisingly, this study has found that CEB is lower among those who did not use contraceptive methods than among those who did, and the correlation is statistically significant. This result might have been because the women who have already had more children may be more likely to adopt contraception to stop further childbearing. Older women generally have a higher CEB and are also more likely to use contraception since they want to stop having more children.

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