Fertility Trends, Patterns and Diffentials in Nepal

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Abstract

Fertility is to give babies during the reproducing age (15-49 years) of women. It is directly related to women's menstrual cycle beings. The main objective of this article to analyze the fertility trends, patterns and differential by different dimention.The required information are obtained from different secondary sources and analyzed and decribed meaningfully. The fertility level is gradually decreasing and it might be have by improvement of the socio-economic situation, health service facilities, enhance the education level of women and policy program of government are successfully implimentated. Fertility is differential by residential area, ecological zone, education, caste/ethnic groups, religion etc.

Keywords: Fertility, Fecundity, Menstrual**,** Reproduction and Determinants

Introduction

Fertility is the ability to have babies or to reproduce the childen by women. When fertility rates in a community increase, more babies are born.Fertility is the quality of a human's ability to produce off spring, which is dependent on age, health, and other factors. Fertility is the natural capability to produce offspring. As a measure, fertility rate is the number of offspring born per married couple, individual or population. Fertility differs from fecundity, which is defined as the potential for reproduction. Human fertility depends on factors of nutrition, consanguinity, culture, instinct, endocrinology, timing, economics, way of life, and emotions. There are many terms of fertility (Frank, O., 2017).

Fertility is directly related to women menstrual cycle begins, as it has been arbitrarily assigned, with menses. Next is the follicular phase where estrogen levels build as an ovum matures (due to the follicular stimulating hormone or FSH) within the ovary. When estrogen levels peak, it spurs a surge of luteinizing hormone (LH) which finishes the ovum and enables it to break through the ovary wall.

This is ovulation. During the luteal phase, which follows ovulation LH and FSH cause the post-ovulation ovary to develop into the corpus luteum which produces progesterone. The production of progesterone inhibits the LH and FSH hormones which (in a cycle without

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pregnancy) causes the corpus luteum to atrophy, and menses to begin the cycle again (Dunson, D.B.; Baird, D.D.; Wilcox, A.J.; Weinberg, C.R.,1999).

Peak fertility occurs during just a few days of the cycle: usually two days before and two days after the ovulation date (Easterlin, Richard A., 1975) This fertile window varies from woman to woman, just as the ovulation date often varies from cycle to cycle for the same woman. The ovule is usually capable of being fertilized for up to 48 hours after it is released from the ovary. Sperm survive inside the uterus between 48 and 72 hours on average, with the maximum being 120 hours (5 days) (Dunson, D.B.; Baird, D.D.; Wilcox, A.J.; Weinberg, C.R.,1999)

As Frank, O, 2017 the key terms of fertility are as follos;

- **Crude Birth Rate** (CBR) - the number of live births in a given year per 1,000 people alive at the middle of that year. One disadvantage of this indicator is that it is influenced

- by the age structure of the population.

- **General Fertility Rate** (GFR) - the number of births in a year divided by the number of women aged 15–44, times 1000. It focuses on the potential mothers only, and takes the age distribution into account.

- **Child-Woman Ratio** (CWR) - the ratio of the number of children under 5 to the number of women 15–49, times 1000. It is especially useful in historical data as it does not require counting births. This measure is actually a hybrid, because it involves deaths as well as births. (That is, because of infant mortality some of the births are not included; and because of adult mortality, some of the women who gave birth are not counted either.)

- **Coale's Index of Fertility** - a special device used in historical research.

- **Total Fertility Rate** (TFR) - the total number of children a woman would bear during her lifetime if she were to experience the prevailing age-specific fertility rates of women. TFR equals the sum for all age groups of 5 times each ASFR rate.

- **Gross Reproduction Rate** (GRR) - the number of girl babies a synthetic cohort will have. It assumes that all of the baby girls will grow up and live to at least age 50.

- **Net Reproduction Rate** (NRR) - the NRR starts with the GRR and adds the realistic assumption that some of the women will die before age 49; therefore they will not be alive to bear some of the potential babies that were counted in the GRR. NRR is always lower than GRR, but in countries where mortality is very low, almost all the

baby girls grow up to be potential mothers, and the NRR is practically the same as GRR. In countries with high mortality, NRR can be as low as 70% of GRR. When NRR = 1.0, each generation of 1000 baby girls grows up and gives birth to exactly 1000 girls. When NRR is less than one, each generation is smaller than the previous one. When NRR is greater than 1 each generation is larger than the one before. NRR is a measure of the long-term future potential for growth, but it usually is different from the current population growth rate.

- TFR: Total fertility rate expressed per woman
- GFR: General fertility rate expressed per 1,000 women age 15-44
- CBR: Crude birth rate, expressed per 1,000 population

Social and Economic Determinants of Fertility

A parent's number of children strongly correlates with the number of children that each person in the next generation will eventually have. Factors generally associated with increased fertility include religiosity, (Hayford, S. R.; Morgan, S. P., 2008) intention to have children (Lars Dommermuth; Jane Klobas; Trude Lappegård (2014) and maternal support (Schaffnit, S. B.; Sear, R.,2014). Factors generally associated with decreased fertility include wealth, education, (Rai, Piyush Kant; Pareek, Sarla; Joshi, Hemlata, 2013)female labor participation, urban residence, intelligence, increased female age and (to a lesser degree) increased male age (Sato, Yasuhiro, 2006),

Bongaarts' Model of Components of Fertility

Bongaarts proposed a model where the total fertility rate of a population can be calculated from four proximate determinants and the total fecundity (TF). The index of marriage (Cm), the index of contraception (Cc), the index of induced abortion (Ca) and the index of postpartum infecundability (Ci). These indices range from 0 to 1. The higher the index, the higher it will make the TFR, for example a population where there are no induced abortions would have a Ca of 1, but a country where everybody used infallible contraception would have a Cc of 0.

$$TFR = TF \times Cm \times Ci \times Ca \times Cc$$

These four indices can also be used to calculate the total marital fertility (TMFR) and the total natural fertility (TN).

$$TFR = TMFR \times Cm$$

$$TMFR = TN \times Cc \times Ca$$

$$TN = TF \times Ci$$

Certain physical conditions may make it impossible for a woman to conceive. This is called "involuntary infecundity." If the woman has a condition making it possible, but unlikely to conceive, this is termed "subfecundity."

The set of 11 intermediate fertility variables proposed by Davis and Blake into eight factors grouped in three broad categories:

I Exposure factors

1. Proportion of married

II Deliberate marital fertility control factors

2. Contraception

3. Induced abortion

III Natural marital fertility factors

4. Lactational infecundability

5. Frequency of intercourse

6. Sterility

7. Spontaneousi ntrauterinem ortality

8. Duration of the fertile period

Objective

Main objective of this article is to findings, analysizing and describing the fertility trends, patterns and differential of Nepal.

Limitations

This article hilighted the fertility trends, patterns and differential by residential areas, ecological zone, education, caste/ethnic groups and religions. Article has not coveraged any other issues besides above mentioned.

Methods

This article is prepared based on secondary information obtainined from different sources. This article is the cross sectional and descriptive tyeps of nature.

Findings

Fertility level indicates the overall socio –economic situation of family, society and nation as well. Fertility differs by socio economic status of people, living conditions, occupations, level of education, employments, residential area, ecological zone, caste/ethnic groups and religions etc. The trend of fertility is gradually decreasing since couple of decades.

Fertility Trends and Patterns

Total fertility refers the total number of live birth given by reproductive age (15-49 years) women. It is calculated in per women. While overview the fertility trends, it was 4.6 per women in 1996, 4.1 in 2001, 3.1 in 2006, 2.6 in 2011 and 2.3 in 2016. The total fertility rate isgradually decreasing.

Table 1: Trend of Total Fertility Rate

Reference year	Total Fertility Rate Per Women
CBS 1991	5.16
NFHS, 1996	4.6
NDHS 2001	4.1
NDHS 2006	3.1
NDHS 2011	2.6
NDHS 2016	2.3

Source: CBS, 2104 and NDHS 2016

The ASFR is higher in Rural comparing to the Urban. As 1991, the ASFR was 0.679 in urban and 1.07 was in rural. Sameway, in 2001 the ASFR was 0.563 in urban and 0.873 in rural. As 2011 NIDHS, urban ASFR was 0.333 and Rural ASFR was 0.542 and ASFR was 0.401 in Urban and 0.587 in rural in 2016.

Table 2: Age Specific Fertility RatePer Women 1981-2011

Discriptions	Reference Rear and ASFR							
	1991		2001		2011		2016	
	Urban	Rural	Urban	Rural	Urban	Rrural	Urban	Rural
ASFR	0.679	1.07	0.563	0.873	0.333	0.542	0.401	0.587

Source: CBS, 2014 &NDHS, 2016

(The age specific fertility is calculated by adding the birth given by women of each age group 5 in years interval aged 15 – 49 years and divided by 1000)

As table 3, the total fertility of urban has 1.6 per women and 2.8 in Rural in 2011 and 2 per women and rural has 2.9. in 2016. The urban area has less fertility comapring to the rural area in both survey year. But fertility rate are increased in 2016 NDHS than 2011 NDHS.

Table 3: Total Fertility Rate by Residential Area 2011- 2016

Residence Area	Total Fertility Rate	
	2011	2016
Urban	1.6	2.0
Rural	2.8	2.9
Total	2.6	2.3

Source: NDHS, 2016

Crude Birth Rate (CBR) is total birth within year from 1000 people. CBR was 39.7/1000 in 1981, 39/1000 in 1991, 33.3/1000 in 2001 and 22.4/1000 in 2011. The CBR is gradually decreasing. It shows the fertility is decreasing.

Table 4: Trends of Curde Birth Rate (CBR) 1981-2011

Reference Year	CBR
1981	39.7
1991	39
2001	33.3
2011	22.4

Source: CBS, 2014

As NDHS 2016, the CBR are 26.3/1000 in rural area and 19/1000 in urban area. The crude birth rate is in urban area are higher in rural areas comparing to the rural areas.

Table 5: Crude Birth Rate Residents

Residence Area	CBR
Urban	19.0
Rural	26.3
Total	22.4

Source: NDHS, 2016

The place of birth attendents are the determinant factors of fertility. The tendency of birth attendents in home was very high until around 2000. But tendency of birth attendents either in home or in health institutions by trained skill manpower is gradually increasing. The practice of birth attendents by skill manpower was only 11 percent in 2001 and it has increased and reached 19 percent in 2006, 36 percent in 2011 and 58 percent in 2016.

Table 6: Trend of Birth Attendent by Skilled Manpower

Reference Year	Percent
2001	11
2006	19
2011	36
2016	58

Source: NDHS, 2016

Discussion on Fertility Differential

Fertility level is indicators of overall situation population size, structures, family size, socio-economic, health, education and other phenomenon of the society as well as nation. There

are many factors are associated to impact for differential of the fertility. Some of the factors are as follows;

Fertility Differentials by Residence

According to Nepal's 2001 Population Census, about 86 percent of the population of Nepal resides in rural areas (CBS, 2002 and UNFPA, 2002). Although the remaining 14 percent of the total population are classified as urban residents, many of them do not exhibit urban characteristics. The urban TFR in Nepal calculated from both the 2001 and 2006 surveys was 2.1 births per woman (NDHS, 2006). In contrast the TFR in rural areas declined by 24 percent, between the 2001 and 2006 surveys. This finding indicates that the fertility declines observed in the national TFR were primarily due to changes in rural areas. As with the national TFR, in the rural areas, the age group with the smallest percentage decline in rural areas was 20-24. Percentage declines were largest among the oldest age groups. Although according to the 1991 census of Nepal, the proportion of urban population was 9.2 percent; by the end of 1997 this proportion had changed to 12.7 percent because of the reclassification of some rural areas as urban centres (Bastola, 2000). In 1991 there were 33 municipalities, but at the beginning of 1992 an additional 3 areas were designated as urban areas. Further, at the beginning of 1997, 15 more areas were designated as urban, and at the end of 1997 still another 7 more areas were designated as urban areas. The fretility rate in urban was 2 per women and 2.9 in rural area (NDHS, 2016)

Fertility by Ecological Zones

Nepal is characterized by three distinct geographic areas running east to west, referred to asthe mountains, the hills and the terai. The mountain areas above 16,000 feet in altitude account for almost 35 percent of the total land area of the country and about 7 percent of the country's total population. The fertility level in the mountain zone has remained high. In 2001 the TFR was estimated at 4.8, almost 20 percent higher than the national rate of 4.1, and in 2006 the corresponding figures were 4.1 and 3.1, respectively.

The hills account for 44 percent of the total land of the country and about 44 percent of thetotal population. The hills have the lowest fertility level; the TFR was 4.0 in 2001 and 3.0 in 2006. Slightly more than one-fifth of the total land area and about 48 percent of the total population are located in the terai. The TFR in the terai was estimated at 4.1 in 2001 and 3.1 in 2006 (Table 7). Fertility declines were observed in all three ecological zones, but the decline has been slowest in the mountain zone. As a result, the difference between the TFR in the mountains and the rest of Nepal is larger in 2006 than it was in 2001. The increase in the age specific fertility rate among women 15-19 in the mountain zone (93 to 102) calls for

special attention, especially given that fertility declined among this age group in the hills and the terai. In all ecological zones, 50 percent or more births were to women age 20-29 (NDHS, 2006)

Fertility Differentials by Development Regions

Among the five development regions of Nepal, in general, the level of social and economic

development is highest in the Eastern region, followed by the Central, Western, Mid-western and Farwestern regions. For example, the human development indices for the Far-western region (0.404) and the Midwestern\region (0.402) were lower than for the Western (0.491), Central (0.490), and Eastern regions (0.493) (UNDP, 2004). One would therefore expect fertility rates to be lowest in the east and highest in the mid-west and far-west. TFR is also comparatively lower in the Central region primarily because this is where the three big cities in the Kathmandu Valley(Kathmandu, Patan and Bhaktapur) are located. Total fertility rates for each development region have been estimated for the three years preceding the 2001 and 2006 NDHS surveys (NDHS, 2016)

Fertility levels declined in all development regions between 2001 and 2016. The regions with the highest fertility rates according to the 2001 survey experienced the greatest declines, resulting in smaller differences in fertility rates among the five development regions in 2006 and 2011. The decline was the\ greatest in the Central development region; the TFR in this region (3.0) was the lowest in the country. The age pattern of fertility was similar in all five development regions in 2001 and 2006 in that it peaked at age 20-24. However, fertility rates were higher for age 15-19 in 2006 than in 2011 in the Eastern and Mid-western development regions (NDHS, 2016)

Fertility Differentials by Education

In general, fertility is inversely related to education. In all four surveys 2001, 2006, 2011 and 2016 showedthat women with no education had the highest fertility. Between the 2001 and 2016 surveys, fertility declined among women in every educational level, with the exception of women with some secondary education. The fertility gaps between women with no education and those with primary or secondary education narrowed between 2001, 2006, 2011 and 2016. However, women with SLC and above continue to have a TFR that is less than half that of women with no education. Compared to the 2001 survey data, the 2016 data showed an increase in fertility among women age 15-19 with primary or no education, whereas fertility decreased among educated women (NDHS, 2016)

Fertility Differentials by Castes/Ethnicity and Religion

Although the 2001 Population Census identified 100 castes or ethnic groups in Nepal (Central Bureau of Statistics and United Nations Population Fund, 2002), 90 of these groups represent less than 2 percent of the total population. Because the number of cases in many of these castes and ethnic groups is small, fertility cannot be estimated for them. However, TFRs have been estimated for the larger groups. TFRs for the major caste/ethnic groups. Fertility was highest among Muslim women. The Bahun (Brahmin) and Chhetri caste group had the second lowest TFR (3.6) in 2001; this group also had a low TFR (2.9) in 2006. "Other terai castes" comprises 25 different castes. Their TFR was 4.1 in 2001 and 3.8 in 2006. This group experienced the slowest decline (-7 percent) in fertility among all major castes and ethnic groups. Fertility among Dalit women was nearly 5 in the three years preceding the 2001 survey, but declined by nearly one child in the three years preceding the 2006 survey. Dalit women had the second highest fertility rate after Muslim women, and their pace of decline (-19 percent) was the second slowest after the other terai group. Newar women had the lowest TFR in 2001 (3.3) and 2006 (2.4). The Janjati group comprises 23 groups. The TFR of Janjati women was 4.3 in the three years preceding the 2001 survey; their TFR declined by 32 percent to 2.9 in the three years preceding the 2006 survey. Both the 2001 and 2006 surveys showed that Muslim women had the highest TFR of the seven major caste and ethnic groups. However, fertility declined among Muslim women between 2001 and 2006. Women in the "other" category had a TFR of 4.1 in 2001 and 2.5 in 2006 (NDHS, 2006)

Conclusions

The fertility level is gradually decreasing since 1976 and it might be have by improvement of the socio-economic situation of people i.e health service facilities, enhance the education level of women and policy program of government are successfully implimentated. However, fertility is differential by residential area, ecological zone, education, caste/ethnic groups and religion etc.

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