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Effect of Women's Status in Fertility Transition of Nepal

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Abstract

Assessing the relationship of fertility transition with different socio-economic situation of women is the overall purpose of this study. Fertility is primarily natural demographic determinant; however, it is affected by different social, economic and demographic phenomena. This study aimed to assess the changing fertility pattern (TFR and CBR) relating to the socioeconomic and demographic status of women in case of Nepal. Literacy status, health services, employment pattern, age at marriage, foreign migration (social determinants of population change) inequality aspects of women are considered as the socioeconomic and demographic aspects determines the pace of change of fertility rate and measured by the linear regression equation and multiple regression analysis. Quantitative and descriptive analysis is used to demonstrate the

relationship examined and assessed through secondary data. The output of the statistical test is found that there is strong negative relationship (more than -0.90) with more than 80 per cent of explaining variability of fertility rate of Nepal by these independent (socioeconomic and demographic) variables. Finally, as literacy rate, age at marriage, economically activeness, life expectancy of female are found in increasing pattern with advancement of Nepalese society, CBR and TFR both are found in decreasing trends along with reduction on gender inequality.

Keywords: Fertility, age at marriage, literacy, value of children, health facilities.

INTRODUCTION

The pattern of family system is shifted from extended and joint to nuclear as couple preferred to the ideal family and the birth is limited to the replacement level. Additionally, international migration of husband's to work, widening the gap of coital frequency. Improvement in health facility and family planning services also affecting fertility behaviour of couple. These all changes resulting fertility decline as the state of development of nation is being widen (Karki & Krishna, 2008). Fertility, mortality and migration directly determine the demographic situation and changes of any nation. Both fertility and mortality are natural and direct determinants of population change. Contextual variables like educational status of women, cultural factors like son preference, empowerment of women, tempo of urbanization, modernization, poverty situation, literacy and access to the health services (Karki & Krishna, 2008) to make changes in structure, composition, distribution and growth of the population along with changes in fertility, mortality and migration. Intermediate variables like intercourse, conception and gestation variables also affect the fertility. In this way level and change of fertility may be identified and known as more than one way (Tien, 1968).

There is positive relationship between fertility and mortality resulting birth and death rate. Demographic transition shows the transition of population from high birth and death rate to low birth and death rate as the country (or any region) moves from pre-industrial era to an industrialized era. Thus the major emphasis of the theory is given to the economic development which results in change in population (Adhikari, 2017). If there is high fertility in any nation or place, rate of death could be ultimately high as described by the first stage (high stationary stage) of demographic transition theory. Due to the socioeconomic advancement stage of transition changes and shifts in next stage until reaching to the low stationary stage and changes into opposite in the declining stage.

Socio-economic status of any nations is indicated by health, employment and education related indicators. It is also the indicator of empowerment level of people in that place. Relating to these topics there are different sub indicators referring to the socioeconomic status. Good health, employment and educational status enhance the capacity of decision making supports to empowerment. So, it is widely accepted that empowerment is a quality of human beings and a multidimensional phenomenon. Any people can be empowered by involving themselves into the work through process of inclusion. It is the process of reorientation of all forces, values and beliefs that determine human behaviour in organization. Empowerment process releases full potential of every individual to contribute to the common enterprise. Gaining the courage to choose is part of what aims to achieve means by empowerment. The improvement in the status of women in the society can be analysed in the light of the major changes that have taken place in areas such as legislations, education, economic and employment sector, political participation and awareness of their rights on the part of women, etc. (Singh, 2014).

Among the different theories related to fertility transition, economic theory links population changes due to declining fertility with increasing level of

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income to induce quality of children rather than quantity, investment in education, and health and nutrition. It states that higher educational level and labour force participation of women lower the fertility as women become better educated and financially independent (Yurtseven, 2015). The global fertility rates will continue to decline since women will have decision to the number of children, empowerment and good economic status with reduction in gender inequality (Cheng, et al., 2022).

Among the two approaches of fertility reduction (voluntary and coercion fertility limitation) voluntary approach involves; leaving matters to the responsible reflection of the people themselves, helped by the process of economic and social development (Sen, 1996).

Change in fertility patterns has widespread implications of population growth, dependency, utilization of contraceptives, and family and societal relations. Fertility, which refers to the live birth performance of women; of each society or country depends upon the birth and death rates, available birth controlling measures, awareness of the couple as well as status, participation, decision making role and economic strength of the women. It is at this background this article shows with the facts and statistical measures related to women's status and changes in fertility in Nepal. The main objective of the paper is to assess on how and to what extent improvements in women's lives have contributed to fertility decline. However, the specific objective of the paper is determined as to state some demographic and social situation of Nepalese women; to assess the transition of Total Fertility Rate (TFR) and Crude Birth Rate (CBR) over the time in Nepal; and to examine the relationship between different socio-economic aspects and fertility patterns in the population of Nepal.

MATERIALS AND METHODS

Published reports of national census and surveys have been utilized to examine the effects of demographic, social and economic factors on the fertility pattern (TFR; and CBR) in Nepal using GII as international data source. Using purposive sampling method, secondary sources of data related to fertility and socio-economic and demographic variables are assessed.

Socio-economic and demographic variables such as singulate mean age at marriage (SMAM), Refined activity rate, Literacy rate, Life expectancy at birth of female have been included as major four components in data analysis. Similarly gender inequality index (GII) and female foreign labour migrants are also examined as other socio-economic components. In specific representative term, economic aspects with refined activity rate, health aspects by life expectancy at birth, social aspects by literacy rate, gender inequality index, female foreign labour migrants, and demographic aspects by singulate mean age at marriage are used for further analysis.

The paper has defined two sets of variables in two ways. Firstly, TFR is taken as dependent and other four components (SMAM, Refined activity rate, Literacy rate, Life expectancy at birth of female) are taken as independent. Secondly modern representation of social inequality GI index and mobility for

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employment internationally (foreign employment) also taken as dependent and independent variables for examining socio-economic aspect.

The dependent and independent variables have been re-categorized from the data file to make a meaningful analysis. Regression statistics are generated by using Microsoft Excel 2013 and then data are further processed. First, data is analysed on the basis of tabulations of fertility (CBR and TFR), socio-economic and demographic variables. Second, bivariate linear regression has been used to predict the likelihood of fertility transition by socio-economic aspects of women in Nepal. Third, female labour migrants in foreign countries (x1), Gender Inequality Index (GII=x2) and TFR (y) are also used to predict the socio-economic condition of Nepalese women with the help of multiple regression analysis using Microsoft Excel sheet.

RESULTS

Socio-economic and Demographic Characteristics

Livelihood status and fertility both are dependent to the state of development of any society. Income, health, and knowledge are three factors influence the fertility decision of educated women. Higher incomes, the positive health impacts of education on both women and their children, and the knowledge impact of education for developing population policies related to women lives. It is thus important to understand those factors and their impacts and influence on fertility decisions with the specific country context (Kim, 2016). These all are discussed with the results here.

Demographic Aspects

Table 1 shows the total population, female population, sex ratio, economically active population total and female and calculated refined activity rate since the first population census conducted in Nepal. The population of Nepal decreased by one per cent between 1911 and 1920 and similar trends is clearly observed between 1920 and 1930. The absolute decline in population size between 1911 and 1920 may be attributed, among others, to: (a) effect of the worldwide influenza epidemic in 1918 which had also passed through Nepal and took the lives of a large number of population, and (b) heavy loss suffered by the Nepalese men serving with the allied forces during the First World War. In the 1930 census, the population decline can also be attributed to the under-enumeration due to the lack of separate organization and the apprehension of being conscripted into the army for possible war against Tibet in 1929 (Upreti, 2001). Census report then after stated that there is continuous increase of total population and reached 29192480 in 2021. In terms of female population, there was about 3.5 times increment in size from 1952/54 (4184472) to 2021 (14901169) as shown in the following table.

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Table 1

Some Demographic and Economic Parameters of Nepal at National Level, 1911 - 2021

Year	Total Population	Female Population	Sex Ratio	Total EAP	Female EAP n (%)	Female Refined Activity Rate
1911	5,638,749		100.1			
1920	5,573,788		100.9			
1930	5,532,574					
1941	6,283,649		104.3			
1952/54	8,256,625	4184472	96.8	4,153,455	1,692,963(40.8)	55.1
1961	9,412,996	4776963	97.3	4,306,839	1,742,924(40.5)	59.38
1971	11,555,983	5,738,780	101.4	4,852,524	1,418,236(29.2)	35.12
1981	15,022,839	7,327,503	105.0	6,850,886	2,370,942(34.6)	46.21
1991	18,491,097	9270123	99.5	7,339,586	2,964,003(40.4)	45.2
2001	23,151,423	11,587,50	99.8	10,637,243	4,666,219(43.9)	55.29
2011	26,494,504	13,645,46	94.2	11,108,915	5,044,781(45.4)	79.4
2017*	28,825,709	14,850,03	94.1			
2021**	29,192,480	14,901,16	95.91			

Note: Population Monograph, Volume III, 2014, Nepal population Report 2017, CBS 1995, 2003 and 2014, 2022.

** estimated, **preliminary report,*

Economically active female population; comprises all ten years and above female sex who furnish the supply of labour for the production of goods and services as defined by the United Nations systems of national accounts and balances, during a specified time reference period (Hussmanns, Mehran, & Verma, 1990). The demographic dividend is the accelerated economic growth that may result from a decline in a country's mortality and fertility and the subsequent change in the age structure of the population (Gribble & Bremner, 2012) which can be seen in the Table 1. In 1952/54 AD census out of total economically active population (EAP) the share of female was just 40.8%. There was negative growth till the 1961 AD census with increasing population. Since then Nepal's EAP of female, is increasing continuously and reached the share of 45.5% in 2011 AD. Women in Nepal work for longer hours than men have much lower opportunity for gainful employment and possess extremely limited property rights (Ministry of Population and Environment, 2017). The Refined activity rate was 55.1% in 1952/54, little bit increased in 1961 (59.38%), but dropped remarkably in 1971 (35.12%), increased in 1981 (46.21%) again dropped in 1991 (45.2%), since than this rate was rapidly increased and reached 79.4% in 2011.

Employment Aspect

Decisions related to various aspects of life such as allocation of resources for consumption, saving and investment in the development of human resources are generally made at the household level. Hence, where women are involved and had any kinds of influence in such decisions they are more likely than men to

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invest in the development of human resources. Control over resources increase their relative role and power within and outside the household. So women's involvement in gainful employment and control over financial resources is likely to reduce fertility (Shrestha & Shrestha, 1991).

In Japan, especially rising unemployment rates were associated with somewhat higher fertility during the period 1990-2006 (Raymo & Shibata, 2017). In case of Nepal, the share of female employee and representation is shown in Table 2. Due to the legal provision of the parliament female representation is found about one third in both houses. In health service about half employees (48.20%) were found female, which is the highest representation of female stated in the table. Discussing about the female share in service of Nepal army non officer female were found least (1.3%) share while officer female were 5.5 per cent. Similarly in Nepal police share of female officer and non-officer is found 3.5% and 6.2% respectively. In civil service, the share of female employees is found 26.42% respectively. There was only 6.7% of female share in constitutional bodies found in Nepal. Similarly, in case of teaching personnel up to grade 12 in community and institutional school, there were 39.54 % female teachers found in Nepal.

Table 2
Women Participation in Different Bodies and Service Sectors

Sector	Year	Class	Total	Female	Female%
Constitutional Bodies	2020 (2077 BS)	All	335	24	6.7
Civil Service	2020 (2077 BS)	All	89563	23666	26.42
Health Service	2020 (2077 BS)	All	26467	12758	48.2
Nepal Army	2013	Officer level	5,498	305	5.5
		Non Officer level	93137	1631	1.8
Nepal Armed Police	2013	Gazetted	1,358	29	2.1
		Non Gazetted	32157	1102	3.4
Nepal Police	2014	Gazetted	1,897	67	3.5
		Non Gazetted	65,519	4,056	6.2
Federal Parliament	2022 (2079 BS)	House of Representative	275	91	33.1
		National Assembly	59	19	32.2
School Teacher	2020/21 (2076 BS)	All	320576	126765	39.54

Note: Department of Civil Personnel records, 2072, Social Statistics 2072, Social Statistics Book 2079, MoWCSW, Economic Survey 2075/76, Election Commission of Nepal, 2079, CEHRD Flash Report 2077.

Among the four theoretical perspectives of migration and fertility (termed as generational/ socialization perspective, adaptation perspective, selectivity perspective and disruptive perspective) the disruption hypothesis stresses the fact that migration in itself tends to reduce fertility. The hypothesis maintains that migration may disrupt fertility in several ways such as leading to separation of spouses, the move may be stressful to actually interfere with physiological capacity to bear children, and other factors may lead to a reduction in fertility of

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recent migrants (Majelantle & Navaneetham, 2013). The following table (Table 3) shows that highest share of female in foreign employment was found to be 6.15% in fiscal year 2012/13 and least share of female was found in fiscal year 2010/11 (2.90%). In other fiscal years i.e., F/Y 2008/09 to 2018/19; share of female in foreign employment were found in between these values. Similarly backward society is the main cause for high fertility and unequal behaviour/treatment among the sexes. It is measured by inequality measures and gender inequality index is one of them. UNDP compiled a new gender index in 2010 the Gender Inequality Index (GII) to replace the GDI and GEM. The below table shows the gender related inequality index since 1995AD to 2019 AD. The index mentioned in the table shows that inequality index is in decreasing pattern. It was 0.709 in 1995 AD and reduced at 0.480 in 2017AD (United Nations Development Programme, 2018) and minimally reduced in 2019 with 0.479 and 0.452 in 2021.

Table 3

Share of Female and Male Population in Total Labour Migrants, 2008/09-2018/19 Gender Inequality Index, 1995-2021

Year	Female %	Male %	Year	Gender Inequality Index
2008/09	3.90	96.10	1995	0.709a
2009/10	3.40	96.60	2000	0.668
2010/11	2.90	97.10	2005	0.652
2011/12	6.00	94.00	2010	0.526
2012/13	6.15	93.85	2011	0.516
2013/14	5.60	94.40	2012	0.507
2014/15	4.29	95.71	2014	0.496
2015/16	4.58	95.42	2015	0.488
2016/17	5.26	94.74	2016	0.481
			2017	0.480
2018/19b	8.70	91.30	2019	0.479
			2021	0.452

Note: a- Uses 'Share of seats in parliament' that refers to 1997, b-Total labour permits 2018/19 Labour Migration for Employment, a Status Report for Nepal, 2015/16-2016/17 MoLE, Human Development Report 2018, 2021-22, Migration in Nepal: A Country Profile 2019, NHDR 2020.

Health and Fertility Aspects

Crude birth rate (CBR) and Total fertility rate (TFR) are the most common measures of fertility in any area. It is primarily dependent to the educational status of couple as well as of female partner, employment and health services known as socio-economic phenomena. Fastest declines of fertility in the nation due to the relatively advancement of society such as access to education, increasing employment levels of women and attempts to address social and gender inequalities by the civil societies (Pande, Malhotra & Namy, 2012) and individual family itself. The economic theory of fertility suggests an incentive effect: more educated women have higher opportunity costs of bearing children

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in terms of lost income. The household bargaining model suggests that more educated women are better able to support themselves and have more bargaining power, including on family size (Pradhan, 2015). Based on this theory, Table 4 shows that both CBR and TFR of Nepal since 1952/54 is in declining pattern. CBR and TFR in 1952/54 were 45-50 per thousand population and 5.74 per woman respectively. TFR was found to be in increasing pattern till 1981 AD (6.39/woman in 1981) Since than TFR has remarkably decreased and reached at 2.1 live births per woman in 2022 AD. Similarly CBR in all years were found continuously decreasing and reached 20/1000 population in 2022 AD.

On the other hand, literacy rate of women with 5 years and above age is always lower than the men. Female literacy rate in 1961 AD was only 1.8 per cent of the total female population with five years and above age. This was also rapidly increasing and reached 62 per cent in 2014 AD. The proportion of men and women remaining single for different age group indicates by singulate mean age at marriage (SMAM). The mean age at marriage for men and women which is increasing over the years indicates that increase in age at marriage has a negative impact on fertility for two basic reasons. First women who marry later have a shorter reproductive life span and second the factors that affect the age at marriage also affect the desired family size norms thereby reducing fertility (Ministry of Population and Environment, 2017). According to the table (Table 4) SMAM of male and female in 1961 were just 19.5 years and 15.4 years that results most of the marriage occurred within teenage with highest year gap of SMAM between male and female. The situation is changing and SMAM of both sexes is increasing while gap between by sex in each census year is narrowed down. In 2011 AD SMAM of male was 23.8 years and female were 20.6 with 3.2 years gap between the sexes. In 2014 AD Female SMAM was found 20.7 years which is 0.1 year higher than the 2011 AD of same sex.

In most of the countries in the world, women live longer life than men due to the biological capacity. In some parts of Asia, such advantages are overridden by gender-based discrimination so that female life expectancy at birth is lower than or equal to that of males. This fact shows that life expectancy for women also varies across regions, sociocultural settings and income levels of countries (World Health Organization, 2019). Life expectancy is an estimate of the average number of additional years a person could expect to live if the age-specific death rates for a given year prevailed for the rest of his or her life (Population Reference Bureau, 2011).

Table 4.

CBR, TFR, Female Literacy, Life Expectancy and SMAM Since 1952/54

Year	CBR	TFR	Female Literacy	SMAM		Life Expectancy	
				Male	Female	Female	Male
1952/54	45-50	5.96Ω				28.5	27.1
1961	42	5.74*	1.8	19.5	15.4	37.4	35.2
1971	42	5.83	3.9	20.8	16.8	40.0	42.1
1981	39.7	6.39	12	20.7	17.2	48.1	50.9
1991	39@	5.12***	25	21.4	18.1	53.5	55.0

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2001	33.3	4.1	42.8	22.9	19.5	60.7	60.1
2006	6	3.1					
2011	22.4	2.6	57.4	23.8	20.6	67.9	65.5
2014**	Na	2.3	62		20.7#		
2016	22	2.3					
2017\$		2.3				69.8	66.7
2018€		2.3				71.0	70.0
2022	20	2.1					

Note: *Krotki and Thakur (1971), Karki (1984), **Nepal Multiple Indicator Cluster Survey 2014, CBS, ***MOH (1993) @=1991 Census data corrected for under-reporting. This estimate is quite robust in that the estimated TFR matches well with Retherford and Thapa (August 1999) estimate of 5.16 for 1990/91, #United Nations, World Marriage Data 2017, \$National Population and Housing Census 2011 (Population Projection 2011-2031), CBS, €PRB (2018), PRB (2017), ΩTFR of 1950-1955, World Population Prospects 2019 CBS (1987), CBS (2014), CBS (2003), Karki (2003) Nepal Demographic and Health Survey 2011, Nepal DHS 2016, DHS 2022, MoHP.

Nepal has achieved significant decline in mortality rates, fertility rates, and population growth rates, while experiencing rapid improvements in life expectancy. In fact, Nepal is experiencing rapid demographic change as a result of positive socioeconomic developments (National Planning Commission, 2017). Similarly, life expectancy at birth of Nepalese male, female has rapidly increased within 1952/54 to 2017 AD. It was just 27.8 years (total), 28.5 years (female) and 27.1 years (male) at birth in 1952/54 AD census. Women generally live longer than males – on average by six to eight years (World Health Organization, 2019). However, there was just 1.4 years difference between male and female. In 1971 and 1981 AD census of Nepal a new-born male child had higher life expectancy than female child. It is identified that adjusted age specific death rates of women in rural areas was higher, uncertainty of life of women in reproductive age is greater than men in the same years are causing these situation (Acharya, 1979). Since 1981 census, the life expectancy of female at birth exceeded male life expectancy. In 2018, female life expectancy at birth reached 71 years while male life expectancy was at 70 years with just one year difference between males and females, and 0.4 years less than that of 1952/54 census.

Provincial Status of TFR

Nepal was declared as seven-provincial state in 20 September 2015 (2072/06/03) by the constitution. So there is still lack of data on various sectors at provincial level. Following table (Table 5) shows the population distribution and fertility rate in seven provinces in 2014. Out of seven provinces Bagmati province comprises major size of the total population (20.87%) followed by Madhesh province (20.40%) and least size in Gandaki province (9.07%). In case of female population share only Madhesh province has less than half of the population (49.7%) and all other provinces have more than half of the total population. Gandaki province has least population size but female population has highest share (54.6%). Similarly fertility rate is highest in Karnali province (TFR 3.2/woman) followed by Madhesh province with 2.9 per woman while least total fertility rate is found in Bagmati province (1.8/woman). The total population size

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is little bit increased in Madhesh and Lumbini province in 2021 while TFR is decreased to 2.1 per women.

Table 5

Total Population, Female Population and Total Fertility Rate by Province 2011 to 2021

Province	2011	2021	TFR	*Total Population n (%)	*Female Population n (%)
	Population %	Female Population %			
Province 1	17.12	52.2	2.1	4972021 (17.03)	2546755(51.2)
Madhesh	20.40	49.7	2.9	6126288(20.99)	3048065(49.8)
Bagmati	20.87	50.3	1.8	6084042(20.84)	3050468(50.1)
Gandaki	9.07	54.6	2.0	2479745(8.49)	1299285(52.4)
Lumbini	16.98	52.4	2.4	5124225(17.55)	2666741(50.4)
Karnali	5.93	51.1	3.2	1694889(5.81)	866582(51.1)
Sudurpaschim	9.63	52.3	2.3	2711270(9.29)	1423273(52.5)
Nepal	26494504 (100.0)	13645463 (51.5)	2.3 2.1*	29192480(100.0)	14901169(51.04)

Note: * Preliminary data, ** NDHS 2022

CBS 2014, 2022, Nepal Multiple Indicator Cluster Survey, 2014, CBS

Statistical Analysis

Regression analysis is a statistical tool which is used to produce an equation that will predict a dependent variable using one or more independent variables i.e., y and x (multiple x). It may be bivariate or multi variate. In Table 6, regression statistics is stated and has shown the relationship between dependent variable (y=TFR) and independent variable (x-Female RAR). Regression statistics of the table shows that there is strong negative correlation (-0.7577) between x and y variable, about 57.41% of the variation and strength is explained by y variable according to the data.

Table 6.

Linear Regression Analysis between Female Refined Activity Rate and TFR

Year	Female RAR	TFR	Regression Statistics		
1952/54	55.1	5.96	Multiple R	-0.7577	P value on Slope =
1961	59.38	5.74	R Square	0.574109	0.048473
1971	35.12	5.83	Adjusted R Square	0.488931	Intercept=
1981	46.21	6.39	Standard Error	9.986323	94.33606
1991	45.2	5.12	SSR	672.1681	X variable (slope)=
2001	55.29	4.1	SSE	498.6332	-7.96453
2011	79.4	2.6	SST	1170.801	

Note: as of the source based on Table 1 and Table 4

The negative correlation between women's education and fertility is strongly observed across regions and time; however, its interpretation is unclear. Women's education level could affect fertility through its impact on women's health and their physical capacity to give birth, children's health, the number of children desired, women's ability to control birth and knowledge on different birth control methods (Kim, 2016). According to Table 7, regression statistics

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shows the relationship between dependent variable ($y=TFR$) and independent variable (x -Female Literacy) in between 1961 to 2014. Regression statistics of the table shows that there is also strong negative correlation (-0.959446) between x and y variable and about 92.05% of the variation and strength is explained by y variable according to the data.

Table 7.

Linear Regression Analysis between Female Literacy Rate and TFR

Year	Female Literacy	TFR	Regression Statistics			
1961	1.8	5.74	Multiple R	-0.959446	P value on Slope	=0.00062234
1971	3.9	5.83	R Square	0.920537		
1981	12	6.39	Adjusted R Square	0.904645	Intercept=6.402835	
1991	25	5.12	Standard Error	0.501496		
2001	42.8	4.1	SSR	14.56745	X variable (slope)=	-
2011	57.8	2.6	SSE	1.25749	0.0620548	
2014	62	2.3	SST	15.82494		

Note: as of the source based on Table 4

Malthus could with some justification assume that fertility was determined primarily by two primitive variables, age at marriage and the frequency of coition during marriage (Becker, 1960). Table 8 below shows the regression statistics and the relationship between dependent variable ($y=TFR$) and independent variable (x -Female SMAM) in between 1961 to 2014. Regression statistics in the table shows that there is strong negative correlation between x and y variable with about 83.37% of the variation and strength explained by y variable according to the table.

Table 8.

Linear Regression Analysis between Female SMAM and TFR

Year	SMAM	TFR	Regression Statistics			
1961	15.4	5.74	Multiple R	-0.913106	P value on Slope =	0.004078
1971	16.8	5.83	R Square	0.833762	Intercept =	18.06245
1981	17.2	6.39	Adjusted R Square	0.800515		
1991	18.1	5.12	Standard Error	0.725355	X variable (slope)=	-0.73544
2001	19.5	4.1	SSR	13.19424		
2011	20.6	2.6	SSE	2.630701		
2014	20.7	2.3	SST	15.82494		

Note: as of the source based on Table 4

World statistics indicates six to eight years of advantage in life span of woman than man. This difference is partly due to an inherent biological advantage for the female, but it also reflects behavioural differences between men and women (World Health Organization, 2019). According to Table 9, regression statistics shows the relationship between dependent variable ($y=TFR$) and independent variable (x -Female Life expectancy) in between 1952/54 to 2018. Statistics in the below table shows that there is strong negative correlation (-

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0.902927) between x and y variable, about 81.52% of the variation and strength is explained by y variable.

Table 9.

Linear Regression Analysis between Female Life expectancy and TFR

Year	Female Life		Regression Statistics		
	Expectancy	TFR			
1952/54	28.5	5.96	Multiple R	-0.902927	X variable (slope)=-
1961	37.4	5.74	R Square	0.815278	-0.09837
1971	40.0	5.83	Adjusted R Square	0.788889	
1981	48.1	6.39	Standard Error	0.776382	
1991	53.5	5.12	SSR	18.62237	
2001	60.7	4.1	SSE	4.219385	
2011	67.9	2.6	SST	22.84176	
2017	69.8	2.3	P value on Slope	0.000852	
2018	71	2.3	Intercept	9.694813	

Note: as of the source based on Table 4

Migration out of developing countries is generally associated with lower fertility rates (Neumayer, 2006) due to the gap of intercourse between spouses during the marital relation (Satyal, 2022). In this regard, Table 10 shows the relationship between dependent variable (y=TFR) and independent variables (x1- Female Labour migration, x2 GII) with regression coefficient. Multiple Regression statistics of the table shows that there is strong negative correlation (-0.920274) between x1, x2 and y variable, about 84.69% of the variation and strength is explained by y variable.

Table 10.

Multiple Regression Analysis between GII, Share of Female Labour Migrants (FLM) and TFR

Year	Gender Inequality Index	Female Labour Migrants	TFR *	Regression Statistics		
2010	28.5	3.4	3.0	Multiple R	-0.920274	P value on GII =
2011	37.4	2.9	2.6	R Square	0.846905	0.017367
2012	40.0	6.0	2.6	Adjusted R Square	0.770357	P value on FLM=
2014	48.1	6.1	2.4	Standard Error	0.118771	Intercept=3.383054
2015	53.5	5.6	2.4	SSR	0.312145	GII (slope)= -0.01519
2016	60.7	4.3	2.3	SSE	0.056427	FLM (Slope) = -
2017	67.9	5.26	2.3	SST	0.368571	0.02912

Note: For the Calculation Purpose Fiscal year 2009/10 is assumed as the year 2010 and subsequent fiscal years also assumed for subsequent years.

* as of the data based on Table 3, CBS 2014, PRB 2010, 2012, 2014, 2015, 2016, 2017.

DISCUSSION

The population age structure will be changed and developing country will get direct economic benefits due to the fertility decline (Bongaarts & Hodgson, 2022) as result of transition. Fertility decline has been accompanied by change in socio-cultural values of children, higher involvement of women outside and foreign employment and significant changes in social norms resulting decreased gender inequality in education and employment (Pande, et al., 2012). Lim (n.a) stated that, developed countries that experienced the largest increases in female labour force participation rates in the 1980s also tended to have the largest declines in total fertility rates in those countries. Either inside or outside, if female are economically active and actively participating in economic activities, they are likely to bear few number of child. This is due to advancement in livelihood pattern, higher span of female than male, the distinct behaviour between them (World Health Organization, 2019) along with determination of age at marriage and coital frequency during the marriage (Becker, 1960). The strong negative relationship also helps to conclude this situation in Nepal.

Theoretically demographic transition incorporates fertility decline as a result of pre-transitional society to post-transitional society caused by socioeconomic development and modernization. However, changes in reproductive behaviour often have only been minimally correlated with economic, social, or cultural change occurs in different society (National Research Council, 1999). Finding clearly indicates that there is an inverse relationship between the age at marriage and the total number of children born and the best way to achieve low fertility is to promote an older age at marriage among women (Kumar, 2010). Increase in the singulate mean age at marriage has inverse relation with marital fertility along the reproductive span. The study also shows the result supporting this evidence in Nepal. A negative correlation is most clearly seen between different levels of female education and the total fertility rate (TFR) in a population. This study also found the strong negative relationship between literacy rate and TFR (Pradhan, 2015).

Compelling evolutionary theories suggest that there is an inverse association between fertility and longevity (Ehrlich, 2017). Literatures show that a large number of children have an adverse effect on the length of life in women (Lockhart et al., 2017). In this assessment, fertility decline is found with the increasing life expectancy of women. Migration and inequality pattern shows somehow socio-economic condition of the society. Correlation coefficient suggests that migration has curbed forces of change, possibly in relation to a stronger exposure to conservative ideas prevailing in countries of emigration like in Gulf countries (Fargues, 2007). So that women of society with traditional background are less likely to migrate and found suffering from inequality which ultimately results high fertility in that country.

Limitations of the Study

This study is primarily based on secondary data. Census and survey reports published at national and Gender Inequality Index (GII) published at international level are the major sources of data in this study. Regression

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coefficient is used to show the state of relationship between the indicators. Marriage, literacy, inequality index, employment and economic activeness are taken as socio-economic indicators and fertility is examined by total fertility rate of Nepal for the statistical measure. The following sections therefore present the relations of these variables on fertility transition in Nepal.

CONCLUSION

Contextual variables like education of women, values of son and their preference culture, women empowerment, patterns of urbanization, modern health and other facilities, poverty, literacy and health situation along with intercourse, conception and gestation like Intermediate variables affect the fertility transition in the nation. Theoretically, demographic, educational, employment/occupational, inclusion and decision making capacity, marital aspects etc. are prominent components which affects the socio-demographic and economic status of women and men in any society. These aspects directly or indirectly influence the fertility level. This review study tried to explore and examine the relation between and among the socio-demographic and economic condition to the fertility level (TFR) of Nepal.

As of the total population of Nepal is in increasing pattern, total female population is also found increasing accordingly. The Sex Ratio shows higher share of female since 1991, however, data shows that the share of women in service sectors is less than men. Except in 1952 to 1961 and 1981 to 1991 female life expectancy is higher than male, concludes the better health condition of female now a days. Based on data analysed in this assessment, both TFR and CBR are found declining by more than half during the period as the increasing level of economic involvement, educational awareness, age at marriage, life expectancy of female and narrowing gender inequality. Social changes such as age at marriage at later period of reproductive span and economic status such as less discrimination in employment conditions of women, increased health facilities results low fertility levels coinciding with dramatic change in women's lives. So that, we can conclude that positive change in women's live positively effects to fertility decline in the nation.

Additionally, statistical analysis helps to conclude that strong negative relationship between fertility rate and economically active population, literacy rate, singulate mean age marriage, life expectancy at birth of female. Results depict the opposite relation and explain more than eighty per cent of variability to the fertility rate (TFR). So, increasing rate of these socio-economic and demographic indicators affects to decline fertility rate of Nepal. Similarly some modern and wider measure of inequality (GII) and labour migration of female has moderate negative relation which explains the 28.61 per cent of the variability of gender inequality index of Nepal. So the fertility transition affected the Nepalese women's status as the literatures suggested earlier.

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