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Spatial Demographic Analysis: Life Tables for Male Populations of Divisional Districts in Bangladesh

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Abstract

Life tables are essential tools in demographic and epidemiological studies, providing detailed insights into mortality, survival rates, and life expectancy. For Bangladesh, a developing country with diverse regional disparities, constructing life tables for the male population at the divisional district level offers a deeper understanding of demographic patterns and regional health inequalities. The Orphanhood method utilized data on the average number of children ever born, the proportion of surviving children, and those deceased to estimate child survival functions across divisional districts in Bangladesh. The Widowhood method used the distribution of the female population of divisional districts in Bangladesh by current marital status due to age in the census year 2011. The life expectancy at birth for the male population in the divisional districts of Bangladesh, as estimated in the 2011 census, is as follows: Barisal (63.80 years), Chattogram (63.41 years), Dhaka (61.69 years), Khulna (62.47 years), Mymensingh (63.26 years), Rajshahi (62.10 years), Rangpur (60.33 years), and Sylhet (58.57 years). This paper aims to guide the development and implementation of targeted health policies that address district-specific disparities. By focusing on districts with significantly lower life expectancies compared to the national average, policymakers can make informed decisions to improve health outcomes and reduce regional lifespan gaps.

Keywords: Male Population, Life Table, Life Expectancy, Mortality, Singulate Mean Age at Marriage.

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1. INTRODUCTION

A life table is a mathematical tool based on age-specific death rates within a specific area. It provides a structured approach to analyzing mortality, life expectancy, and demographic trends by estimating the probability of survival at different ages. Life tables are widely used by demographers, public health professionals, actuaries, and researchers to examine various aspects of population dynamics, including fertility, marriage, migration, and population projections. By offering a detailed assessment of mortality patterns, life tables play a crucial role in informing public health policies, social security programs, and economic planning.The importance of life tables extends beyond mortality analysis, as they also reflect broader socio-economic conditions, healthcare accessibility, and demographic disparities. District-level life expectancy, in particular, serves as an essential indicator of regional development and inequality, highlighting variations in health outcomes and living standards. These insights can be instrumental in designing targeted interventions to improve healthcare services and socio-economic policies at a localized level.

Bangladesh, as a developing country, has undergone significant demographic and epidemiological transitions over the past few decades. The country has seen notable improvements in healthcare access, reductions in infant and maternal mortality rates, and increased life expectancy. However, these gains are not uniformly distributed across all regions, with disparities persisting between urban and rural areas, and among different socio-economic groups. Constructing life tables at the district level is therefore essential to understanding and addressing these disparities. Hossain et al. (2025) studied demographic trends in Bangladesh by analyzing time series data on key indicators such as crude birth rate (CBR), crude death rate (CDR), life expectancy at birth for males and females (LEBM and LEBF), and reproduction rates (GRR and NRR). Their research utilized autoregressive models to capture long-term demographic shifts and forecast future changes up to 2030. The study emphasized that understanding patterns in mortality and fertility is essential for demographic planning, particularly in overpopulated countries like Bangladesh. Their findings support the strategic formulation of policies related to population control, healthcare, and aging, aligning with national goals for sustainable development.

Several studies have been instrumental in developing life tables for Bangladesh, notably those conducted by Ali (1990), Islam (2005, 2006 & 2007), Hossain et al. (2024a), and Islam et al. (2003 & 2013). These studies have employed various methodologies to estimate mortality and life expectancy, with a particular focus on the Widowhood Method. This method utilizes marital status data to infer mortality rates, providing a valuable alternative to traditional approaches in contexts where direct mortality data may be limited or unreliable. By leveraging such methods, researchers have been able to generate insightful analyses of population mortality trends and their implications for policy-making.

Life expectancy serves as a critical indicator of population health, encompassing economic, environmental, and biological factors. It is often regarded as a key measure of quality of life, influenced by healthcare access, nutrition, education, economic conditions, and social structures. Understanding life expectancy at the district level allows policymakers and researchers to identify vulnerable populations, allocate resources effectively, and develop strategies for improving overall public health and well-being.

Given the dynamic demographic landscape of Bangladesh, spatial demographic analysis through life tables is crucial for informed decision-making. By examining mortality patterns and life expectancy across divisional districts, this study aims to provide a comprehensive understanding of demographic variations and their underlying causes. The findings will contribute to a more nuanced approach to policy planning, ensuring equitable health and socio-economic development across the country.

2. LITERATURE REVIEW

According to Gulis (2000), and Panzabekova and Digel (2020), life expectancy plays a central role in evaluating well-being and public health interventions. Studies dating back to the 1920s and 1930s (Robine, 2007; Dublin, 1923; Dublin & Lotka, 1934) have emphasized its significance in population health. More recent works by Hossain et al. (2023, 2024) have focused on reducing mortality and increasing life expectancy in different age groups. As global life expectancy has increased over the past two centuries, researchers have developed more refined measurement tools, such as life tables, to analyze mortality trends at both national and regional levels.

Studies by Andersson et al. (2017), who constructed life tables across Europe and the U.S., and Tareque (2022), who examined life expectancy trends in Bangladesh using the Sullivan method, have demonstrated the impact of mortality and morbidity on life expectancy. Life expectancy in Bangladesh has risen from 46.6 years in 1971 to 72.8 years in 2020 (Bangladesh Bureau of Statistics, 2024), reflecting a demographic transition driven by reduced early-life mortality. Mortality estimation methodologies, such as the Coale-Demeny Model Life Tables and the Brass Logit Life Table Systems, have been applied in Bangladesh (Coale & Demeny, 1966; Brass, 1978). The Statistical Yearbook of Bangladesh (2016) provides national-level life tables for male, female, and combined populations.

Despite these advancements, no detailed life table studies have been conducted for Bangladesh's divisional districts. This gap necessitates further research to assess regional disparities in male life expectancy. Understanding variations in life expectancy between districts and the national average is crucial for identifying regional health inequalities and informing targeted public health policies. Thus, this study constructs life tables for the male population across eight divisional districts in Bangladesh: Barisal, Chattogram, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, and Sylhet. By estimating adult mortality in these regions and comparing findings with national-level life tables from the 2011 Census, this study aims to provide insights into regional variations in life expectancy and mortality. Such analysis is essential for evaluating how socio-economic factors, healthcare access, and environmental conditions impact male health across Bangladesh. National-level life tables (Bangladesh Bureau of Statistics, 2016) serve as a benchmark for comparison.

3. METHODOLOGY

3.1 Data and Data Sources

The data utilized in this study is drawn from the Population and Housing Census and Statistical Yearbooks of Bangladesh, which are published by the Bangladesh Bureau of Statistics (BBS). BBS conducts a Population and Housing Census every ten years, offering detailed demographic information about the country's population. In addition to this decennial census, the Sample Vital Registration System (SVRS) is used to track annual population changes between censuses. To fulfill the objectives of this study, a variety of demographic data were collected from the Bangladesh Bureau of Statistics (BBS) reports, particularly from the Population and Housing Census and Statistical Yearbooks. Specifically, the following datasets were used for the construction of life tables for the male population across the divisional districts of Bangladesh:

- Male population by age for each of the eight divisional districts: Barisal, Chattogram, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, and Sylhet.
- Marital status composition for the female population across the same divisions.
- Children everborn and children died after birth, which provide insights into mortality patterns related to childbearing.
- The age structure for the male population in Bangladesh, which forms a key aspect of life table construction.

These data were collected from a series of reports and publications from BBS, specifically from the 2011 Census and its subsequent yearbooks published between 2015 and 2023

(Bangladesh Bureau of Statistics, 2015, 2015a, 2015b, 2015c, 2015d, 2015e, 2015f, 2015g, 2015h, 2023).

3.2 Estimation of Infant and Child Mortality by the Orphanhood Method

To estimate key fertility indicators, such as the average number of children everborn, the proportion of children surviving, and children dead, the data collected for the study includes information from the 2011 Population and Housing Census and other relevant Statistical Yearbooks from the Bangladesh Bureau of Statistics (BBS). These indicators are calculated using the number of children everborn and the number of children surviving by age for the female population, both at the divisional district level (Barisal, Chattogram, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, and Sylhet) and at the national level for Bangladesh in 2011. The mean childbearing age is noted by $m = 2.25\, {}^{P_3}/_{p_2} + 23.95$ where, P_2 and P_3 are the average number of children everborn to women aged 20-24 years and 25-29 years respectively (United Nations, 1967). The set of Brass Multipliers has been estimated corresponding to m by linear interpolation technique. Then probabilities of dying, q(x) from birth to age x, where x=1, 2, 3, and 5 years are obtained by multiplying the proportion of children dead and corresponding Brass multipliers. Now smoothen q(x) values by using logit transformation and West Model Life Table in the Coale Demeny system (Coale and Demeny, 1966). The approximate level of mortality, l_x is chosen from the model life table and also consider $l_x = 1 - q(x)$. The smoothed values of l_2 for both sexes populations have been estimated as 0.93534, 0.93467, 0.93485, 0.93470, 0.93439, 0.93478, 0.93452, and 0.93457 for Barisal, Chattogram, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, and Sylhet districts respectively. l_2 values for the male population have been calculated as 0.92876, 0.92810, 0.92828, 0.92812, 0.92782, 0.92821, 0.92795, and 0.92800 for Barisal, Chattogram, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, and Sylhet districts respectively by the formula, $l_x(Female\ Population) = \frac{l_x^s(Female\ Population)}{l_x^s(Both\ Sexes\ Population)} \times l_x(Both\ Sexes\ Population)$, where l_x^s is the level of mortality taken from the Coale Demeny Model Life Table (Coale and Demeny, 1966; Hossain et al, 2024).

3.3 Estimation of Adult Mortality by the Widowhood Method

Adult mortality for the male population of divisional districts in Bangladesh is estimated by using the marital status composition for the female population of divisional districts in Bangladesh by using the Widowhood method which is proposed by Hill (1977). For this, corrected the proportion not widowed for the female population, $\hat{\pi}^m(x)$ is calculated as $\hat{\pi}^m(x) = \frac{\pi^m(x)}{1+p}$ (Brass, 1978), where $\pi^m(x)$ and p are the proportion not widowed and the remarriage rate of the female population respectively. The proportion not widowed has been converted to the probability of survival ratio using some weighting factors that are given by Hill (1977) corresponding to singulate mean age at marriage (SMAM) for one sex and weighted singulate mean age at marriage (WSMAM) for the other sex. If SMAM for the female population is equal or less than 20 years, the term $\frac{l_{(x+5)}}{l_{22.5}}$ is used to indicate the probability of survival for male population from age 22.5 to (x+5) where x=20, 25 and so on; if SMAM is more than 20 years, the term $\frac{l_{(x+5)}}{l_{27.5}}$ is used to indicate the probability of survival from age 27.5 to (x+5) where x=25, 30 and so on. Thus, if SMAM for the male population is equal or less than 25 years, the term $\frac{l_{(x-5)}}{l_{17.5}}$ is used to indicate the probability of survival for female population from age 17.5 to (x-5) where x= 30, 35 and so on; if SMAM is more than 25 years, the term $\frac{l_{(x-5)}}{l_{22.5}}$ is used to indicate the probability of survival from age 22.5 to (x-5) where x= 30, 35 and so on. Estimated l_2 value used for linking infant mortality to adult mortality. For this, a linear function $Y_x = a + bY_x^s$ is fitted by the iteration method (Sivamurthy and Seetharam, 1980), where $Y_x = \frac{1}{2} log \frac{l_x}{(1-l_x)}$ and Y_x^s is the logit survival function of standard life table (United Nations, 1982). Mortality for the male population, Y_x are then converted to the survival functions l_x values, the number of persons surviving at an exact age x.

3.4 Construction of Life Table

The l_x values have been applied to construct life table using the relationships among life table functions and presented in Table 2 - Table 5. A life table contains the columns x, age measured in years; l_x, the number of persons surviving to exact age x, where l_0 is hypothetical life table cohort of 100000, and l_x = Probability of Surviving × 100000; ${}_nd_x$, the number of deaths between age x and (x + n) out of the total number of births assumed in the table, where ${}_nd_x = l_x - l_{x+1}$, and for the last age interval with the indefinite upper age limit ${}_nd_x = l_x$; ${}_nq_x$, the mortality between age x and (x + n), where ${}_nq_x = {}_nd_x / l_x$; ${}_nL_x$, the number of years of life attained between exact ages x and x + n , where ${}_1L_0 = 0.3l_0 + 0.7l_1$, ${}_2L_1 = 0.4l_1 + 0.6l_2$, and ${}_\infty L_x = l_x(log\, l_x)$ used by Ali (1990). ${}_1L_0$, ${}_2L_1$, and ${}_\infty L_x$ are calculated separately because the mortality pattern in the first two years and last age interval with the indefinite upper age limit of a person is different from the other age groups while in other age groups, the deaths are almost evenly distributed in the different age groups and calculated as ${}_nL_x = \frac{n}{2}(l_x + l_{x+n})$; T_x, the total number of years of life remaining from a certain age x which is calculated as $T_x = \sum_x^n {}_nL_x$; e_x, the average period expectation of life at exactly age x, that is, the average number of years at aged x will live, and derived as $e_x = \frac{T_x}{l_x}$.

4. RESULTS AND ANALYSIS

4.1 Probability of Survival and Singulate Mean Age at Marriage (SMAM)

The Singulate Mean Age at Marriage (SMAM) for both the male and female populations of Bangladesh have shown noticeable changes between the census years 2001 and 2011. In 2001, the SMAM for males was 25.30 years, and for females, it was 19.10 years. By 2011, the SMAM increased to 26.41 years for males and 19.35 years for females. Over the decade, the rate of increase in SMAM was higher for the male population (4.39%) compared to the female population (1.31%), resulting in a widening gap in SMAM between males and females. In 2001, the gap was 6.20 years, and by 2011, it had increased to 7.06 years.

When examining the SMAM for the eight divisional districts of Bangladesh in 2011, Sylhet had the highest SMAM for both males and females at 27.85 years and 21.51 years, respectively, while Mymensingh had the lowest at 24.17 years for males and 19.06 years for females. Other districts displayed intermediate values, with Chattogram showing an SMAM of 27.18 years for males and 20.83 years for females, Dhaka at 26.64 years for males and 20.36 years for females, and Barisal at 25.67 years for males and 19.63 years for females. The figures indicate regional variation in marriage patterns, with delays in marriage being more pronounced in some districts compared to others.

The Weighted Singulate Mean Age at Marriage (WSMAM) for females in Bangladesh in 2011 also varied across districts, providing a more refined understanding of marriage trends by accounting for the age distribution of marriage occurrences. Sylhet had the highest WSMAM at 21.11 years, followed by Dhaka at 20.74 years and Chattogram at 20.73 years. In contrast, Mymensingh had the lowest WSMAM at 18.68 years, followed by Rangpur at 18.81 years. The WSMAM values highlight slight regional differences in marriage timing, with some districts exhibiting older ages at marriage than others.

Using the values of PNW, WSMAM, and SMAM in the widowhood method, the probability of survival has been estimated for the male population of divisional districts in Bangladesh in the census year 2011. It was observed that the probability of survival from age 22.5 to (x+5), where x = 20, 25, ..., 60, was selected and estimated for the male population in Barisal, Khulna, Mymensingh, Rajshahi, and Rangpur districts. Similarly, the probability of survival from age 27.5 to (x+5), where x = 25, 30, ..., 60, was estimated for the male population of Chattogram, Dhaka, and Sylhet districts and is presented in Table 1.

Table 1: Probability of Survival for Male Population of Divisional Districts in Bangladesh in the Census Year 2011

Age	Barisal	Chattogram	Dhaka	Khulna	Sylhet	Mymensingh	Rajshahi	Rangpur
20	0.9934			0.9934		0.9935	0.9939	0.9932
25	0.9927	0.9939	0.9932	0.9909	0.9878	0.9914	0.9918	0.9894
30	0.9863	0.9888	0.9864	0.9830	0.9768	0.9835	0.9836	0.9793
35	0.9742	0.9779	0.9732	0.9694	0.9587	0.9720	0.9697	0.9632
40	0.9504	0.9569	0.9434	0.9453	0.9227	0.9476	0.9422	0.9310
45	0.9205	0.9158	0.9054	0.9094	0.8792	0.9187	0.9046	0.8896
50	0.8695	0.8664	0.8336	0.8512	0.8184	0.8690	0.8409	0.8231
55	0.8120	0.7822	0.7765	0.7827	0.7482	0.8136	0.7656	0.7466
60	0.7216	0.6946	0.6481	0.6778	0.6575	0.7255	0.6494	0.6382

4.2 Life Expectancy of the Male Population in Divisional Districts

The estimated life expectancy at birth for male populations across various divisional districts of Bangladesh in the 2011 census reveals notable regional disparities, as presented in Tables 2 to 5. The highest life expectancy at birth for the male population was observed in Barisal at 63.80 years, followed by Chattogram at 63.41 years, and Mymensingh at 63.26 years. In contrast, Sylhet had the lowest life expectancy at 58.57 years, followed by Rangpur at 60.33 years, and Dhaka at 61.69 years. Other districts, such as Khulna and Rajshahi, reported life expectancies of 62.47 years and 62.10 years, respectively. Despite these variations, almost all divisional districts had life expectancy values above 60 years, except for Sylhet.

Table 2: Life Tables for Male Population of Barisal and Chattogram Districts in Bangladesh in the Census Year 2011

Age (x)	Barisal			Chattogram		
	Survival Function l_x	Mortality Rate ${}_nq_x$	Life Expectancy e_x	Survival Function l_x	Mortality Rate ${}_nq_x$	Life Expectancy e_x
0	100000	0.05825	63.80	100000	0.05864	63.41
1	94175	0.01379	66.73	94136	0.01409	66.34

2	92876	0.00688	66.66	92810	0.00704	66.28
3	92237	0.00422	66.12	92156	0.00432	65.75
4	91847	0.00288	65.40	91758	0.00295	65.03
5	91583	0.00665	64.58	91488	0.00681	64.23
10	90975	0.00314	60.00	90864	0.00322	59.65
15	90689	0.00395	55.18	90571	0.00406	54.83
20	90330	0.00474	50.39	90204	0.00487	50.05
25	89902	0.00598	45.62	89764	0.00615	45.28
30	89364	0.00745	40.88	89212	0.00766	40.54
35	88698	0.01095	36.16	88529	0.01126	35.84
40	87727	0.01736	31.54	87532	0.01788	31.22
45	86204	0.02854	27.05	85967	0.02944	26.74
50	83743	0.04942	22.77	83436	0.05105	22.48
55	79605	0.08034	18.83	79177	0.08309	18.55
60	73209	0.13289	15.25	72598	0.13747	15.00
65	63480	0.20024	12.21	62618	0.20680	12.00
70	50768	0.29113	9.64	49668	0.29944	9.47
75	35988	0.39007	7.57	34796	0.39891	7.45
80	21950	0.49433	5.81	20915	0.50250	5.74
85+	11099	1.00000	4.05	10405	1.00000	4.02

Table 3: Life Tables for Male Population of Dhaka and Khulna Districts in Bangladesh in the Census Year 2011

Age (x)	Dhaka			Khulna		
	Survival Function l_x	Mortality Rate ${}_nq_x$	Life Expectancy e_x	Survival Function l_x	Mortality Rate ${}_nq_x$	Life Expectancy e_x

0	100000	0.05744	61.69	100000	0.05806	62.47
1	94256	0.01516	64.43	94194	0.01467	65.31
2	92828	0.00767	64.42	92812	0.00738	65.27
3	92116	0.00474	63.91	92127	0.00455	64.75
4	91679	0.00324	63.21	91708	0.00310	64.05
5	91382	0.00753	62.42	91423	0.00720	63.25
10	90693	0.00358	57.87	90765	0.00341	58.69
15	90369	0.00452	53.07	90455	0.00430	53.88
20	89960	0.00544	48.30	90066	0.00518	49.10
25	89471	0.00690	43.55	89600	0.00654	44.34
30	88854	0.00863	38.84	89014	0.00817	39.62
35	88086	0.01277	34.15	88286	0.01206	34.92
40	86961	0.02043	29.56	87222	0.01922	30.32
45	85185	0.03398	25.13	85545	0.03181	25.87
50	82290	0.05965	20.92	82824	0.05552	21.63
55	77382	0.09829	17.09	78226	0.09097	17.76
60	69776	0.16362	13.68	71110	0.15105	14.28
65	58360	0.24492	10.87	60369	0.22674	11.38
70	44066	0.34766	8.58	46681	0.32501	8.99
75	28746	0.44980	6.83	31509	0.42632	7.11
80	15816	0.54960	5.36	18076	0.52816	5.53
85+	7123	1.00000	3.85	8529	1.00000	3.93

Table 4: Life Tables for the Male Population of Mymensingh and Rajshahi Districts in Bangladesh in the Census Year 2011

Age (x)	Mymensingh			Rajshahi		
	Survival	Mortality	Life	Survival	Mortality	Life

	Function l_x	Rate ${}_nq_x$	Expectancy e_x	Function l_x	Rate ${}_nq_x$	Expectancy e_x
0	100000	0.05881	63.26	100000	0.05776	62.10
1	94119	0.01420	66.20	94224	0.01489	64.89
2	92782	0.00710	66.15	92821	0.00752	64.87
3	92123	0.00436	65.62	92123	0.00464	64.36
4	91721	0.00297	64.90	91696	0.00317	63.65
5	91448	0.00688	64.09	91405	0.00735	62.85
10	90819	0.00325	59.52	90733	0.00349	58.30
15	90523	0.00410	54.71	90417	0.00440	53.50
20	90153	0.00492	49.92	90019	0.00530	48.72
25	89709	0.00621	45.16	89541	0.00671	43.97
30	89152	0.00774	40.42	88941	0.00839	39.25
35	88462	0.01138	35.72	88195	0.01239	34.56
40	87455	0.01808	31.10	87102	0.01978	29.96
45	85874	0.02978	26.63	85379	0.03281	25.51
50	83317	0.05166	22.37	82578	0.05743	21.30
55	79013	0.08412	18.45	77835	0.09436	17.44
60	72366	0.13918	14.92	70491	0.15688	14.00
65	62294	0.20923	11.92	59432	0.23523	11.14
70	49261	0.30246	9.42	45452	0.33567	8.79
75	34361	0.40207	7.41	30195	0.43747	6.97
80	20545	0.50540	5.72	16986	0.53842	5.45
85+	10162	1.00000	4.01	7840	1.00000	3.89

Table 5: Life Tables for Male Population of Rangpur and Sylhet Districts in Bangladesh in the Census Year 2011

Age (x)	Rangpur			Sylhet		
	Survival Function l_x	Mortality Rate $_nq_x$	Life Expectancy e_x	Survival Function l_x	Mortality Rate $_nq_x$	Life Expectancy e_x
0	100000	0.05687	60.33	100000	0.05562	58.57
1	94313	0.01610	62.95	94438	0.01734	61.00
2	92795	0.00824	62.97	92800	0.00901	61.07
3	92031	0.00511	62.49	91964	0.00563	60.62
4	91560	0.00351	61.81	91446	0.00388	59.97
5	91239	0.00817	61.03	91091	0.00909	59.20
10	90493	0.00390	56.51	90264	0.00436	54.72
15	90141	0.00493	51.72	89870	0.00553	49.95
20	89696	0.00596	46.96	89373	0.00671	45.21
25	89161	0.00757	42.23	88774	0.00857	40.50
30	88486	0.00952	37.53	88013	0.01082	35.83
35	87644	0.01414	32.87	87061	0.01618	31.19
40	86405	0.02275	28.30	85652	0.02627	26.66
45	84439	0.03813	23.91	83402	0.04450	22.31
50	81220	0.06753	19.75	79691	0.07976	18.24
55	75735	0.11212	16.00	73335	0.13369	14.60
60	67244	0.18691	12.71	63530	0.22257	11.47
65	54675	0.27743	10.06	49390	0.32510	9.04
70	39507	0.38617	7.96	33334	0.43922	7.18
75	24250	0.48777	6.39	18693	0.53733	5.85
80	12422	0.58309	5.09	8649	0.62564	4.75
85+	5179	1.00000	3.71	3238	1.00000	3.51

5. DISCUSSION

For comparison, the overall life expectancy for the male population of Bangladesh in 2011 was 67.9 years, as reported by the Bangladesh Bureau of Statistics (2024). The life expectancy gap between the divisional districts and the national average was substantial, with the Sylhet district showing the largest gap of 9.33 years, followed by Rangpur with a gap of 7.57 years, and Dhaka with a gap of 6.21 years. These disparities indicate significant differences in health outcomes, access to healthcare services, and socioeconomic conditions among districts.

To address these disparities and increase life expectancy, it is suggested that steps be taken to improve public health infrastructure, vaccination programs, and food distribution systems. Strengthening healthcare facilities, ensuring better nutrition, and improving maternal and child health services could help reduce mortality rates and contribute to a higher life expectancy across districts. Policymakers should also consider targeted interventions aimed at addressing region-specific health challenges, as well as investments in education and economic development to improve overall living standards. Such findings can inform government and policy initiatives to design targeted programs for different districts in order to address the health challenges contributing to these disparities. By prioritizing public health initiatives and addressing regional inequities, it is possible to ensure a more equitable distribution of health outcomes across Bangladesh.

6. CONCLUSION

Life tables for the divisional districts of Bangladesh serve as essential tools for assessing regional health disparities and understanding population mortality patterns. By comparing the life expectancy (LE) of the male population in individual districts to the national average, these values provide valuable insight into the overall health status of each district. The large gaps in life expectancy observed in districts like Sylhet, Rangpur, and Dhaka (9.33 years, 7.57 years, and 6.21 years, respectively) suggest that these areas face significant health challenges that require targeted attention. The discrepancies in life expectancy highlight several factors that could be influencing the lower life span in these districts. These include socio-economic conditions, healthcare access and infrastructure, nutrition, and sanitation. The government must take proactive steps to address these challenges. Strategies could include investing in healthcare infrastructure, addressing social determinants, and public health campaigns.

By focusing on these areas, the government can effectively narrow the life expectancy gap, ensuring that all citizens, regardless of district, have access to the resources necessary for a long and healthy life. Therefore, the data is based on the 2011 census, which may not reflect recent demographic and mortality trends. The Widowhood Method used for mortality estimation relies on marital status data, which may introduce biases. Additionally, factors like migration, lifestyle changes, and emerging health threats are not explicitly considered. Future research should address these limitations to improve the accuracy of demographic assessments for policy planning.

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