Life Expectancy and Healthy Life Expectancy of Adults in Oman: Does Women's Longer Life Expectancy than Men Mean Success or Burden for Women?

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Abstract: *Objectives*: The objective of this study was to examine the life expectancy (LE) and healthy life expectancy (HLE) of Omani adults with age and gender differentials, focusing on whether the higher LE of women than men is a gain or burden for women.

Method: Data for the study come from multiple sources such as the 2010 population census, the 2008 World Health Survey in Oman, and secondary data published in the Statistical Yearbook of Oman. The life table and the modified life table proposed by Sullivan were used for estimating the LE and HLE of adult people of age 20 and above, respectively.

Results: LE in Oman reached 76 years for both sexes in recent times. However, since 2010 LE has been stalled in the vicinity of 76 years in Oman. Women had higher LE than men (79 years versus 74 years). In terms of HLE, men outweighed women in Oman. At the age of 20, the gap between male-female LE was found to be 4.7 years in favor of females, whereas the gap between male-female HLE was found to be 5.8 years in favor of males. Females spent a relatively long time in poor health status than males (20.8 years versus 10.8 years) and the proportion of life spent in poor health was greater for females than males (35.0% vs. 19.3%). This revealed the paradox of less mortality but higher morbidity among women, supporting the "Failure of Success" hypothesis.

Conclusion: Appropriate health policy and strategy need to be taken to reduce the gender gap in LE and HLE in Oman.

Keywords: Life expectancy, Healthy life expectancy, Burden, Morbidity, Oman.

INTRODUCTION

The 20th century has been a period of both demographic and epidemiologic transitions for the populations in both developed and developing countries [1, 2]. During this period, almost all the countries across the world experienced a huge decline in mortality and fertility, resulting in one of the remarkable public health achievements of the twentieth century the impressive gain in average life expectancy (LE) — the average remaining years an individual of a particular age can be expected to live. For example, in the United States, the average life expectancy has increased from 47.3 years in 1900 to 76.8 years in 2000, a gain of about 30 years [3]. Most of the gain in LE came from controlling infectious diseases, improving public health, and economic progress [4]. The decline in mortality and fertility over the period and the increase in longevity, combined with the increase of degenerative chronic diseases, caused a rapid process of demographic and epidemiologic transition, imposing a new phenomenon of global population aging and public health agenda in the face of the complexity of the new morbidity pattern [1, 5].

The substantial gain in LE over the period caused a dramatic change in the age structures of the populations, giving a sharp rise in the percent of the elderly population. There was also a sharp rise in non-communicable chronic and degenerative diseases, primarily affecting the older population [6]. The significant gain in average LE and its demographic and health consequences lead to a question of what quality of life may be experienced in the extra years lived. Are people living longer in healthy conditions or living relatively with a greater burden of morbidity in the older ages? Gruenberg [7] and Kramer [8] argued that an increase in the average LE was merely a result of a prolonged period living with disability and disease. Gruenberg [7] termed it as ***Failure of Success***. As Olshansky *et al*. [9] observed that the advances in medical technology improve the survival of those with a disabling condition on one hand and the declining mortality from fatal diseases leads to a shift in the distribution of causes of disability from fatal to nonfatal diseases of aging on the other. It is also suggested that the increase in longevity of life would result in a compression of morbidity to the later years of life [10]. However, empirical findings do not support the existence of compression of morbidity when it is defined as major diseases and mobility functioning loss [11]. Riley and Alter [12] have demonstrated, using historical data sources, that morbidity levels tend to rise after mortality declines, rather than the reverse. All these observations encouraged researchers and policymakers to pay attention more to preventing

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disability and morbidity, improving functional healthy life, and developing a population health measure incorporating both longevity and morbidity. One such measure that includes both of these components is broadly known as ‘‘healthy life expectancy’’ (HLE) - a measure of population health that combines length and quality of life into a single measure. While LE is simply the average number of years which a person may be expected to spend alive, HLE is the average number of years which they are expected to spend in a state of good health.

The concept of health expectancy as a health indicator has been developed in the 1960s in the US [13]. After that Sullivan [14] developed a simple method for calculating HLE based on the life table model, which is now widely used as an indicator of the population health measure. According to the World Health Organization [15], HLE's potential applications include comparing the health of one population with another, monitoring changes in the health of populations, and identifying and quantifying health inequalities within populations. Health expectancy can be computed by a variety of different health dimensions. Empirical studies estimated healthy life expectancy indexes based on a variety of health attributes [16,17]. When health states are measured based on self-reported health (SRH) status, the more general name ‘‘healthy years’’ or ‘‘healthy life expectancy’’ is used. However, when health states are defined based on social or functional limitations, the estimated index is called ‘‘disability-free life expectancy.’’ When health states are measured by activity limitation, the index is often called ‘‘active life expectancy’’ [6].

Sultanate of Oman, an oil-rich high-income country of the Arabian Peninsula, is passing through a crucial phase of demographic, epidemiological, and health transition [18]. About 4.5 million people live within a land area of 309,500 sq. km. Along with socio-economic improvement; there is an impressive improvement in the health and survival of the people of the country, which is reflected in the substantial increase in LE in Oman over the last several decades [18]. LE in Oman has increased from a very low average of 36 years in 1950 to 76 years in 2020, and women outweighed men at LE in Oman [19]. Many studies have shown that women live longer than men at all ages, but spend a higher proportion of their total LE in poorer health, a phenomenon described as the “male-female health-survival paradox” or the “gender paradox in health and mortality”[20 – 22]. It is, therefore, important to know whether this gain in the life of Omani people is also associated with long healthy life or longer burdensome life. The higher LE among women than men also raised the question: do women have a better quality of life or healthy life than men in the country? However, to our knowledge, there is no study in Oman on this issue. Thus, the objective of this study was to examine the LE and HLE of the adult people and their differentials by age and gender. The study also examined whether the higher LE of women than men is a gain or burden (*Failures of Success*) for adult women in Oman.

MATERIALS AND METHODS

Source of Data

Data for the study come from multiple sources such as the 2010 population census, the 2008 World Health Survey in Oman, and secondary data published in the Statistical Yearbook of Oman. This paper analyzed HLE in Oman using the Sullivan technique. The information necessary for applying the Sullivan technique are (1) population and deaths or age-specific mortality rates that permit the construction of a life table, and (2) prevalence of health states according to age. In the present study, mortality and population data were obtained from the 2010 Population and Housing Census in Oman. The morbidity information used in applying the Sullivan method comes from the 2008 Oman World Health Survey (OWHS). We assumed that the mortality situation in 2008 was the same as in 2010.

The 2008 OWHS was implemented by the Ministry of Health of Oman in collaboration and technical support of the World Health Organization (WHO). It was a part of the World Health Survey (WHS) series which was developed by the WHO as a means to collect comprehensive baseline information on the health of populations in different countries across the world. The target population of the 2008 OWHS was the adult population of age 18 and above irrespective of their marital status and nationality. Data were collected by face-to-face interview technique and structured questionnaires developed by the WHO for WHS after extensive pre-testing and standardization. The details of the methodology of the OWHS have been published elsewhere [23]. Administratively Oman is divided into 10 regions. Each region has an urban and rural place of residence. A multi-stage stratified cluster sampling design was employed to select a sample of about 5000 households from all over the country with 4.5 million people. Stratification was made

on two factors; level of urbanization (urban/rural) and geographical distribution. The sample size was calculated to ensure adequate precision, and to allow hypothesis testing ensuring adequate power. Out of 4,717 successful individuals interviewed in the survey, 3,370 (71%) were Omani nationals and the rest of 1,347 (29%) were non-Omani. In this study, we have considered Omani nationals of age 20 and above as our study population. To characterize the general health status, a single-item self-rated health (SRH) status has been used. In the survey, respondents were asked to rate their health status on the day of the interview from very good, 'good', 'moderate', 'bad' or 'very bad'. However, for analytical purposes and simplified the analysis, we breakdown the responses into two categories by combing the categories 'very good' and 'good' into one category of 'good' health status and the categories 'moderate', 'bad' or 'very bad' into one category of 'poor' health status.

Calculation of LE

The life table, also known as the mortality table, provides the most complete statistical description of the mortality situation of a population. Demographers also use life tables for a variety of other demographic and statistical analyses. The LE can be estimated by constructing the ordinary life table. We have constructed an ordinary abridge period life table for the adult population of age 20 and above following Chiang [24] method. The life table usually has the following column and functions:

Column 1: (x, x+n) indicate ages in interval with width n=5 except for the final age which is open-ended and usually denoted by ω.

Column 2: ${}_nm_x$, the death rate in age interval (x, x+n), and is calculated by

$$ {}_nm_x = \frac{{}_nD_x}{{}_nP_x} $$

where ${}_nD_x$ are deaths in the interval (x, x+n) and ${}_nP_x$ is the midyear population in the interval (x, x+n). The ${}_nP_x$ and ${}_nD_x$ values are usually obtained from the population census, or national level survey, or vital registration system. In this study, these were obtained from the 2010 Population Census in Oman.

Column 3: ${}_n\hat{q}_x$ is the probability of dying in the interval (x, x+n), and is calculated from the value of ${}_nm_x$ using the relation

$$ {}_nq_x = \frac{2 \times n \times {}_nm_x}{2 + n \times {}_nm_x} $$

Column 4: l_x, the number of persons who attain exact age *x* out of the cohort of l_0 =100,000 births, called the radix of the life table.

Column 5: ${}_nd_x$, the number dying in the interval (x, x+n). The interrelationships between l_x, ${}_nd_x$ and ${}_nq_x$ are as follows:

Table 1: Life Table for Adult Omani Population, 2010

Age	${}_nP_x$	${}_nD_x$	${}_nm_x$	${}_nq_x$	l_x	${}_nd_x$	${}_nL_x$	T_x	e_x
20-24	240,492	218	0.000906	0.004522	100,000	452	498869	5818040	58.18
25-29	206,181	163	0.000791	0.003945	99,548	393	496757	5319170	53.43
30-34	152,842	131	0.000857	0.004276	99,155	424	494715	4822413	48.64
35-39	101,433	109	0.001075	0.005359	98,731	529	492333	4327698	43.83
40-44	73,014	132	0.001808	0.008999	98,202	884	488801	3835365	39.06
45-49	59,308	172	0.0029	0.014396	97,318	1401	483089	3346564	34.39
50-54	52,119	242	0.004643	0.02295	95,917	2201	474083	2863475	29.85
55-59	36,153	213	0.005892	0.029031	93,716	2721	461778	2389392	25.50
60-64	32,464	435	0.013399	0.064826	90,995	5899	440230	1927614	21.18
65-69	22,729	310	0.013639	0.065946	85,097	5612	411453	1487384	17.48
70-74	20,820	579	0.02781	0.13001	79,485	10334	371589	1075931	13.54
75-79	10,327	473	0.045802	0.205482	69,151	14209	310231	704341.5	10.19
80-84	8,046	497	0.06177	0.267535	54,942	14699	237961	394110.1	7.17
85+	6,759	704	0.104157	1.000000	40,243	40243	156149	156149	3.88

$_nd_x = l_x \times {}_nq_x$, x=0,1,……., ω

and $l_{x+n} = l_x - {}_nd_x$, x=0,1,……., ω -1.

Also $_nd_x = l_{x+n} - l_x$, x=0,1,……., ω -1,

Column 6: $_nL_x$ the number of person-years lived by the total cohort in the interval (x, x+n), and $_nL_x = \frac{n}{2}(l_x + l_{x+n})$, for x ≥1, and L_0 is calculated as L_0= $0.3l_0$+ $0.7l_1$. However, for the last age group (85+) an assumption was made about $\mathbf{e}_{85+}$ and then $_nL_{85+}$ was calculated using the formula $_nL_{85+}$= l_{85+} * $\mathbf{e}_{85+}$ [43].

Column 7: T_x, the total number of years lived beyond age *x*. Thus,

$$T_x = {}_nL_x + {}_nL_{x+n} + ...+ L_\omega = \sum_{y=x}^{\omega} L_y \text{ , x=0,1,……., } \omega$$

and Column 8: e_x, the LE is estimated by $e_x = \frac{T_x}{l_x}$.

Thus, LE is the outcome of the life table which measures the average life expectancy of groups of people currently at specified ages if they lived the rest of their lives experiencing the age-specific mortality rates observed for the population at a specific time.

Using the mortality data obtained from the 2010 population and housing census in Oman, we constructed the national life table for the Omani adult population of age 20 and above as well as for male and female. As an illustrative example, Table **1** presents the life table for the Omani adult population of age 20 years and above.

Calculation of HLE

The HLE can be estimated by modifying the ordinary life table functions as suggested by Sullivan [14]. To calculate HLE, we first obtained the age-specific prevalence rates of being healthy, by calculating the rates of reporting ''poor'' health ($_n\pi_x$). The rate of being healthy, that is, reporting ''good '' health is then ($1-{}_n\pi_x$). An example is shown in columns 4 and 5 of Table **2**. Then for each age interval (*x, x+n*), the rates of being healthy ($1-{}_n\pi_x$) are multiplied with the total number of years lived within the same age interval ($_nL_x$) to estimate the total number of years a group of persons is expected to live in a healthy state during the interval which we denoted by $_nL_x^h$. Thus

$$_nL_x^h = (1 - {}_n\pi_x) \times {}_nL_x$$

Thus the values of $_nL_x^h$ are the number of healthy person-years lived in the interval (x, x+n).

The number of healthy person-years lived beyond age x is then obtained as

$$T_x^h = \sum_{i=x}^{\omega} {}_nL_i^h$$

Finally, like in an ordinary life table, the HLE is obtained as

$$e_x^h = \frac{T_x^h}{l_x}$$

Table 2: Calculation of Healthy Life Expectancy (HLE) for Adult Omani Population, 2010

Age	l_x	$_nL_x$	$_n\pi_x$	$1-{}_n\pi_x$	$_nL_x^h$	T_x^h	e_x^h
20-24	100000	498869	0.099	0.901	449481	4416366	44.16
25-29	99548	496757	0.106	0.894	444101	3966885	39.85
30-34	99155	494715	0.101	0.899	444749	3522784	35.53
35-39	98731	492333	0.154	0.846	416513	3078035	31.18
40-44	98202	488801	0.169	0.831	406193	2661521	27.10
45-49	97318	483089	0.194	0.806	389370	2255328	23.17
50-54	95917	474083	0.272	0.728	345133	1865958	19.45
55-59	93716	461778	0.31	0.69	318627	1520826	16.23
60-64	90995	440230	0.289	0.711	313003	1202198	13.21
65-69	85097	411453	0.35	0.65	267445	889195	10.45
70-74	79485	371589	0.374	0.626	232615	621750	7.82
75-79	69151	310231	0.425	0.575	178383	389136	5.63
80-84	54942	237961	0.449	0.551	131117	210753	3.84
85+	40243	156149	0.49	0.51	79636	79636	1.98

Table 3: Life Expectancy (LE) in Oman in Selective Recent Years by Gender, 1995-2020

Year	Life expectancy at birth		
	Male	Female	Both sex
1995	66.8	67.7	67.4
2000	72.5	74.3	73.4
2005	73.2	75.4	74.3
2010	73.6	78.7	76.1
2015	74.2	78.8	76.4
2020	73.9	78.6	76.0

Source: Statistical Year Books, National Centre for Statistics and Information (NCSI), Ministry of National economy, Available at http: www.ncsi.gov.om

The expected years of unhealthy life are then obtained as $e_x - e_x^h$. As an illustrative example, Table **2** presents the calculation of HLE for Omani adult population of age 20 years and above by applying the Sullivan method, taking into consideration the proportion of individuals in each quinquennial age group with a self-rated health status that is good.

RESULTS

Table **3** shows the LE at birth in Oman for the period 1995-2020, which were obtained from the published Statistical Year-Books of the Ministry of National Economy of Oman [25]. The results indicate that the overall LE at birth for both males and females combined has reached 76 years in Oman in 2020. This may be interpreted as the average number of years a newborn is expected to live 76 years in Oman provided that the newborn experience the age-specific mortality rate of 2020. The LE at birth is higher for females than males (78.9 years vs. 73.6 years), and the male-female gap in LE is about 5 years. The results also indicate that since 2010, the total LE remains stable at 76 years. This is also true for both males and females.

Figure **1** depicts the historical trends in LE at birth in Oman since 1950 as documented by the World Population Prospects 2019 Revision of the United Nations (UN) [26]. Since 1950, there is a steady increase in LE at birth in Oman. LE has increased from 36 years in 1950 to 78 Years in 2020, which is more than doubled and about 117 percent increase within 70 years period. The UN projection results also indicate that the LE at birth in Oman will reach 80 years in 2030 [26]. Figure **1** also indicates that female has higher LE at birth than male, and over the period the gap between male and female is widening, reaching about 5 years gap between male and female in recent time.

In this study, the life table technique used to illustrate the Sullivan method's calculation has been

Figure 1: Historical trends in LE of Omani nationals by gender, 1950 – 2015.

Source: UN Population Division: World Population Prospects: The 2019 Revision.

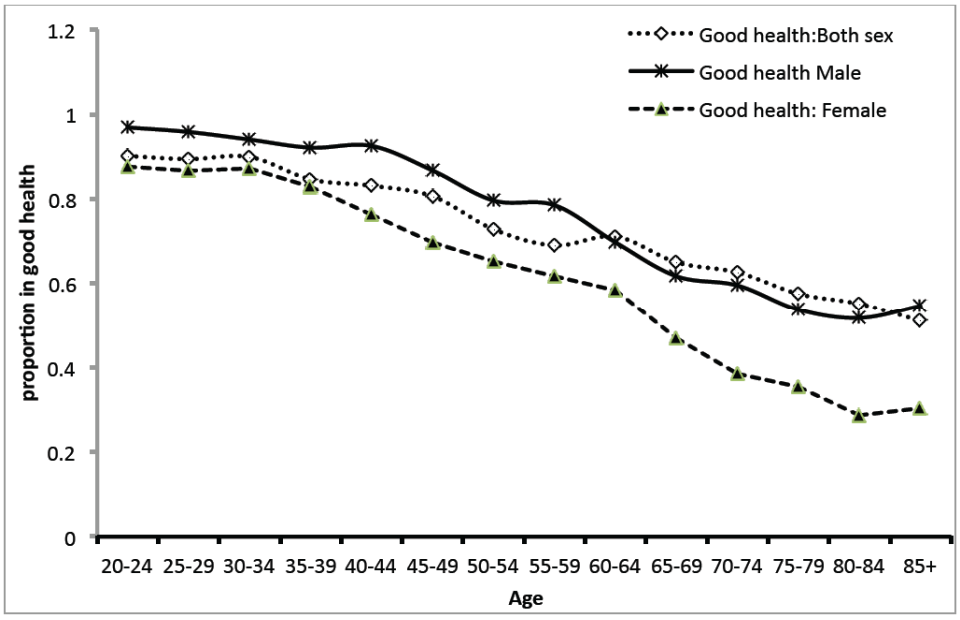

Figure 2: Age-specific proportion in good health by gender, 2008 WHS in Oman.

summarized in quinquennial age groups, beginning at 20 years of age, since the information from the World Health Survey (WHS) in Oman refers to individuals 18 years or older. Table **1** shows the application of the life table technique to illustrate the calculation of LE for a synthetic cohort of adult Omani people of age 20 years. The results indicate that the LE at age 20 was 58.2 years and the LE at age 65 years was 17.5 years.

Table **2** shows the application of the Sullivan method, taking into consideration the proportion of individuals in each quinquennial age group with self-rated health that is defined as good as the specific rate by age of being healthy. Column 5 of Table **2** shows the observed age-specific proportion of Omani people with good health. As expected the prevalence of good health decrease monotonically with age. However, as can be seen from Figure **2** that the age-specific prevalence of good health was higher among males than females.

Similar to the ordinary life table, the last column (column 8) of Table **2** presents the HLE (e_x^h) for the Omani adults of age 20 and above. As can be observed from column 8 of Table **3**, at the age of twenty, one expects to live another 44.2 healthy years.

Table **4** displays the LE, HLE, number of years live in poor health state and the percentage of total LE live in poor health state by age and sex for Omani population. For example, at age 20 years, whereas the total LE was 58.2 years, the HLE was 44.2 years, and thus 14.0 years were lived in a poor state of health which accounts for 24% of the total LE at age 20 years. Similarly, at age 65 years, the total LE was 17.5 years, the HLE was 10.5 years, and consequently, 7.0 years were lived in a poor state of health which accounts for 40% of the total LE at age 65 years.

In terms of total LE, females outweigh males in all age groups. On average, females at age 20 expect to live approximately 5.0 years more than males of the same age (60.7 years versus 56.1 years). At the age of 65 years, the difference by sex is, on average, 3.0 years in favor of females. However, concerning the HLE, given that the prevalence of poor health is more pronounced among females, females have a lower average HLE compared to males. At age 20 years, whereas the HLE was found to be 45.3 years for males, the corresponding figure for females was 39.5 years, about 6 years in favor of males. Consequently, at age 20 years, males live 10.8 years in poor health status, as opposed to 20.8 years for females, accounting for 19.0% of the total LE at poor state among males compared to 35% among females. According to the estimate, at the age of 65 years, it is expected that males spend, on average, 42.0% of the years yet to be lived with poor health status. This average is 64.0% for females.

DISCUSSIONS

This study examined the level and trends of LE in Oman and estimated the HLE in Oman for adults of age 20 and above. LE and HLE are the two important measures of population health that are needed to

Table 4: Life Expectancy (LE) and Healthy Life Expectancy (HLE) by Age and Gender

	Life expectancy (LE)	Healthy life expectancy (HLE)	Years lived in a poor health state	% of total LE live in poor health sate
Both sex				
20-24	58.18	44.16	14.02	24.10
25-29	53.43	39.85	13.58	25.42
30-34	48.64	35.53	13.11	26.95
35-39	43.83	31.18	12.65	28.86
40-44	39.06	27.10	11.96	30.62
45-49	34.39	23.17	11.22	32.63
50-54	29.85	19.45	10.4	34.84
55-59	25.50	16.23	9.27	36.35
60-64	21.18	13.21	7.97	37.63
65-69	17.48	10.45	7.03	40.22
70-74	13.54	7.82	5.72	42.25
75-79	10.19	5.63	4.56	44.75
80-84	7.17	3.84	3.33	46.44
85+	3.88	1.98	1.90	48.97
Male				
20-24	56.05	45.26	10.79	19.25
25-29	51.40	40.70	10.7	20.82
30-34	46.69	36.14	10.55	22.60
35-39	41.95	31.64	10.31	24.58
40-44	37.24	27.25	9.99	26.83
45-49	32.68	22.94	9.74	29.80
50-54	28.24	18.99	9.25	32.75
55-59	24.00	15.51	8.49	35.38
60-64	19.90	12.15	7.75	38.94
65-69	16.49	9.62	6.87	41.66
70-74	12.78	7.28	5.5	43.04
75-79	9.42	5.23	4.19	44.48
80-84	6.25	3.29	2.96	47.36
85+	2.82	1.54	1.28	45.39
Female				
20-24	60.74	39.46	21.28	35.03
25-29	55.88	35.17	20.71	37.06
30-34	50.99	30.91	20.08	39.38
35-39	46.11	26.62	19.49	42.26
40-44	41.27	22.51	18.75	45.44
45-49	36.48	18.81	17.67	48.43
50-54	31.84	15.51	16.33	51.29
55-59	27.38	12.50	14.88	54.33
60-64	22.86	9.43	13.43	58.75
65-69	18.82	6.89	11.93	63.39
70-74	14.61	4.83	9.78	66.96
75-79	11.27	3.43	7.84	69.55
80-84	8.48	2.87	5.62	66.20
85+	5.40	2.12	3.28	60.70

improve our understanding of the determinants of health, for the efficient allocation of resources, and health care planning and policymaking. Our findings indicate that there is an impressive gain in LE in Oman over the last few decades which reach 76 years for both sexes in recent times. Women have been found to have a higher LE than men (79 years among women versus 74 years among men), a trend that is consistent with the trend observed around the world [27, 28]. Higher LE among women than men relates to genetics, inherent biological superiority of women over men, behavioral differences between men and women, less involvement with risk full job among women and lower risk of accidental death among women than men, and so on [29, 30]. The overall gain in LE in Oman can be attributed to the reduction of mortality and morbidity, and improvement in treatment and health care system.

It has also been observed that since 2010, LE has been stalled in the vicinity of 76 years. Further research is needed to determine the underlying causes of LE stall in Oman in recent years. A slowing increase in LE or stall in LE has also been observed in many developed and developing countries [31-35]. Even in the USA, LE has been seen a slightly decline in recent times [36]. The stall in LE in Oman might have a relation with the recent growth of non-communicable diseases such as diabetes, cardiovascular diseases, and hypertension [37] as well as disability caused by age-related changes in physical health, including mobility and ability to perform activities of daily living and road traffic accident [38, 39].

It was observed that an Omani adult of age 20 can expect to live on average 44 more years in a healthy state. As at the age of 20 years, LE is 58 years and HLE is 44 years, so the adults of age 20 years would spend on average 14 years in a poor health state or nearly one-fourth (24%) of their total LE would spend in a poor health state. In a similar study in Brazil, using the 2003 World Health Survey (WHS) data, Romero *et al*. [40] observed that for Brazilian of age 20 years LE was 54 years and HLE was 47 years, indicating a longer healthy life among Brazilian than Omanis. This difference is mainly due to a higher rate of self-reported poor health status in all age groups among the Omani population than Brazilian.

Although females have longer LE than males, they have shorter HLE than males in Oman, indicating the paradox of less mortality but higher morbidity among females in Oman. This is consistent with the higher prevalence of poor health status among females than males as depicted in Figure **2**. At age 20 the gap between male-female LE was found to be 4.7 years in favor of females, whereas the gap between male-female HLE was found to be 5.8 years in favor of males. Females spent a relatively long time in poor health status than males (20.8 years versus 10.8 years) and the proportion of life spent in poor health was greater for females than males (35.0% for females compared with 19.3% for males) (Table **4**). This means that the majority of the extra years of life that females had over males were spent in poor health, demonstrating the “failure of success” [7]. Similar findings were reported by many previous studies [22, 41, 42]. Despite the empirical evidence of higher longevity among women than men across the world, in many settings, women are more disposed to morbidity, disability, depression, discrimination, and sufferings from the loneliness which may lead to the *Failure of Success*.

More research is needed to investigate the biological, behavioral, and social mechanisms that make gender differences in LE and HLE, so that effort can be taken to promote longevity of men and compression of disability and poor health in the years lived, especially among women.

CONCLUSION

There is an impressive gain in LE in Oman over the last few decades which reach 76 years for both sexes in recent time. Women have been found to have a higher LE than men (79 years versus 74 years). However, since 2010 LE has been stalled in the vicinity of 76 years in Oman. Further research is needed to identify the causes for the recent stall of LE in Oman. Despite higher LE among women than men, they have relatively shorter HLE, which means women are more likely to spend their extended life in poor health compared to men. This reveals the paradox of less mortality but higher morbidity among women in Oman and our result also supports the “Failure of Success” hypothesis. Considering the importance of LE and HLE as the summary measure of health outcomes, Oman should adopt a consistent measure and reporting of LE and HLE as the principal health outcome measure for the nation and regions, and adopt the policy to reduce the gender gap in LE and HLE.

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