*Original Article*
http://mjiri.iums.ac.ir
**Medical Journal of the Islamic Republic of Iran (MJIRI)**

*Med J Islam Repub Iran.* 2024 (12 Aug);38.92. https://doi.org/10.47176/mjiri.38.92

# Estimating the Disability-Adjusted Life-Years (DALYs) of Five Most Prevalent Cancers in the Elderly in Markazi Province, Iran, 2019

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Received: 24 Apr 2023 Published: 12 Aug 2024

## Abstract

**Background:** Cancer is one of the diseases affecting the elderly and can lead to loss of life years. The skin, breast, gastric, colorectal, and lung cancers are five prevalent cancers in the elderly. The present study was conducted to evaluate the incidence and burden of these cancers in the elderly.

**Methods:** This secondary study was conducted on available extracted data from the population-based cancer registry in Markazi province in 2019. The data of all cases older than 60 years that lived more than six months in Markazi province were extracted. Collecting information involves gathering data on cancer incidence and death rates based on age and sex groups, as well as overall mortality rates. This also includes survival rates, recovery rates for cancer patients, and disability attributed to cancer using the global burden of disease (GBD) standard table from various sources. Various data, including the latest death registration report and the latest cancer registration report for 2019 and the Iran Statistics Center, were obtained. In order to check and analyze the data, Excel and DISMOD2 software were used. In order to analyze the data, formulas for calculating the burden of diseases (DALY=YLL+YLD) were used. For the validity and reliability of the data, the method of preventing the registration of impossible codes and useless codes was used.

**Results:** The incidence rate of skin, breast, gastric, colorectal, and lung cancers in elderly women was 52.87, 59.02, 67.63, 47.95, and 20.90, respectively, per 100000. DALYs of these cancers in elderly women were 63.15, 423.86, 686.37, 366.49, and 385.18, respectively. The incidence rate of skin, gastric, colorectal, and lung cancers in elderly men was 100.84, 135.80, 49.74, and 68.57, respectively per 100000. DALYs of these cancers in elderly men were 342.31, 1117.01, 337.99, and 452.41, respectively. The highest YLL and YLD were related to gastric cancer (493.31/100,000) and breast cancer (220.84/100,000)

**Conclusion:** Based on the results of this study, the incidence, mortality, and DALY of skin, breast, stomach, colorectal and lung cancers were higher in the elderly. In this study, the burden of some cancers such as breast, was lower compared to provinces such as Yazd.

**Keywords:** Cancer, Incidence Rate, Disability Adjusted Life Years, Elder

***Conflicts of Interest:*** *None declared*
***Funding:*** *None*



***Cite this article as***: Amani A, Fadayevatan R, Eshrati B, Rafiee M, Akbari Kamrani AA. Estimating the Disability-Adjusted Life-Years (DALYs) of Five Most Prevalent Cancers in the Elderly in Markazi Province, Iran, 2019. *Med J Islam Repub Iran.* 2024 (12 Aug);38:92. https://doi.org/10.47176/mjiri.38.92

## Introduction

Most regions of the world are getting older rapidly (1). The statistical data show that Iran's elderly population is increasing, as well (2). Aging is a biological process with a progressive decrease in the performance of most of the body's systems, which ultimately leads to the inability to meet the body's needs for the rest of life. The decrease in

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***↑What is "already known" in this topic:***
Aging is a growing phenomenon in the world, and the burden of cancers in this age group is increasing. The DALY index summarizes and quantitatively expresses mortality, disability and quality of life. Therefore, this index is used to explain the health problems of societies, cost-benefit analysis, and other health policies.

***→What this article adds:***
The results of this study can be helpful in planning for first-level prevention, including proper education and awareness through the media, identifying risk factors, and eliminating these factors in the elderly community to reduce the incidence of these cancers.



[ DOI: 10.47176/mjiri.38.92 ]

the functional capacity of the body can be attributed to the progressive decrease in the active cells of the tissues due to aging. In normal conditions, the body's stability mechanisms remain constant in response to environmental changes, whether inside or outside the body. Younger people have a functional storage capacity in all their body parts, but this capacity is gradually lost with age (3, 4). Most chronic diseases are observed in the elderly. It is estimated that 80% of individuals with an age of above 65 years have one chronic disease and 50% of them have two chronic diseases (5).

In 2019, the global burden of disease (GBD) data revealed that there were a total of 6,746,260 reported cases of cancer in individuals over 75 years old worldwide. The incidence rate in males was 3302.68 per 100,000 people, while in females, it was 1821.66 per 100,000, resulting in a male-to-female ratio of 1.81. Additionally, cancer led to 3,487,482 deaths, with a male-to-female mortality ratio of 1.72.

In most regions of the world, such as the USA, Europe (6), Egypt (7), and Jordan (8), most cases of cancers are observed in the elderly. Also, in Iran, the incidence of cancer is increased with aging (9). According to studies in Iran, skin cancer is the most prevalent cancer in the elderly (10). Also, the most prevalent cancers in Iranian male elderly are skin cancer, gastric cancer, and bladder cancers, and in female elderly, are skin cancer, breast cancer, and gastric cancers (11).

For the correct leading of health sources, an index is needed to show the consequences of early death and its burden. Disability-adjusted life year (DALY) is a health interval index. This index calculates the life lost years due to both years of life lost (YLL) and years lost due to disability (YLD) (12).

According to the frequency of some cancers, such as breast, skin, gastric, colorectal, and lung, in the elderly and the limited number of studies calculating the burden of these five cancers in the elderly, the study aimed to assess the incidence and burden of these cancers on the elderly in Markazi in 2019.

## Methods

This secondary study used available data related to cancers in Markazi province in 2019.

The data of all cases older than 60 years that lived more than six months in Markazi province were extracted.

We gathered data based on age and sex groups to track the incidence and death rate of cancer, as well as overall mortality rates. Information on survival rates, recovery rates of cancer patients, and the impact of disability attributed to cancer-based on the global burden of disease (GBD) standard table was also collectedfrom various sources.

Various data, including the latest death registration report and the latest cancer registration report for 2019 and the Iran Statistics Center, were obtained. In order to check and analyze the data, Excel and DISMOD2 software were used. In order to analyze the data, formulas for calculating the burden of diseases (DALY=YLL+YLD) were used. For the validity and reliability of the data, the method of preventing the registration of impossible codes and useless codes was used.

The following data were needed for the calculation of cancer burden. 1) The population estimate of the Markazi province was extracted based on the population data of the statistics center and the health center of this province; 2) Incidence rate of cancers in all age groups that were extracted from the population-based cancer registry program in the province; 3) Age-specific death rate of all causes and deaths due to cancer in all age groups that were extracted from death register program in the province; 4) The mean age of death due to cancer, the mean age of cancer onset, and mean of cancer duration in all age groups that were extracted from data of elderly patients; 5) Calculation of standard life expectancy and life tables for Markazi province; 6) Mean age of cancer onset with the use of available data of patients in cancer registry; 7) Calculation of cancer duration from onset to death (or recovery); 8) Use of standard weights of studies in other countries; 9) Finally, the burden of cancer calculated using these data. All considerations in the global burden of disease studies were applied to compare the results of this study.

Because the burden of diseases was calculated according to the death registration system, and deaths in death registration software were recorded based on cancer. Therefore, the burden of cancer was calculated based on any registered cancer.

Since deaths in the national death registration software are usually recorded based on one type of cancer. Therefore, the disease burden was calculated based on each registered cancer case. Therefore, in this study, in case of simultaneous occurrence of two or more cancers, in the calculations and final analysis, the disease was considered as the cause of death. Also, the calculation of YLL was not conducted for cancer patients who died of other causes (such as stroke, accident, etc.) and only the YLD was calculated for them.

YLL and YLD were needed for the calculation of the burden of disease (13). Life expectancy tables were used for YLL calculation and comparison with standard life expectancy. Standard life expectancy was calculated using the Cole Demeny table. Based on this table, the standard life expectancy was 82.5 years for women and 80 years for men. This life expectancy was related to Japan's population (13). The YLL formula for each death that occurred in each specific age (a) is:

$$YLLs=\frac{KCe^{ra}}{(r+\beta)^2}\left[e^{-(r+\beta)(L+\beta)}\left[-(r+\beta)(L+\alpha)-1\right]-e^{-(r+\beta)\alpha}\left[-(r+\beta)\alpha-1\right]\right]+\frac{1-K}{r}(1-1-e^{-rL})$$

According to the global burden of diseases, r=0.03, β=0.04, K=1, and C=0.1658 in this formula. The formula includes three basic assumptions: r represents the annual discount rate, while K and β are the parameters that weigh age. This implies that more importance is placed on years lost in youth compared to older ages, and C is a constant value. Table 1 shows the number of YLLs in each age group based on the formula mentioned above (14).

The following formula was used for YLD:

$$YLD = I \times DW \times L$$





[ DOI: 10.47176/mjiri.38.92 ]

*Table 1.* Standard life expectancy and years of life lost (YLL) due to death at each age

| Age (years) | Life expectancy (years) | | YLL due to a death at each age | |
|---|---|---|---|---|
| | Female | Male | Female | Male |
| 0 | 82.50 | 80.00 | 33.12 | 33.01 |
| 1 | 81.84 | 79.36 | 34.07 | 33.95 |
| 5 | 77.95 | 75.38 | 36.59 | 36.46 |
| 10 | 72.99 | 70.40 | 37.62 | 37.47 |
| 15 | 68.02 | 65.41 | 36.99 | 36.80 |
| 20 | 63.08 | 60.44 | 35.24 | 35.02 |
| 25 | 58.17 | 55.47 | 32.78 | 32.53 |
| 30 | 53.27 | 50.51 | 29.92 | 29.62 |
| 35 | 48.38 | 45.37 | 26.86 | 26.50 |
| 40 | 43.53 | 40.64 | 23.74 | 23.32 |
| 45 | 38.72 | 35.77 | 20.66 | 20.17 |
| 50 | 33.90 | 30.99 | 17.69 | 17.12 |
| 55 | 29.37 | 26.32 | 14.87 | 14.21 |
| 60 | 24.83 | 21.81 | 12.22 | 11.48 |
| 65 | 20.44 | 17.50 | 9.75 | 8.98 |
| 70 | 16.20 | 13.58 | 7.48 | 6.69 |
| 75 | 12.28 | 10.17 | 5.46 | 4.77 |
| 80 | 8.90 | 7.45 | 3.76 | 3.27 |
| 85 | 6.22 | 5.24 | 2.45 | 2.12 |
| 90 | 4.25 | 3.54 | 1.53 | 1.30 |
| 95 | 2.89 | 2.31 | 0.94 | 0.76 |
| 100 | 2.00 | 1.46 | 0.57 | 0.42 |

In this formula, I is the incidence of disease, DW is disability weighted, and L is the duration of disease. The incidence rate was calculated based on available data in the cancer registration system. In the global burden of disease study, a specific weight was considered for each age. The following formula was used for YLD calculation for the global burden of disease study and also in this study:

$$YLD=\frac{IDWCe(ra)}{(\beta+r)2\left[e-(\beta+r)(L+a)\left[-(\beta+r)(L+a)-1\right]-e-(\beta+r)a\left[-(\beta+r)a-1\right]\right]}$$

$$r=0.03,\beta=0.04,K=1,C=0.1658$$

The incidence or duration of cancers for each age group was needed for the calculation of YLD. Thus, the modeling for each cancer was done with DisMod software v.2. The prevalence, recurrence rate, and death rate due to cancer were given to the software, and the incidence rate or duration of cancer was calculated for each age group (13).

In this study, the control of not recording all cases and incorrect registration of death due to cancer was done for appropriate validity and reliability. Demographic methods were used for low registration control. These methods compare the registered deaths of specific age groups with expected ratios. Also, for the bad registration control, the impossible codes (such as men's reproductive cancer in women), the improbable codes (such as oral and gastric cancers at the age of under 5 years), and the useless codes (cancer without type and details) were not recorded.

In order to check the validity and reliability of the data, it is necessary to register impossible codes (such as assigning cancers of the male reproductive system to females), improbable codes (such as cancers of the mouth, stomach, etc., under the age of five) and useless codes (cancer without mentioning the type and its details) was prevented.

## Results

The incidence rate and age-specific death rate of skin, breast, gastric, colorectal, and lung cancers per 100,000 Iranian elderly women in 2019 are presented in Table 2. These results showed that the highest and lowest incidence rate of cancer in women was related to gastric cancer (67.63/100,000-CI95% 60.31,74.95/100,000) and lung cancer (20.90/100,000-CI95% 17.3,24.50/100,000), respectively. The highest and lowest death rate was related to gastric cancer (50.41/100,000) and skin cancer (1.22/100,000-CI95% 089,1.55/100,000), respectively. The highest incidence rate in the 60-69, 70-79, and >80 age groups was related to breast cancer (81.97/100,000-CI95%72.17,91.77/100,000), gastric cancer (90.86/100,000-CI95% 60.31,74.95/100,000), and colorectal cancer (97.63/100,000-CI95% 89.18,106.08/100,000), respectively. Also, the highest death rate in all age groups was related to gastric cancer (32.79, 39.5, and 127.67 per 100,000 in 60-69, 70-79, and >80 age groups, respectively).

The incidence rate and age-specific death rate of skin, gastric, colorectal, and lung cancers per 100,000 Iranian elderly men in 2019 are presented in Table 3.

These results showed that the highest and lowest incidence rate of cancer in men was related to gastric cancer (135.80/100,000-CI95%112.9,158.70/100,000) and colorectal cancer (49.74/100,000-CI95% 40.44,59.04/100,000), respectively. The highest and lowest death rate was related to gastric cancer (96.80/100,000-CI95% 88.45,105.15/100,000) and skin cancer (8.06/100,000-CI95% 5.36,10.76/100,000), respectively. The highest incidence rate in 60-69, 70-79, and >80 age groups was related to skin cancer (64.37/100,000-CI95% 55.04,73.70/100,000), gastric cancer (216.71/100,000-CI95% 178.21,255.71/100,000), and gastric cancer (234.77/100,000-CI95% 202.27,267.27/100,000), respectively. Also, the highest death rate in the 60-69 age group was related to lung cancer (29.50/100,000-CI95%





[ DOI: 10.47176/mjiri.38.92 ]

*Table 2.* Population, incidence rate, and age-specific death rate of skin, breast, gastric, colorectal, and lung cancers per 100,000 Iranian elderly women

| Age group | Population | Cancer | Incidence Rate (95% CI) | Death Rate (95% CI) |
|---|---|---|---|---|
| 60-69 | 42694 | Skin cancer | 30.44 (18.9, 41.98) | 0 |
| | | Breast cancer | 81.97(62.45,101.49) | 18.73(15.21,22.25) |
| | | Gastric cancer | 46.84(36.51,57.17) | 32.79(24.48,41.10) |
| | | Colorectal cancer | 30.44(20.20,40.78) | 9.36(6.86,11.86) |
| | | Lung cancer | 9.36(7.13,11.59) | 18.73(15.47,21.99) |
| 70-79 | 25313 | Skin cancer | 86.91(71.60,102.22) | 0 |
| | | Breast cancer | 43.45(35.01,51.89) | 11.85(9.48,14.22) |
| | | Gastric cancer | 90.86(72.14,109.58) | 39.50(32.15,46.85) |
| | | Colorectal cancer | 51.35(40.90,61.98) | 37.04(30.69,43.39) |
| | | Lung cancer | 23.70(16.30.31.10) | 43.45(36.13,50.77) |
| >80 | 13315 | Skin cancer | 60.08(38.81,81.35) | 7.51(5.19,9.83) |
| | | Breast cancer | 15.02(11.50,18.57) | 15.02(11.27,18.80) |
| | | Gastric cancer | 90.12(63.81,116.43) | 127.67(100.34,155.00) |
| | | Colorectal cancer | 97.63(70.03,125.23) | 45.06(38.74,51.38) |
| | | Lung cancer | 52.57(37.73,67.41) | 52.57(44.94,60.20) |
| Total | 81322 | Skin cancer | 52.87(37.52,68.22) | 1.22(1.09,1.35) |
| | | Breast cancer | 59.02(40.21,77.83) | 15.98(12.65,19.31) |
| | | Gastric cancer | 67.63(53.26,82.00) | 50.41(42.08,58.74) |
| | | Colorectal cancer | 47.95(35.68,60.22) | 24.59(20.22,28.98) |
| | | Lung cancer | 20.90(12.57,29.23) | 31.97(26.14,37.80) |

*Table 3.* Population, incidence rate, and age-specific death rate of skin, breast, gastric, colorectal, and lung cancers per 100,000 Iranian elderly men

| Age group | Population | Cancer | Incidence Rate (95% CI) | Death Rate (95% CI) |
|---|---|---|---|---|
| 60-69 | 37281 | Skin cancer | 64.37(43.15,85.59) | 2.68(1.71,3.65) |
| | | Gastric cancer | 48.38(30.03,66.73) | 40.23(32.98,47.48) |
| | | Colorectal cancer | 34.87(25.29,44.45 | 2.68(1.81,3.55) |
| | | Lung cancer | 29.50(21.17,37.83) | 42.91(33.58,52.24) |
| 70-79 | 22610 | Skin cancer | 119.41(90.84,147.98) | 17.69(13.36,22.02) |
| | | Gastric cancer | 216.71(174.36,259.06) | 150.37(140.32,160.42) |
| | | Colorectal cancer | 75.18(51.77,98.59) | 48.65(40.32,56.98) |
| | | Lung cancer | 110.57(82.22,138.92) | 48.65(39.90,57.40) |
| >80 | 14482 | Skin cancer | 165.72(134.44,197.00) | 6.90(4.33,9.47) |
| | | Gastric cancer | 234.77(191.52,266.05) | 158.81(135.49,182.13) |
| | | Colorectal cancer | 48.33(30.90,65.76) | 48.33(40.77,55.89) |
| | | Lung cancer | 103.57(75.75,131.39) | 69.05(56.35,81.75) |
| Total | 74373 | Skin cancer | 100.84(79.47,122.21) | 8.06(5.73,10.39) |
| | | Gastric cancer | 135.80(104.43,167.17) | 96.80(86.30,107.30) |
| | | Colorectal cancer | 49.74(36.37,63.11) | 25.54(19.89,31.19) |
| | | Lung cancer | 68.57(48.84,88.30) | 49.74(40.41,59.07) |

21.15,37.85/100,000) and in the 70-79 and >80 age groups was related to gastric cancer (150.37 and 158.81 per 100,000, respectively).

The results of YLL, YLD, and DALYs of skin, breast, gastric, colorectal, and lung cancers per 100,000 Iranian elderly women in 2019 are presented in Table 4. According to these results, the highest YLL and YLD were related to gastric cancer (493.31/100,000) and breast cancer (220.84/100,000), and also, the highest DALYs were related to gastric cancer (686.37/100,000). Moreover, the highest DALYs in all age groups were related to gastric cancer.

The results of YLL, YLD, and DALYs of skin, gastric, colorectal, and lung cancers per 100,000 Iranian elderly men in 2019 are presented in Table 5. According to these results, the highest YLL, YLD, and DALYs were related to gastric cancer (793.92, 323.07, and 1117.01 per 100,000, respectively). Moreover, the highest DALYs in all age groups were related to gastric cancer.

## Discussion

The present study evaluated the incidence rate and burden of five cancers (skin, breast, colorectal, gastric, and lung) in the elderly. The results of this study showed that the highest DALYs of cancer in all age groups and both genders in the elderly were related to gastric cancer. Also, the lowest death rate due to cancer and the burden of cancer in all age groups and in both genders in the elderly was related to skin cancer.

In our study, breast cancer ranked second cancer for DALYs in 60-69 old women. The first rank was related to gastric cancer. However, the burden of this cancer was lower in 70-79 and >80 years. Also, the incidence rate and death rate of breast cancer in 60-69 years were highest and more than other cancers. This issue shows the importance of age 60-69 years in breast cancer. This result was similar





[ DOI: 10.47176/mjiri.38.92 ]

*Table 4.* The YLL, YLD, and DALYs of skin, breast, gastric, colorectal, and lung cancers per 100,000 Iranian elderly women

| Age groups | Cancers | YLL | YLD | DALYs |
|---|---|---|---|---|
| 60-69 | Skin cancer | 0 | 131.53 | 131.53 |
| | Breast cancer | 284.83 | 354.12 | 638.96 |
| | Gastric cancer | 492.95 | 202.35 | 695.31 |
| | Colorectal cancer | 142.41 | 131.53 | 273.95 |
| | Lung cancer | 290.34 | 40.47 | 330.81 |
| 70-79 | Skin cancer | 0 | 201.76 | 201.76 |
| | Breast cancer | 116.93 | 100.88 | 217.82 |
| | Gastric cancer | 376.68 | 210.94 | 587.62 |
| | Colorectal cancer | 406.12 | 119.22 | 525.35 |
| | Lung cancer | 441.83 | 55.02 | 496.86 |
| >80 | Skin cancer | 29.96 | 86.18 | 116.16 |
| | Breast cancer | 101.27 | 21.54 | 122.83 |
| | Gastric cancer | 716.16 | 129.28 | 845.45 |
| | Colorectal cancer | 221.15 | 140.05 | 361.20 |
| | Lung cancer | 271.78 | 75.41 | 347.20 |
| Total | Skin cancer | 29.96 | 145.96 | 63.15 |
| | Breast cancer | 202.51 | 220.84 | 423.86 |
| | Gastric cancer | 493.31 | 193.06 | 686.37 |
| | Colorectal cancer | 237.39 | 129.09 | 366.49 |
| | Lung cancer | 334.45 | 50.72 | 385.18 |

*Table 5.* The years of life lost (YLL), years of life disability (YLD), and disability-adjusted life years (DALYs) of skin, breast, gastric, colorectal, and lung cancers per 100,000 Iranian elderly men

| Age group | Cancer | YLL | YLD | DALYs |
|---|---|---|---|---|
| 60-69 | Skin cancer | 39.61 | 278.08 | 317.70 |
| | Gastric cancer | 522.26 | 208.56 | 720.83 |
| | Colorectal cancer | 39.61 | 150.62 | 190.24 |
| | Lung cancer | 581.48 | 127.45 | 708.94 |
| 70-79 | Skin cancer | 147.01 | 277.22 | 424.24 |
| | Gastric cancer | 1264.18 | 503.11 | 1767.30 |
| | Colorectal cancer | 416.43 | 174.55 | 590.99 |
| | Lung cancer | 396.98 | 256.69 | 653.68 |
| >80 | Skin cancer | 40.05 | 237.72 | 277.78 |
| | Gastric cancer | 759.08 | 336.77 | 1095.87 |
| | Colorectal cancer | 250.90 | 69.33 | 320.24 |
| | Lung cancer | 356.33 | 148.57 | 504.91 |
| Total | Skin cancer | 72.34 | 269.96 | 342.31 |
| | Gastric cancer | 793.92 | 323.07 | 1117.01 |
| | Colorectal cancer | 195.31 | 142.07 | 337.99 |
| | Lung cancer | 481.55 | 170.85 | 452.41 |

to the findings of other studies. Rezagholi et al. assessed the burden of breast cancer in all age groups. The results of this study showed that most DALYs of breast cancer were related to the 60-69 age group (622/100,000), and the highest incidence rate was related to the age 60-64 years (15). These results were consistent with our findings. Another study concluded that the incidence rate of breast cancer in all stages (0, I, advanced, and metastatic) was higher in the 60-69 age group (16). Also, another study in Iran showed that the incidence rate of breast cancer was highest in the 60-64 age group. However, the highest death rate was related to the 70-74 age group, which was not consistent with our results (17).

The present study showed that the incidence rate of skin cancer was higher in the elderly; however, the death rate of this cancer was low. The highest incidence rate in women was observed in the 70-79 age group, and in men, the highest incidence rate of skin cancer was related to age above 80 years. The incidence rate and death rate of skin cancer in men were higher than in women. Also, DALYs of skin cancer in men were higher than in women. Global data on skin cancer showed that the overall incidence rate of this cancer was 1.43 in Middle East Asia (18). However, the higher incidence of skin cancer in the elderly was mentioned in other studies (19, 20). Also, the higher incidence rate of skin cancer in men in other studies (21, 22) is consistent with our findings.

The results of the present study showed that the incidence rate, death rate, and DALYs of colorectal cancer in elderly women and men ranked fourth, third, and fourth, respectively. The overall incidence of colorectal cancer is 17.2 in the world and 7.4 in the Eastern Mediterranean Regional Office (EMRO) (23). In our study, the incidence rate of colorectal cancer was 49.74 in elderly men and 47.95 in elderly women, which represents a higher incidence of colorectal cancer in the elderly rather than in other age groups.





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The highest incidence rate of colorectal cancer in elderly women was related to the age above 80 years and in elderly men was related to the age of 70-79 years.

In this study, the incidence rate of lung cancer was 68.57 in the female elderly, which was higher than the overall incidence rate in the world (33.8) (24). Also, the incidence rate of this cancer in elderly women was 20.9, which was higher than the overall incidence of lung cancer in the world (13.5) (25). Previous studies have shown that lung cancer is more observed in the elderly than in other age groups (26, 27). The YLD of lung cancer was lowest in women in this study. The YLD for cancers with a lower survival rate is lower than for cancers with a higher survival rate, such as breast cancer (28). This issue was seen in our study. The YLD of breast cancer in women older than 80 years (that survival rate is lower) was 21.54 and was lower than in other age groups. The overall DALYs of lung cancer in Asian men and women were 491 and 201, respectively (29), which was lower than our findings. This issue shows that the DALYs of lung cancer in the elderly were higher than in other age groups.

In the present study, the incidence rate, death rate, and DALYs of gastric cancer in men were higher than in women. Also, the highest incidence rate, death rate, and DALYs of gastric cancer were observed in the age above 80 years, which was consistent with other studies. Also, a comparison of the results of this study with other studies showed that the DALYs of gastric cancer in elderly patients were higher than in other age groups (30, 31). Sankaranarayanan reported that the DALYs of gastric cancer in men and women were 357 and 186, respectively, which were lower than our findings. Gastric cancer has been reported as an important cancer for the elderly, which can confirm our findings (29).

In this study, in case of simultaneous occurrence of two or more cancers, in the calculations and final analysis, the disease was considered as the cause of death. Also, due to the fact that disease burden calculations are based on software for registering causes of death, naturally, if a person suffering from cancer dies for another reason (such as a heart attack or stroke, etc.), it is not included in the calculation of YLL and only YLD is calculated for this individual.

## Conclusion

According to the results of this study, the incidence rate, death rate, and DALYs of skin, breast, gastric, colorectal, and lung cancers in the elderly were higher than the overall rates in all age groups in Asia and the world. Therefore, attention to these cancers in the elderly is especially important.

### Authors' Contributions

AA, RF, BE, MR, and AAAK contributed to the project design and its development. AA, RF, and BE wrote the manuscript. MR and AAAK analyzed data. All authors read and approve the final manuscript.

### Ethical Considerations

All procedures performed in the study by the ethical standards of the Research Ethics Committee of the University of Social Welfare and Rehabilitation Sciences (Ethic code: IR.USWR.REC.1396.326).

### Acknowledgment

We would like to thank the Vice-Chancellor of the University of Social Welfare and Rehabilitation Sciences for approval and financial support of this study.

### Conflict of Interests

The authors declare that they have no competing interests.

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