# The Effect of Multimorbidity on Quality of Life among Older Adults

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**Abstract**

**Background:** Multimorbidity defined as the co-occurrence of two or more chronic conditions which is very common among older adults. **The Aim** of this study was to assess the effect of multimorbidity on quality of life among older adults. **Research design**: a descriptive analytical study was done. **Setting**: This study conducted at the geriatric hospital (Elshahid Elmohandes Ahmed Shawky Hospital) outpatient clinic of medicine affiliated to Ain Shams university Hospitals. **Sample**: A purposeful sample of 125 older adults with multimorbidity representing approximately 5 % of all patients attending at the previously mentioned setting and have the following criteria: All older adults (males and females) diagnosed with at least two chronic health diseases and aged 60 years or more. **Tools:** interviewing questionnaire was used which included five parts :**( 1)** Socio-demographic characteristics about older adults. **part (2)** past history about older adults. **part (3)** Older adults health behaviors related to multimorbidity. **part (4)** Quality of life assessment scale. **Part (5)** Cumulative Illness Rating Scale **Results**: The study showed that 48% of the studied sample of older adults their age ranged between 65 - < 70 years. Also, 57.6% of them are male. There was 72% of the studied sample of older adults had poor level of health behaviors. The study showed that, 73.6% of the studied sample of older adults had Endocrine-Metabolic problems, while 69.6% of them had vascular problems. Related to total quality of life, 56% and 53.6%, respectively of the studied sample of older adults had poor level of physical and psychological aspects. **Conclusion**: The study concluded that a highly significant negative correlation between multimorbidity and their quality-of-life in which more than half of the studied sample of older adults with multimorbidity had low level of quality of life. **Recommendation:** the study recommended that; increase public awareness throughout educational sessions, programs, and campaigns about multimorbidity for older adults and their families.

**Keywords:** Multimorbidity, Quality of life, Older Adults.

**INTRODUCTION**:

Multimorbidity, defined as the co-existence of two or more chronic diseases, has attracted growing attention from scholars and funders in the past two decades. With a continuing increase in life expectancy, multimorbidity has become a worldwide public health issue and is associated with increasing adverse health outcomes, such as mortality, disability, poor quality of life, hospitalizations, and concomitant use of healthcare resources and expenditure. A systematic review of 41 articles showed that the prevalence of multimorbidity from different countries lies between 20% and 30% for the entire population and 55% to 98% for individuals older than 65 years **(Zhang, et al., 2022).**

Multimorbidity is important for both patients and the healthcare system, and a great public health concern, because multimorbidity is associated with higher mortality, reduced functional status, lower quality of life, longer hospitalization, higher readmission, more frequent healthcare utilization, and higher healthcare costs **(Panagioti, et al., 2018).**

Due to age-related physiological changes, the risk of chronic diseases becomes greater with increasing age. In addition, consequences of long-term exposure to risk factors such as smoking, sedentary lifestyle, excessive noise, and air pollution accumulate over the life span and contribute to numerous chronic diseases. Thereby, multimorbidity becomes more and more prevalent in later life

and is associated with growing likelihood for functional impairments in daily life e.g., impairments in climbing stairs, walking long distances, or doing chores **(Woolford, et al., 2020).**

As people age, they undergo progressive morphological and physiological changes across multiple organs and systems (the "multisystem effect of aging"), leading to loss of resilience, increased vulnerability to stressors, disease susceptibility, frailty, disability, and death. Indeed, age is the main risk factor for morbidity and mortality. Consequently, older adults with multimorbidity present a greater risk of frailty, geriatric syndromes, functional dependence, poor quality of life, hospitalization, institutionalization, and mortality. Moreover, individuals with multimorbidity commonly experience polypharmacy with a subsequent higher likelihood of drug-drug and drug-disease interactions and adverse effects "Drug reactions, resistance, and polypharmacy" **(Fabbri, et al., 2019).**

Disease interactions known to affect quality of life include, among others, diabetes with hypertension, heart disease, arthritis, obesity and respiratory problems, arthritis with heart disease, hypertension, pulmonary diseases and obesity. Grouping diseases and their severity in specific organ domains may facilitate the understanding of the complex relationship between multiple chronic conditions and quality of life **(Fortin, et al., 2019).**

Quality of life is a patient-centered outcome that assesses the impact of health conditions on daily living, based on the self-perception of the individuals, and considers their social and cultural context. Available evidence demonstrates that quality of life is negatively associated with multimorbidity in hospital, outpatient clinic and community settings. Also, quality of life is a holistic concept that aims to capture a range of health status indices **(Wang, et al., 2020).**

Multimorbidity has a significant negative impact on QoL and is more common in older age, clinically important negative effects on QOL were observed for clients with a previous diagnosis of stroke, osteo- and rheumatoid arthritis, or CHF, as well as with increasing levels of multimorbidity. Findings provide baseline preference based QOL scores for home care clients with different diagnoses and may be useful for identifying, targeting, and evaluating care strategies toward populations with significant QOL impairments **(Mondor, et al., 2019).**

Older people with multimorbidity have been reported to suffer from a high symptom burden such as pain, dry mouth, lack of energy, and difficulty in sleeping, and such symptom burden has a negative effect on QOL. Additionally, high symptom burden, pain in particular, often leads to a limitation of physical activity with a decrease in physical functioning that is negatively related to ability in the activities of daily living **(Pisu M, et al.,2018).**

To date, the impact of multimorbidity on quality of life has been investigated based on two general categories of multimorbidity: i) the number of chronic conditions (count definition) and ii) the cluster of chronic conditions (cluster definition). Although quality of life scores decreases with an increasing number of co-occurring chronic conditions, the full impact of multimorbidity on quality of life is unlikely to be captured by the simple count method. Meanwhile, some specific clusters of multimorbidity, such as the combination of mental and physical conditions, have been shown to have a notable effect on quality of life **(Wang, et al., 2020).**

The assessment of such patients needs adequate time, and, regardless of their age, is best modelled around comprehensive geriatric assessment. So, the community health nurse seeks to initiate changes that positively affect health of patients with multimorbidity through awareness campaigns about lifestyle and behavior modifications, engages in collection, analysis of data and systematic investigation for solving multimorbidity problems, preventing complications of multimorbidity, and enhancing community health practice especially at primary health care settings **(Kenneally, 2020).**

## Significance of the Study:

Multimorbidity is an important public health problem due to its high prevalence, and

its association with higher mortality risk, functional decline, and low quality of life, in addition to the difficulty of adequate management by health services. The prevalence of multimorbidity increases substantially with age. However, the absolute number of people with multimorbidity has been found to be higher in those younger than 65 years due to the age distribution of the population. This is especially true in areas of high deprivation **(Schafer et al., 2020).**

Globally, the number of people aged 60 or over is set to rise from 841 million to more than 2 billion between 2013 and 2050; this equates to 21.1% of the world's population. The proportion of people aged 80 years or over is growing even faster; estimated to be 125 million in 2015 contrasted to 71 million worldwide at the turn of the millennium. This number is projected to increase by 61 per cent over the next 15 years, reaching nearly 202 million in 2030 **(Aggarwal, et al., 2020).**

**Aim of the Study:**

The aim of this study was to assess the effect of multimorbidity on quality of life among older adult through:

1. Determining the most common clusters of multimorbidity among older adults.
2. Assessing older adults' health behaviors related to multimorbidity.
3. Assessing older adults' quality of life domains.

**Research Question**

**To fulfill the aim of this study, the following research questions were formulated:**

1- Is there relation between quality of life and socio-demography?
2- Is there correlation between quality of life, health behavior and total cumulative illness and?
3- Is there correlation between cumulative illness and quality of life domains?

**Subject and Methods**

**Research design:**

A descriptive analytical study was done.

**Setting:**

This study was conducted at the geriatric hospital (Elshahid Elmohandes Ahmed Shawky Hospital) outpatient clinic of medicine affiliated to Ain Shams university Hospitals.

**Sample:**

A purposeful sample of 125 older adults with multimorbidity.

**Tools of data collection:**

**The following tools were used for data collection,** an interviewing questionnaire composed of five parts, it was including the following:

**Part (1): Socio-demographic data:** It composed of 8 questions as age, gender, level of education, occupation, marital status, income, place of residence and Living place. It was close-ended questions.

**Part (2): Medical history** to assess current medical diagnosis.

**Part (3): Older adults health behaviors related to multimorbidity:** Adopted from ***Riegel B, et al., (2017)*** and modified by the investigator to assess lifestyle practices for multimorbid patients, it consisted of five aspects**:**

**1- Nutritional Aspects:** it included number of meals/day, types of fat used for cooking, follows health diet with disease, component of daily meal.

❖ **Scoring system:**

For question (No1) give 3marks if more than three meals/day, 2 marks if three meals/day and one mark if less than three meals/day. Question (No 2) given 2 mark for unsaturated fats and one for saturated fats. Question (No 3) given 2 mark for Yes and one for No. Question (No 4) give 2 mark for integrated meal & 1 if not integrated meal. Total marks for this part (9 marks).According to patients daily nutritional pattern more than 50% from total score

considered satisfactory and less than 50% considered unsatisfactory.

**2-Water consumption:** It was concerned with daily consumption from water.

❖ **Scoring system**:

For water intake/day score divided into 3 marks for intake 6-8 glasses/day, 2 marks for 4-6 glasses/day and 1 mark for less than 4 glasses/day.

**3-Physical exercise aspect:** as exercise practicing or not, number of days for exercise.

❖ **Scoring system:**

For questions (No 1) give 2 marks for yes and 1 mark for no answer, question (No 2) score divided into 3 marks for daily, 2 marks for three days/week, and one mark for one day weekly. The total score for physical exercise practicing (5 marks) according to patient's physical activity, more than 50% considered satisfactory and less than 50% considered unsatisfactory.

**4- Smoking aspect:** as active smoking, mean of smoking, actions to quit smoking, and exposed to passive smoking.

❖ **Scoring system:**

For question (No 1) given 2 marks for No answer and 1 for yes answer, question 2 take mean for cigarettes numbers/day and question (No 3) give 2 marks for yes and 1 for no answer, question (No 4) gives 2 marks for correct action and 1 for incorrect action. Total score for smoking consumption (6 marks) more than 50% considered satisfactory and less than 50% considered unsatisfactory.

**5- Rest and sleep pattern as:** taken rest period during day, sleep hours/day, sleep problems and difficult in sleeping.

❖ **Scoring system:**

For (question1) give 2 marks for yes and 1for no answer. Question (No 2) give 2 marks if sleep hours from 6-8 hours/day and 1if less than 6 hours/day. Question (No 3) give 2 marks for No and 1 for Yes answer. Total score for rest sleep aspect (6 marks), according to patients rest and sleep pattern more than 50% considered satisfactory and less than 50% considered unsatisfactory.

**Part (4): Quality of life assessment (WHOQOL-100):** it was close-ended questions, the tool constituted 100 questions; including the six domains about the quality of life; physical, psychological, social, level of dependence, environmental/ financial, and spiritual domains and they measured through 5 levels of Likert scale **(WHO, 1995).**

❖ **Scoring system:**

Measuring different aspects of quality of life was done by using a scale developed by World Health Organization Quality of Life scale **(WHO, 1995)** and modified by the investigator it included 6 aspects:

- **Physical domain includes the facts**: pain, discomfort, energy and fatigue, sleep and rest and sexual needs.
- **Psychological domain includes the facets**: positive filling, thinking, learning, memory and concentration, self-esteem, personal appearance, negative filling.
- **Social domain includes the facets**: personal relation, social support.
- **Level of dependence includes the facets**: movement, activity of daily living, dependence on medication and medical treatment and ability to work.
- **Environmental/ financial domain includes the facets:** safety and security, the geriatric home, money needed, medical care, chance for acquiring new information and skills, relaxation and leisure time, environmental pollution and noise, and transportation.
- **Spiritual domain includes the facet of** personal believe.
- **Outcome:**The investigator considered the older adult patient is having poor QOL if the patients respond were less than 50%, moderate QOL if generally the patients respond were ranged from 50% - 75% and

good QOL if the patients respond were more than 75%.

**Part (5):** Cumulative Illness Rating Scale (CIRS): A Cumulative Illness Rating Scale, adopted from (***Linn, et al., 1968)***. Which is a comprehensive and reliable instrument for assessing physical impairment. The scale format provides for 14 relatively independent areas grouped under body systems. Ratings are made on a 5-point "degree of severity" scale, ranging from "none" to "extremely severe."

❖ **Scoring system:**

- CIRS 0-6: No significant comorbidities or minor impact on morbidity, mild discomfort or disability and mild affected quality of life.
- CIRS 7-12: Moderate comorbidities or disability, moderate affected quality of life, moderate impairment in function, requires daily treatment or first-line therapy.
- CIRS > 12: Severe comorbidities, severely affected quality of life, severe impairment in function and short-life expectancy, suitable for supportive care or immediate treatment required.

**Operational design:**

**Preparatory phase:**

A review of current, recent, national, and international related literatures covering all aspects of the research subjects using the available textbooks, journals, nursing magazines and websites to get a clear picture of the research problem.

**Validity and Reliability:**

The tools of the study were given to a group of three experts, two from community health nursing field and one expert from geriatric medicine. The tools examined for content coverage, clarity, relevance, applicability, wording, length, format, and overall appearance. Based on experts' comments and recommendations; minor modifications had been made such as rephrasing and rearrangements of some sentences.

**Testing the reliability of the tools through Alpha Cronbach reliability analysis:**

| Tools | Alpha Cronbach |
|---|---|
| An interviewing questionnaire | 0.731 |
| Health behaviors assessment | 0.805 |
| Quality of life for older adults | 0.837 |
| Cumulative Illness Rating Scale | 0.850 |

**Pilot study:**

The pilot study was conducted to test the simplicity of language of tools. It was conducted to evaluate applicability of the study tools which used in data collection in addition to the time required to fill each tool. It was carried out on 10% of the patients with multimorbidity which had been included in this study. They were chosen from the geriatric hospital outpatient clinic of medicine of Elshahid Elmohandes Ahmed Shawky Hospital and the tool not modified.

**Field Work:**

- The investigator took approval for conducting the study from the head of the geriatric hospital (Elshahid Elmohandes Ahmed Shawky Hospital).
- The investigators started with introducing herself and explain the aim of study for the selected patients, assured that the data collected will be confidential and would be only used to achieve the purpose of the study.
- The field of work was carried out over two days (Saturday, Thursday) per week during morning shift from (9.00 am to 12.00 pm) in the geriatric hospital outpatient clinic of medicine of Elshahid Elmohandes Ahmed Shawky Hospital For four months starting at the beginning of March 2021 to the end of June, 2021.
- Purpose of the study was explained to the clients before starting the interview where each client will be interviewed individually. Each client took 45 minutes to complete the tool.
- The investigator filled the questionnaire by herself. The investigator read questions and waited patients respond for all older adults. The investigator filled (3-4) tools from patients daily.

## Ethical Considerations:

The research approval obtained from the research ethical committee in faculty of nursing, Ain Shams University before starting the study. Informal client's agreement had been taken to be included in the study subject. Before carrying out the study the investigator clarified the aim of the study and its expected outcomes. The study subjects had been secured that all the gathered data will be confidential and will be used for the research purpose only. The study subjects have the right to withdraw from the study whenever they want. When it is possible the study subject would be provided with feedback about the research outcomes.

### Administrative Design:

An official permission to carry out the study had been obtained from the Dean of Faculty of Nursing/Ain Shams University directed to the director of the geriatric hospital (Elshaid Elmohandes Ahmed Shawky Hospital).

### Statistical analysis:

The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 22. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (X) and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (X) 2, P-value to test association between two variables and Pearson correlation test (R- test) to the correlation between the study variables. Degrees of significance of results were considered as follows P-value > 0.05 not significant, where P-value at ≤ 0.05 considered significant, while P-value ≤ 0.01 considered highly significant.

## Results:

**Table (1): shows that** 48% of the studied sample of older adults their age ranged between 65 - < 70 years. Also, shows that, 57.6% of the studied sample of older adults are male. In addition, there was 36% of them could not read or write.

**Figure (1)** shows that, 28% of the studied sample of older adults had good level of health behaviors. While 72% of them had poor level of health behaviors.

**Table (2):**Related to total quality of life, shows that, (56% and 53.6%, respectively) of the studied sample of older adults had poor level of physical and psychological aspects. In addition, (49.6% and 56%) of them had poor level of social and independency. Also, (50.4% and 54.4 respectively) of them had poor level of environmental aspects and financial need and acquiring new skills. Moreover, 40% of the studied sample of older adults had moderate level of spiritual aspects. Additionally, 52% of the studied sample of older adults had low level of quality of life. Also, 30.4% of them had moderate level. While 17.6% of them had high level.

**Figure (2):** shows that, 73.6% of the studied sample of older adults had Endocrine-Metabolic problems, while 69.6% of the studied sample of older adults had vascular problems. Moreover, (60%) of the studied sample of older adults had EENT problems. Also, (57.6% and 52%, respectively) of the studied sample of older adults had hepatic, pancreatic and musculoskeletal problems.

**Table (3):** reveals that, there was highly statistically significant relation between patients' quality of life and their socio-demographic characteristics as age, education level and monthly income at (P= < 0.01). In addition, there was statistically significant relation with their marital status, previous job and place of residence at (P= < 0.05). While there was no statistically significant relation with their gender and living place at (P= > 0.05).

**Table (4):** indicates that, there was highly significant negative correlation between the studied sample of older adults ' cumulative illness levels and their levels of quality of life, levels of health behaviors at (P= < 0.01). While there was highly significant positive correlation between patients'

levels of quality of life and their levels of health behaviors at (P= < 0.01).

**Table (5)** reveals that, there was highly significant negative correlation between patients' cumulative illness levels and their quality-of-life domains at (P= < 0.01).

**Table (1):** Number and percentage distribution of the studied sample of older adults according to their socio-demographic data **(n = 125)**.

| Socio-demographic characteristics | | Studied sample. (n = 125) | |
|---|---|---|---|
| | | N | % |
| **Age (year)** | | | |
| 60 -< 65 | | 22 | 17.6 |
| 65 -< 70 | | 60 | 48 |
| 70 -< 75 | | 28 | 22.4 |
| ≥ 75 | | 15 | 12 |
| **Mean SD** | **68.9± 8.20** | | |
| **Gender** | | | |
| Male | | 72 | 57.6 |
| Female | | 53 | 42.4 |
| **Education level** | | | |
| Neither read nor write | | 45 | 36.0 |
| Can read and write | | 30 | 24.0 |
| Primary education | | 25 | 20.0 |
| Preparatory education | | 12 | 9.6 |
| Secondary education | | 10 | 8.0 |
| High education | | 3 | 2.4 |

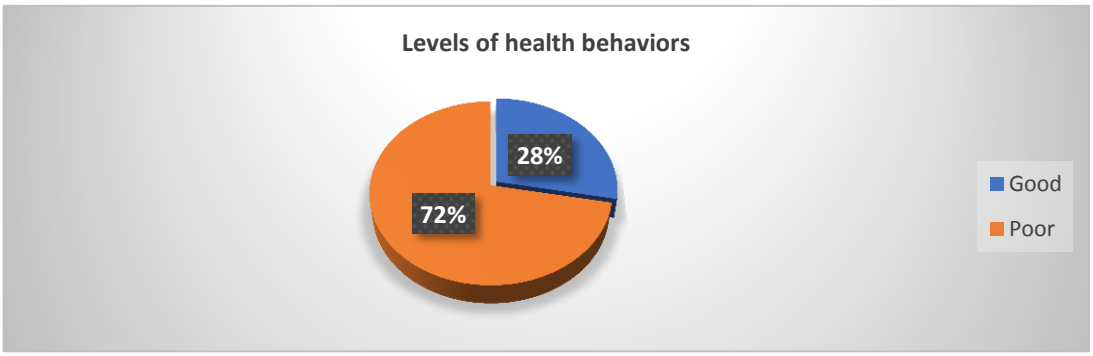


**Figure (1):** Percentage distribution of the studied sample of older adults according to their total level of health behaviors **(n = 125)**.

**Table (2):** Number and percentage distribution of the studied sample of older adults' according to their total quality of life **(n = 125)**.

| Domains of quality of life | No. of items | Studied sample (n = 125) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | poor | | Moderate | | good | | Mean- SD |
| | | N | % | N | % | N | % | |
| **Physical** | **16** | **70** | **56** | **38** | **30.4** | **17** | **13.6** | **41.52±21.9** |
| **Psychological** | **20** | **67** | **53.6** | **40** | **32** | **18** | **14.4** | **50.84±28.5** |
| **Social** | **8** | **62** | **49.6** | **42** | **33.6** | **21** | **16.8** | **21.31±10.9** |
| **Independence** | **16** | **70** | **56** | **40** | **32** | **15** | **12** | **40.7±22.6** |
| **Environmental** | **24** | **63** | **50.4** | **43** | **34.4** | **19** | **15.2** | **62.4±29.31** |
| **Financial need and acquiring new skills** | **8** | **68** | **54.4** | **45** | **36.0** | **12** | **9.6** | **22.5±9.90** |
| **Spiritual** | **4** | **32** | **25.6** | **50** | **40** | **43** | **34.4** | **13.5±4.18** |
| **Total** | **96** | **65** | **52** | **38** | **30.4** | **22** | **17.6** | **252.77±129.2** |

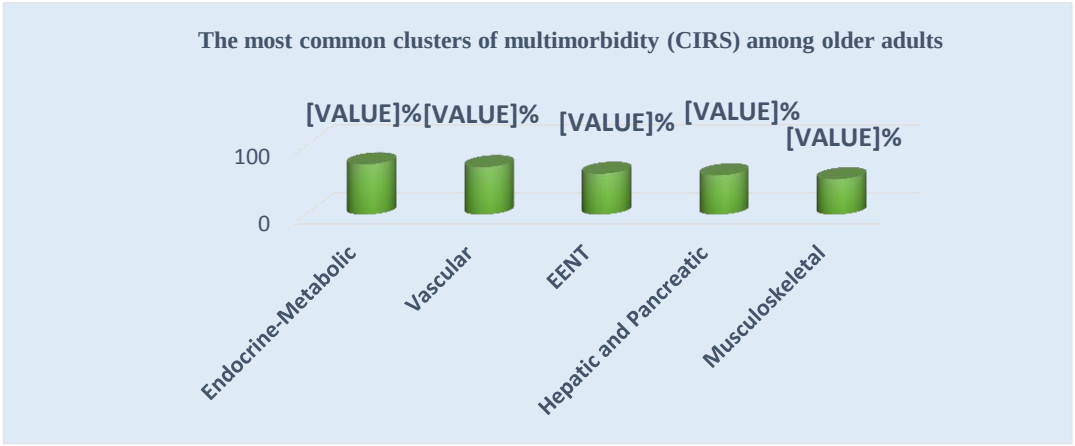


**Figure (2):** Percentage distribution of the most common clusters of multimorbidity (CIRS) among the studied sample of older adults (n=125).

**Table (3): According to research question 3:** Relation between the studied sample of older adult's Socio-demographic characteristics and their levels of quality of life (n=125).

| Socio-demographic characteristics | | Level of quality of life | | | | | | X2 | P-Value |
|---|---|---|---|---|---|---|---|---|---|
| | | Good (n=22) | | Moderate (n=38) | | Poor (n=65) | | | |
| | | N | % | N | % | N | % | | |
| **Age (year)** | 60 -< 65 | 18 | 81.8 | 4 | 10.5 | 0 | 0.0 | 13.50 | .001** |
| | 65 -< 70 | 4 | 18.2 | 34 | 89.5 | 22 | 33.8 | | |
| | 70 -< 75 | 0 | 0.0 | 0 | 0.0 | 28 | 43.1 | | |
| | ≥ 75 | 0 | 0.0 | 0 | 0.0 | 15 | 23.1 | | |
| **Gender** | Male | 16 | 72.7 | 28 | 73.7 | 28 | 43.1 | 3.957 | .176 |
| | Female | 6 | 27.3 | 10 | 26.3 | 37 | 56.9 | | |
| **Marital status** | Married | 18 | 81.8 | 22 | 57.9 | 4 | 6.2 | 7.031 | .037* |
| | Divorced | 0 | 0.0 | 0 | 0.0 | 5 | 7.7 | | |
| | Widowed | 4 | 18.2 | 16 | 42.1 | 48 | 73.8 | | |
| | Single | 0 | 0.0 | 0 | 0.0 | 8 | 12.3 | | |
| **Education level** | Neither read nor write | 0 | 0.0 | 0 | 0.0 | 45 | 69.2 | 15.30 | .000** |
| | Can read and write | 0 | 0.0 | 10 | 26.3 | 20 | 30.8 | | |
| | Primary | 0 | 0.0 | 25 | 71.4 | 0 | 0.0 | | |
| | Preparatory | 9 | 40.9 | 3 | 7.9 | 0 | 0.0 | | |
| | Secondary | 10 | 45.5 | 0 | 0.0 | 0 | 0.0 | | |
| | High education | 3 | 13.6 | 0 | 0.0 | 0 | 0.0 | | |
| **Previous job** | Leadership, advisory, and supervisory jobs | 3 | 13.6 | 0 | 0.0 | 0 | 0.0 | 7.201 | .047* |
| | Technical jobs | 5 | 22.7 | 0 | 0.0 | 0 | 0.0 | | |
| | Clerical jobs | 4 | 18.2 | 1 | 2.6 | 0 | 0.0 | | |
| | Skilled and support services jobs | 8 | 36.4 | 25 | 65.8 | 25 | 38.5 | | |
| | Free business | 2 | 9.1 | 7 | 18.4 | 27 | 41.5 | | |
| | Don't work | 0 | 0.0 | 5 | 13.2 | 13 | 20 | | |
| **Monthly Income** | Sufficient | 17 | 77.3 | 0 | 0.0 | 0 | 0.0 | 14.93 | .000** |
| | Suffices and saves | 5 | 22.7 | 1 | 2.6 | 0 | 0.0 | | |
| | Not sufficient | 0 | 0.0 | 37 | 97.4 | 65 | 100 | | |
| **Place of residence** | Urban | 22 | 100 | 33 | 86.8 | 20 | 30.8 | 7.105 | .045* |
| | Random areas | 0 | 0.0 | 2 | 5.3 | 10 | 15.4 | | |
| | Rural | 0 | 0.0 | 3 | 7.9 | 35 | 53.8 | | |
| **Living place** | Geriatric home | 4 | 18.2 | 12 | 31.6 | 10 | 15.4 | 2.933 | .211 |
| | Personal home | 0 | 0.0 | 16 | 42.1 | 51 | 78.5 | | |
| | Living with one of his sons | 18 | 81.8 | 10 | 26.3 | 4 | 6.1 | | |

**No significant at p > 0.05. *Significant at p ‹ 0.05. **highly significant at p ‹ 0.01.**

**Table (4):According to research question 2:** Correlation between the studied sample of older adults' cumulative illness levels, their levels of quality of life, and their levels of health behaviors **(n = 125)**.

| Items | Total quality of life | Levels of health behaviors |
|---|---|---|
| **Total cumulative illness** | r = -.405<br>P = .000** | r = -.397<br>P = .000** |
| **Total quality of life** | | r = .412<br>P = .000** |

****highly significant at p ‹ 0.01.**

**Table (5): According to research question 2:** Correlation between the studied sample of older adults' cumulative illness levels and their quality-of-life domains **(n = 125)**.

| Items | Total cumulative illness |
|---|---|
| **Physical** | r = -.376<br>P = .000** |
| **Psychological** | r = -.411<br>P = .000** |
| **Social** | r = -.323<br>P = .003** |
| **Independence** | r = -.417<br>P = .000** |
| **Environmental** | r = -.400<br>P = .000** |
| **Financial need and acquiring new skills** | r = -.493<br>P = .000** |
| **Spiritual** | r = -.270<br>P = .009** |

****highly significant at p ‹ 0.01.**

## Discussion:

Older adults with multimorbidity are becoming increasingly common in the world, and it is claimed that they may soon become the norm rather than the exception. Patients with multimorbidity face enormous personal challenges as well as providing financial challenges for the provision and delivery of their care. Developing successful management pathways for these patients will be the focus in the coming years **(Feather, 2018).**

Most studies have shown impaired QoL by gender with the presence of many chronic diseases or with aging in older people. Patients with multimorbidity reported poorer mean physical component score (PCS) and mental component score (MCS) compared to patients without multimorbidity. In older adults (50 years or more), both PCS and MCS was negatively associated with multimorbidity. For example, presence of arthritis with chronic back pain and vision impairment had poorer outcomes on both physical and mental components of QoL ***(Pati, et al.,2019).***

Considering socio-demographic data **Table (1)** the present study revealed that the study sample age was 60 years-old and more and the highest percentage of sample (less than half of the study sample) was from 65 - < 70, with mean age **68.9±8.20.** In a similar study done by **Calderón-Larrañaga, et al., (2018),** Rapidly developing multimorbidity and disability in older adults: does social background matter? in Sewid country found that multimorbidity is more common among those aged 60–66. This could be due to the average life expectancy for both sexes in Egypt is 72.5 years **https://www.worldometers.info/demographics/egyptdemographics/#life-exp.2020.**

Also, as regard to sex, the finding of the present study showed that more than half of the study sample were male **Table (1).** This finding disagrees with **Calderón-Larrañaga, et al., (2018),** concerning the gender of the study sample, in which more than of the study sample were female. This could be due to more than half of the population in Egypt are male while the others are female according to the last **population census in Egypt, (2017).**

Regarding to education level **(Table 1),** the present study findings revealed that more than one third of the study sample neither read nor write. These findings agreed with **Formiga, et al., (2021).** Patterns of comorbidity and multimorbidity in the oldest old: the Octabaix study, in Spain, who reported that more than one third of the study samplewere not educated. Also, these findings agreed with **Yu & Zhang, (2020),** Neighborhood's locality, road types, and residents' multimorbidity: evidence from China's middle-aged and older adults in China who reported that almost one third of the study sample were illiterate. These results may be due to more than quarter of the population in Egypt are uneducated according to the last **population census in Egypt, (2017).**

The current study **Figure (1)** showed that more than two third of the studied sample had poor level related to their levels of health behaviors**.** This result agrees with the study done in Malaysia under the title of: Incidence and predictors of multimorbidity among a multiethnic population in Malaysia: a community-based longitudinal study by **Hussin, (2019)** who found in his studied sample that lifestyle factors including nutrient intake, smoking behavior and physical activity were important predictors of multimorbidity among multiethnic older adults' population in Malaysia. These results may be due to lack of the awareness about the health behaviors and about the healthy lifestyle in the community.

Related to total quality of life **Table (2)**, the current study showed that more than half of the studied patients had poor quality of life level in which the physical and independence QoL domains had the highest score, followed by the psychological QoL subdomain and the environmental QoL sub-domain, and the lowest were in the social QoL subdomain and the spiritual QoL sub-domain. This result goes in a similar way with **Pengpid & Peltzer (2021),** who report that the overall QoL was poorer among the studied patients, in which the social QoL domain had the highest score, followed by the physical QoL subdomain, and the lowest were in the psychological QoL subdomain and the environmental QoL sub-domain.

The current study **Figure (2)** showed that there were five most common clusters of multimorbidity among older adults according to the cumulative illness rating scale: Endocrine-Metabolic problems, vascular problems, EENT problems, Hepatic pancreatic problems and Musculoskeletal problems in a decreasing order. This result contrast with the study done by **Guisado-Clavero et al., (2018)** who found in his studied sample that 6 clusters were identified for each of the four groups studied (two age groups of men and women). The first pattern, formed by only the most prevalent diseases, was named the "nonspecific" pattern; the remaining 5 patterns were specific to Musculoskeletal, Endocrine-metabolic, Digestive/digestive-respiratory, Neuropsychiatric, and cardiovascular diseases, in decreasing order depending on the percentage of the population included.

The current study **Table (3)** revealed that there was a highly statistically significant relation between patients' quality of life and their characteristics as age, education level and monthly income, while there was no statistically significant relation with their gender and living. This result goes in the same way with the study conducted in Germany by **Nützel et al., (2018),** under the title of: Self-rated health in multimorbid older general practice patients: a cross-sectional study who stated that age, income, and education were the only socioeconomic variables associated with health-related quality of life in the whole sample, but gender-specific analyses indicated that there are no differences in the relationship of self-rated health in men and women. This may be related to those age-related changes, insufficient income and not being able to read and write or to learn about the disease process are factors associated with poor quality of life especially for patients with multimorbidity.

The current study **Table (4)** revealed that there was a highly significant negative correlation between patients' cumulative illness levels, their levels of quality of life and their level of behaviors**.** This result goes in the same way with the study conducted in China by **Gu et al., (2018)** under the title of: multimorbidity and health-related quality of life among the community-dwelling elderly: a longitudinal study who stated that multimorbidity was found to be negatively associated with elderly level of behaviors and quality of life except for

memory function. This may be related to that the sum of the main effects of each condition and age-related changes are sufficient to explain the poor health outcomes/ behaviors and poor quality of life associated with multimorbidity.

Also, the current study **Table (5)** illustrated that, there was highly significant negative correlation between patients' cumulative illness levels and their quality-of-life domains. These results supported by **Gu et al., (2018),** Multimorbidity and health-related quality of life among the community-dwelling elderly: a longitudinal study in China, who report that multimorbidity was associated with lower health-related quality of life of the community-dwelling elderly in which distinct multimorbidity patterns had various impacts on different dimensions of health-related quality of life.

The current study **Table (5)** showed that physical dimensions for quality of life related to (pain& discomfort, energy& fatigue, sleep& rest, and sexual needs) are negatively affected by multimorbidity. This result agrees with the **systematic review** study done, by **Fortin, et al (2018)** under the title of: Multimorbidity and quality of life in primary care: a systematic review who report that the loss of QOL is proportional to the number of diagnoses for the dimensions of energy, pain, mobility, and sleep.

Also, the current study **Table (5)** showed that psychological aspects for quality of life related to (positive feeling, thinking, learning, memory and concentration, self-esteem, and personal appearance) are extremely influenced by multimorbidity especially for feeling negatively about their health. This result disagrees with **Fortin, et al (2018)** who report that emotional dimensions of QOL is little influenced until health is significantly impaired (4 or more diagnoses).

The current study **Table (5)** showed that social dimensions for quality of life related to (personal relation and social support) are much influenced by multimorbidity. This result disagrees with **Pengpid & Peltzer (2021),** Chronic conditions, multimorbidity, and quality of life among patients attending monk healers and primary care clinics in Thailand, who report that social dimensions of QOL is little influenced until health is significantly impaired (4 or more diagnoses).

The current study showed that level of independence for quality of life is extremely influenced by multimorbidity especially for activity of daily living. This result disagrees with **Guerra, et al (2019),** measuring multimorbidity in older adults: comparing different data sources in Canada**,** who report that majority of the studied sample didn't need assistance in the basic activities for daily living.

The findings of this study showed that multimorbidity, sociodemographic characteristics especially (age, education, and income) and patients' health behaviors especially (nutrition and exercise) were affecting patients' quality of life in addition to the effect of the body mass index. The truth of having more than one disease, taking large number of prescribed medications, follow up with more than a physician, and suffering both physically and psychologically from the severity and the complexity of the diseases leads to much deterioration in older adults' health.

## Conclusion:

Based on the findings of the present study, it can be concluded that there were five most common clusters of multimorbidity among older adults according to the cumulative illness rating scale: Endocrine-Metabolic problems, vascular problems, EENT problems, Hepatic pancreatic problems, and Musculoskeletal problems in a decreasing order.

According to research questions there were more than two third of the studied sample had poor level related to their levels of health behaviors**.** Related to total quality of life, the current study showed that more than half of the studied patients had poor quality of life level.

Finally, there was highly significant negative correlation between the studied sample of older adults ' cumulative illness levels and their levels of quality of life, levels of health behaviors.

## Recommendations:

The following recommendations were reached in the light of the results of this study:

- Increase older adults' awareness about modification of poor health behaviors related to multimorbidity.
- Encourage educational sessions, programs and campaigns for early detection, diagnosis, treatment prevention of complications, referral, and management long term side effects of treatment for chronic diseases.
- Further studied are needed to:

- Conduct research to study the different risk factors that increase the prevalence of multimorbidity to find out the suitable solutions.
- Conduct an interventional program to improve quality of life for older adults with multimorbidity.

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