Long-Term Conditions, Multimorbidity Burden, and Chronic Disease Self-Efficacy among Geriatric Patients: A Correlational Study

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Abstract

Background: The chronic conditions prevalence and the susceptibility to getting two or more chronic conditions, which is called multimorbidity, increase with age. Multimorbid geriatric patients face further barriers to diseases management self-efficacy. Aim of the study: This study aims to evaluate the association between long-term conditions, multimorbidity burden, and chronic disease self-efficacy among geriatric patients. **Subjects and Method**: Research design: a correlational descriptive research design was used. **Setting**: This study was conducted in the outpatient clinics of Sohag University Hospitals. **Subjects**: A purposive sample of 200 geriatric patients was selected. **Tools of data collection**: six tools were used: two screening tools for excluding geriatric patients with depressive symptoms or cognitive impairments, and four tools for collecting data. Tool I: Geriatric patients' demographic and clinical data structured interview schedule. Tool II: long-term chronic conditions questionnaire. Tool III: Chinese Multimorbidity Treatment Burden Questionnaire. Tool IV: Chronic Disease Self-Efficacy Scale–Korean Version. **Results**: The majority (94%) of studied geriatric patients had the worst living level with chronic conditions and experienced a high treatment burden level (85%). Approximately half (51%) of the participants had moderate chronic disease self-efficacy. **Conclusion**: There was a statistically significant positive relationship between geriatric patients' long-term conditions and chronic disease self-efficacy while there was a statistically significant negative relationship between multimorbidity burden, and chronic disease self-efficacy. **Recommendations**: These results have potential implications for gerontological nurses' efforts to develop health education programs for geriatric patients regarding multimorbidity rehabilitation and to promote their self-efficacy.

***Keywords**: Burden, Chronic condition, Geriatric patient, Multimorbidity, Self-efficacy*

Introduction

The aging population is increasing worldwide because of increasing life expectancy and declining mortality rates. According to predictions, by 2050, the number of elderly people aged ≥ 60 years will be two billion globally [(1)]. As in many other nations throughout the world, the number of elderly people in Egypt is increasing. Between 2020 and 2050, the estimated senior population in Egypt is expected to increase from 8.4 million (8% of the total population) to 22 million (14%) [(2)]. Consequently, elderly people should receive special attention because they have the right to live, play an active role, and contribute to society [(3)].

With increasing age, chronic condition occurrence increases, as well as getting two or more chronic conditions, which is termed multimorbidity. According to previous studies, multimorbidity affects more than 60% of elderly people (those over the age of 60 years), and above half of them suffer from three or more long-term conditions. Impaired function, disability, and death risk are linked to multimorbidity [(1, 4)]. Two-thirds of all deaths worldwide are caused by the four most prevalent noncommunicable chronic diseases (NCDs): cancer, diabetes, cardiovascular issues, and lung disease.

In addition to a few other chronic diseases [5].

Multimorbid patients have a greater disease burden than those who have single conditions, are more likely to have high treatment burdens, and must exert more effort to maintain their health because of the negative effects on their overall well-being such as commitment to multiple appointments with numerous health professionals, and different time of taking medication. Previous studies evidenced that a high treatment burden is accompanied by low quality of life and treatment compliance, as well as higher mortality, hospitalization, and polypharmacy rates, higher healthcare costs, and greater productivity losses. The difficulty in receiving multiple treatments can affect one's capacity to engage in daily activities, hobbies, and interpersonal relationships with family and friends [4, 6, 7].

Therefore, with multiple chronic conditions and their treatment burden, multimorbid geriatric patients face enormous challenges and boundaries regarding adaptation, active aging, self-management, and self-efficacy. Self-efficacy refers to the belief that a person has the ability to perform his/her tasks. Self-efficacy can promote quality of life by helping people start and maintain physical activity because it influences positive and negative affect [8]. More previous studies confirmed that multimorbid patients' quality of life is affected by self-efficacy [9-12].

Older adults' chronic diseases treatment necessity, and maintaining independence give nurses an important role within interdisciplinary teams. Gerontological nurses should have the ability to create a new specialized care model for multimorbid geriatric patients, as we advance in the treatment of older adults [13].

Significance of the study:

Eighty-six percent of all deaths in Egypt occurred as a result of NCDs in 2022 [14], and five disease categories (cardiovascular diseases, cancer, chronic respiratory diseases, diabetes, and kidney diseases) accounted for approximately 60 percent of these deaths [15]. Older adults and Egypt's healthcare system are heavily burdened by NCDs and their associated risk factors, with out-of-pocket health expenses accounting for approximately 60% of all medical costs [16]. Therefore, to understand all contributing factors and to identify appropriate nursing and management interventions, chronic diseases and their consequences should be a high priority for research in Egypt. This study will provide deep insight into the relationship between chronic diseases, their treatment burden, and self-efficacy.

Aim of the study:

Evaluate the association between long-term conditions, multimorbidity burden، and chronic disease self-efficacy among geriatric patients.

Research Question:

What is the relationship between long-term conditions, multimorbidity burden، and chronic disease self-efficacy among geriatric patients?

Subjects and method:

Research Design: This study used a descriptive-correctional research design. This design explores and describes the correlation between two or more variables. The correlation may be strong or weak (strength), positive or negative (direction) [17].

Study Setting: This study was conducted at the outpatient clinics of Sohag University Hospital in Sohag, Egypt. Sohag University Hospital is in Naser City in Sohag City beside Sohag University in the western direction of the governorate. It provides health care services for all Sohag City inhabitants and all other cities of Sohag governorate at an acceptable price compared to private clinics or hospitals; the clinics included in the study were as follows: medical, cardiac, liver, respiratory, and

orthopedic, which had high elderly flow rates. The clinics are open six days a week from 8 am to 5 pm. A total of 350 - 400 geriatric patients visited clinics over the course of three months.

Study subjects:

A purposive sample of 200 geriatric patients was selected for this study. The G*Power Windows 3.1.9.7 Program was used to calculate the sample size using the following parameters: effect size 0.5, power (1-error probability) is 0.90, and r probability is 0.05. The minimum sample size of 196 geriatric patients was estimated using this computer program. The study's sample size was increased to 200 subjects, who were deemed qualified to participate if they met the following inclusion criteria: being at least 60 years old, speaking coherently and intelligibly, having no or mild cognitive impairment, having no or mild depression, having been diagnosed with at least two chronic illnesses, taking medication as prescribed, and being willing to participate in the study. The studied geriatric patients were selected from Medical, Cardiac, Liver, Respiratory, and Orthopedic clinics (60, 50, 35, 30, and 25 respectively). The head of the outpatient clinics was informed of the study objectives to obtain approval to conduct the study.

Tools for Collecting Data: six tools were utilized to collect data in this study:

Part I: Screening tools, including two tools for excluding geriatric patients with depressive symptoms or cognitive impairment.

Tool (I): "Mental Status Assessment of Older Adults: The Mini-Cog"

Borson et al.[18] Created a 3-minute evaluation tool to aid in the identification of cognitive impairment in the elderly. It can be applied in a range of places, including neighborhoods and hospitals. It has two parts: a Clock Drawing Test (CDT) and a three-item memory recall test. Numbers (1–12) must appear once on a typical clock, in the right order (clockwise). Two hands must also be present, and the hand length is not a factor in the Mini-Cog method. The Mini-Cog's CDT section enables clinicians to rapidly evaluate a variety of cognitive functions, including language comprehension, memory, executive function, and visual-motor skills. In the three-item recall test, older adults were instructed to carefully listen to, remember, and then repeat three unrelated words. This tool provides a clear record of both normal and abnormal performance that can be followed over time. Among senior persons, the Mini-Cog exhibited the highest sensitivity (99%) and client classification accuracy (96%).

Scoring: CDT (0-2 points) and recall of the three items (0-3 points). A total score of 0-2 out of 5 indicates a higher likelihood of clinically important cognitive impairment, and 3-5 out of 5 indicates a lower likelihood of cognitive impairment. The Arabic translation of the scale by Albanna et al. [19] showed that older individuals who speak Arabic find it trustworthy. The Arabic translation's sensitivity and specificity score was 61.6 percent, while Cronbach's alpha was 0.71. This tool was adopted in this study with a Cronbach's alpha of 0.84, which demonstrated strong internal consistency.

Tool (II): Patient Health Questionnaire-9 (PHQ-9):

The PHQ9 was created by Kroenke et al. [20] and was adopted for use in the current study. It is a self-administered depression scale with nine items that match the nine symptoms listed in "the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)." It is valid and reliable for diagnosing depressive disorders in senior people, with sensitivity and specificity of 88% and 88%, respectively. The scale utilized a 0–3 Likert scale (with responses ranging from "not at all" to "almost daily") to assess the patients' symptom frequency during the past two weeks. In this scale, the older adults were asked to report how often they have been bothered by problems such

as “feeling little interest or pleasure in doing things”, “feeling tired or having little energy”, and “feeling down, depressed, or hopeless” over the last two weeks. The PHQ-9 scores range from 0 to 27, with scores of (0-4) indicating minimal depression, (5-9) indicating mild depression, (10-14) indicating moderate depression, (15-19) indicating moderately severe depression and (20-27) indicating severe depression symptoms. It was validated using a sample of Saudi university students, and the Arabic version of the PHQ-9 demonstrated validity and high internal consistency (Cronbach's alpha = 0.85) [21]. In this study, Cronbach’s alpha of this questionnaire was 0.82.

Part II: Assessment tools, including four instruments.

Tool I: Geriatric Patients’ demographic and Clinical Data Structured Interview Schedule.

The researchers created this tool, which consisted of the following two parts:

- **(Part 1):** It comprises demographic data as (age, gender, residence, marital status, education level, occupation, monthly income, and living arrangement)
- **(Part 2):** It includes the medical history of geriatric patients (e.g. having health insurance, number of chronic diseases, type of chronic diseases, and self-report general health status).

Tool II: Long-Term Conditions Questionnaire (LTCQ).

It was created by Peters et al.[22] as a patient-reported outcome measure for evaluating the overall effects of managing many chronic health disorders. The LTCQ was created to determine the help that people want or need while also gaining an understanding of how long-term health issues affect their lives. This questionnaire was adopted by the researchers for use in this study. The LTCQ consists of 20 items, each of which is evaluated from zero (never) to four (always). Items 9 through 15 were graded in reverse as they were negatively worded. This questionnaire includes items such as how frequently the patient feels able to cope well with health conditions, feels bothered by symptoms, and feels lonely due to health conditions. Higher scores represent better levels of “living well with LTCs”. The overall LTCQ score ranges from 0 to 100 after the sum of the 20 item scores was calculated, recalibrated, and classified as worst level of living well with LTCs (a score less than 50), and better levels of "living well with LTCs (a score equal to higher than 50). Convergent construct validity was demonstrated by associations between the LTCQ and all reference measures that ranged from moderate to strong and went in the predicted directions.

As a gauge of the scale's internal consistency, Cronbach's alpha was determined, and the result showed outstanding internal consistency (0.96). The reliability of the (LTCQ) items was assessed in this study, and the findings showed that this tool is reliable, with a Cronbach's alpha of 0.792.

Tool III: **Chinese Multimorbidity Treatment Burden Questionnaire (C-MTBQ).**

It was created by Dou et al.[4] as a measure of the perceived treatment burden of patients with long-term illnesses. There are numerous language versions of it. The (C-MTBQ) has ten mandatory questions, and three further questions are optional (inquiries that may be relevant to other populations but were not relevant in the context of the UK). A 5-point Likert scale, with the following ratings: “0 (does not apply or not difficult),1 (a little difficult), 2 (quite difficult), 3 (very difficult), and 4 (extremely difficult)” was used to rank the replies for each question. The average score is increased by 25, which results in a score ranging from 0 to 100 for the overall C-MTBQ. The four categories for the overall treatment burden scores are as follows: “no-treatment burden (0), low treatment burden

(< 10), medium treatment burden (10–22), and high treatment burden (> 22)".

The C-MTBQ demonstrated good internal consistency (Cronbach's alpha value, 0.76) and test-retest reliability, as seen by the correlations between each item and overall scores of >0.4. (the intraclass correlation coefficient, 0.944). Both the item level content validity index (I-CVI) and the scale content validity index (S-CVI) were 0.89 and 0.83, respectively. The validity of the criterion was 0.875. The estimated Cronbach's alpha (0.7-0.95) and inter-item correlation matrices were deemed acceptable. The current study reveals that this tool is reliable, as Cronbach's alpha is (0.764).

Tool IV: **Chronic Disease Self-Efficacy Scale–Korean Version (CDSES-K).**

The original CDSES was developed by Kime et al.[7] by combining data from a literature review, and theoretical framework for self-efficacy. Three main elements made up the 33-item CDSES: “self-efficacy to perform self-management behaviors, self-efficacy to manage disease in general, and self-efficacy to achieve outcomes.” There were four subscales for the “Self-efficacy to perform self-management behaviors”: “Exercise Regularly” (four items); “Get Information About Disease” (one item); “Obtain Help from Community, Family, and Friends” (two items); and “Communicate with Physician” (five items) with a total of 12 items in this subscale. There is only one subscale in Self-efficacy to manage disease in general: Manage Disease in General which includes (four items). There are three subscales included in the “Self-efficacy to achieve outcomes” as follows: “Do Chores” (four items), “Manage Symptoms” (seven items), and “Control/Manage Depression” (six items) (a total of 17 items).

Scoring system: It has 10 rating anchors that are labeled from one (“not at all confident”) to ten (“totally confident”). A score of 1-10 was assigned to each subscale, with higher values indicating greater confidence. The total score is summed which is ranged from (33-230) and was classified into three categories: low chronic disease self-efficacy (33-132), moderate chronic disease self-efficacy (133-231), and high chronic disease self-efficacy (232-330).

Validity and reliability of the CDSES:

Construct, convergent, and discriminant validity findings were positive. Eigen values for the components obtained by exploratory factor analysis ranged from 2.27 to 3.28, and they collectively explained 91.1 percent of the cumulative variance. Support for goodness of fit came from confirmatory factor analysis. For the entire CDSES-K, the internal consistency reliability was 0.93. For the subscales, Cronbach's alpha coefficients ranged from 0.77 to 0.91, showing acceptable internal consistency. The overall Cronbach’s alpha was 0.781.

Content validity:

A panel of experts in the relevant fields reviewed the study instruments after they had been translated into Arabic by the researchers and checked them for thoroughness, clarity, relevance, and applicability.

Pilot study:

A pilot study was carried out on 10 % of geriatric patients who attended outpatient clinics to test the feasibility of the study process, the clarity of tools used, the required time, and necessary modifications. The participants in the pilot study were excluded from the study sample.

Fieldwork:

The researchers attended the outpatient clinics four days/per week to meet the geriatric patients, clarified the study’s aim, and obtained their willingness to participate. The researchers individually interviewed geriatric patients face-to-face and then excluded geriatric patients who had cognitive impairments and/or

depression by applying the screening tools (The Mini-Cog (PHQ-9). A structured interview was done by the researchers to obtain the necessary data by applying assessment tools (I, II, III, and IV). The duration of each interview was 30-35 minutes. To motivate geriatric patients to participate, the researchers were available in clinics to answer geriatric patients' questions and provide further explanations. The study was conducted from the beginning of February 2023 to the end of April 2023.

Administrative and Ethical Consideration:

Permission to collect the necessary data from the director of the Sohag University Hospital was obtained. The purpose and nature of the study were explained by the researchers.

The study was approved by the Scientific Research and Ethical Committee of the Faculty of Nursing at Sohag University (code (2) on date 15/1/2023), Egypt. The researchers clarified the following for the studied geriatric patients.

- No risk to participants during data collection.
- Confidentiality and privacy were ensured.
- Participants had the right to refuse participation and/or withdraw from the study at any time without rationale.

Statistical analysis:

Categorical variables are represented by number and percentage (No., %), whereas continuous variables are represented by the mean and standard deviation (Mean, SD). The T-test and ANOVA were used to compare continuous variables. Pearson's correlation and multiple linear regression were used to represent the relationships between the variables. A two-tailed $p < 0.05$ was considered statistically significant. All analyses were performed with IBM SPSS 26.0 software.

Results:

Table 1 indicates that the mean age of the studied geriatric patients was 71.7 + 6.32 and that 54.0 percent of them were between 60 - 70 years old, and 55 percent of them were males. Regarding residence, it can be noticed from this table that 53% of the studied geriatric patients were from rural areas, and 92% of them do not live alone. As for marital status, this table shows that 75.0% of the studied geriatric patients were married. As for the education level, this table shows that 40% of the studied geriatric patients reported being illiterate, and some of them reported being able to read and write. Additionally, this table illustrates that 44% of the studied geriatric patients were retired, and 52.0 percent of them reported having a monthly income of less than 1000 pounds.

Table 2 shows the clinical data of the studied geriatric patients, which revealed that 68.0 percent of them reported not having health insurance. Regarding chronic diseases, it can be noticed from this table that 54.0% of the studied geriatric patients reported having two chronic diseases. Diabetes mellitus, hypertension, osteoporosis, and cardiac diseases are the most prevalent chronic diseases, which were reported by 52%, 50%, 44%, and 27%, respectively, of the studied geriatric patients. Additionally, it is noticed from this table that 37% of the studied geriatric patients evaluated their health status as fair.

Table 3 illustrates that 82% of the studied geriatric patients reported sometimes being able to cope well with their chronic health conditions, with 57% of them feeling bothered by symptoms sometimes and 45% of them feeling sometimes more dependent on others. In addition, this table shows that 45% of the studied geriatric patients sometimes felt unhappy because of their health conditions, and 42% of them stated that they were able to fulfill their responsibilities sometimes. Moreover, 39% of the studied geriatric patients explained that their home is rarely suitable for their needs, and 59% of them rarely felt safe at

home. Additionally, this table shows that 64.0% of the studied geriatric patients reported always finding health and other services difficult to cope with, and 70.0% of them stated that they always find treatments difficult to cope with. Furthermore, it can be noticed from this table that the studied geriatric patients sometimes felt they knew enough about their health conditions, rarely had enough support to cope with it, and sometimes felt confident in managing these conditions by 44%, 63%, and 46% of them, respectively.

Figure 1 shows that 94.0% of the studied geriatric patients reported having the worst level of living with chronic diseases, while 6.0% of them stated that they had a better level.

Table 4 exhibits the multimorbidity burden of the studied geriatric patients, which reveals that 70% of them found it extremely difficult to remember how and when to take their medications. Additionally, 64% and 25% of the studied geriatric patients found it quite difficult to take lots of medications and found it extremely difficult to take medicine regularly, respectively. Moreover, it can be noticed from this table that 32% of the studied geriatric patients found very difficulty paying for medications and treatment, and 55% of them found extremely difficulty monitoring their medical conditions. In addition, this table displays that 59.5 percent and 42% of the studied geriatric patients found that it is extremely difficult to see a doctor for a health issue and get health care in the evenings and on weekends, respectively. As well as going to see different doctors, getting time off work, and arranging transport, were reported to be quite and extremely difficult by 44% and 51% of the examined geriatric patients, respectively. Also, this table shows that getting help from community services was reported to be extremely difficult for 54% of the studied geriatric patients, and 55% of them found it extremely difficult to obtain clear and up-to-date information about their condition.

Figure 2 displays that 85.0 % of the studied geriatric patients reported having a high multimorbidity treatment burden of chronic conditions.

Figure 3 shows that 45% of the studied geriatric patients reported having low chronic disease self-efficacy, while 51% and 4% of them reported having moderate and high chronic disease self-efficacy, respectively.

Table 5 explains the correlation between the studied geriatric patients' long-term conditions, multimorbidity burden, and chronic disease self-efficacy. It is noticed from this table that there is a statistically significant negative relationship found between the studied geriatric patients' LTCs (Higher scores represent better levels of "living well with LTCs) and multimorbidity burden as ($r = - 0.671$ & $P = 0.000$). Additionally, this table shows that there is a statistically significant positive relation between the studied geriatric patients' LTCs and their self-efficacy with ($r = 0.457$ & $P = 0.000$). Furthermore, a statistically significant negative relation was noticed in this table between the studied geriatric patients' multimorbidity burden and their self-efficacy with ($r = - 0.477$ & $P = 0.000$).

Table 6 illustrates the relationship between the studied geriatric patients' long-term conditions, multimorbidity burden, and chronic disease self-efficacy by using linear regression. In this model, the studied geriatric patients' chronic disease self-efficacy is expressed as a dependent variable while their chronic conditions and multimorbidity burden are expressed as independent variables. The results of the regression models show a substantial positive correlation between the studied geriatric patients' LTCs (Higher scores represent better levels of "living well with LTCs") and their self-efficacy in managing such conditions ($t = 7.237$, and 3.027 respectively with $P = 0.000$, and 0.003). As well as this model shows a negative relationship between the studied geriatric patients' feeling of multimorbidity burden

and their self-efficacy (t = -3.749, with P = 0.000). Regarding the ANOVA results and its P-value (F = 34.945, P = 0.000), it can be noticed from the model that the studied geriatric patients' LTCs and multimorbidity burden predicting their chronic disease self-efficacy by 26.2% so, it can be concluded that the model reveals a valid correlation between the variables as follows; Chronic Diseases Self-Efficacy = 31.348 + 0.377* Long-term Conditions - 0.391* Multimorbidity Burden.

The normality assumption is depicted in **Figures (4 and 5)** and can be investigated using a variety of measures. These measures involve examining the histograms of residuals and typical P-P graphs. Additionally, the residual statistics were investigated to look at any outliers. It is possible to see that the histogram for the model in Figure 4 is normal. P-P graphs should ideally follow a diagonal straight line, however the normal P-P plot in **Figure (5)** shows a small variation from normality.

Discussion

There is a lack of clinical trials involving multi-morbid patients, resulting in the rarity of multimorbidity management guidelines [(23)]. The previous review involved thirty articles focused on self-management among multimorbid geriatric patients. This review recommended further studies on obstacles to self-management among multimorbid geriatric patients [(24)]. So, the study aimed to assess the association between long-term conditions, multimorbidity burden, and chronic disease self-efficacy among geriatric patients. It included 200 geriatric patients. 108 out of 200 had two chronic conditions, and 90 out of 200 had three or four chronic conditions. The most frequent chronic diseases were diabetes mellitus, hypertension, and cardiac diseases. Their mean age is 71.7 ± 6.32 years. A study was done by Stubbs et al. [(25)] who conducted "a cross-sectional analysis using data from the World Health Organization's Study on Global Ageing and Adult Health (China, Ghana, India, Mexico, Russia, and South Africa)". They found that the mean age of the study subjects was 62.4 (SD=16.0) years, and overall, 56.6% (95% CI=55.0%-58.2%) had multimorbidity.

The studied geriatric patients were questioned by the researchers about their long-term health conditions over the previous four weeks using a variety of self-rated questions, such as how frequently they had to manage their health conditions well while carrying out their activities and maintaining their independence. More than half of them felt bothered by symptoms sometimes, and nearly half of them felt sometimes more dependent on others and unhappy. Nearly two-thirds of them always find health and other services difficult to cope with, and more than two-thirds of them always find treatments difficult to cope with. In addition, nearly two-thirds of them rarely had enough support to cope with it. The majority of them reported that they had the worst level of living with their chronic diseases. This result can be explained by the fact that the studied geriatric patients have low health literacy, lack of support either financial or social, lack of access to transportation as more than half of them are from rural areas, and difficulty in their health assessment appointments. All of these factors illustrate why the majority of them experience worse living with chronic diseases. This result is in line with the logistic regression results of the study conducted in China, which showed that "poor self-rated health was associated with chronic diseases, poor mental health, poor social relationships, and their co-occurrence" [(26)].

The current results show that the majority of the studied geriatric patients reported high multimorbidity treatment burden when questioned about medication taking (how, when, cost, compliance), seeking treatment (checking up, medical appointments, transportation, disease information), lifestyle (diet, exercise, sleep), and getting support. This data can be explicated by the fact that older adults

experience age-related physiological and psychosocial changes that may affect their abilities to manage and cope with their chronic conditions, as well as the clinical and public health implications of the multimorbidity they experience. This finding is in the same line with the findings of a study conducted in the Kungsholmen neighborhood of central Stockholm by Rizzuto et al. [27] which showed a significant burden associated with multimorbidity. People with multimorbidity have extensive medical requirements because of their ongoing illness. The same conclusion, that multimorbidity was linked to a higher number of treatment activities and expenses, was supported by several earlier investigations [28 &29].

The present findings confirmed that more than half of the studied geriatric patients have moderate chronic disease self-efficacy, and nearly half of them have low chronic disease self-efficacy. The high treatment burden of chronic conditions and the worst level of living with chronic diseases may clarify these findings, as evidenced by the results from Pearson's correlation coefficient, which show, firstly, a statistically significant positive relation between the studied geriatric patients' LTCs (Higher scores represent better levels of "living well with LTCs) and their self-efficacy. Secondly, there was a statistically significant negative relationship between the studied geriatric patients' multimorbidity burden and their self-efficacy.

Self-efficacy correlates with the studied geriatric patients' LTCs and multimorbidity burden. This can be attributed to the fact that multi-morbid elderly patients have more challenges meeting their chronic disease requirements, which diminishes their self-efficacy level (the belief that one has the capacity to carry out a task). Along the same line, a study conducted in the US by Finney et al.[30] evaluated the relationship between chronic diseases burden and health-related self-efficacy. Another study done by Hardman et al.[31] in Australia found that 51% of the participants reported a high treatment burden and a high perceived treatment burden was correlated with low self-efficacy.

After testing the normality, the researchers did a multiple linear regression to confirm the correlation between self-efficacy as a dependent variable and the studied geriatric patients' long-term conditions, and multimorbidity burden as independent variables. The regression model confirmed that the studied geriatric patients' LTCs alone have higher prediction of their self-efficacy. Also, the multimorbidity treatment burden has little prediction of their chronic disease self-efficacy. The most significant impacts on self-efficacy can be attributed to a wide range of physical and psychological symptoms, lifestyle changes, and frailty brought on by long-term chronic diseases. This is supported by earlier research examined by the integrative review, which verified that three subjects were recognized as obstacles to self-efficacy: health literacy, access to healthcare, and patient support systems [32].

Conclusion:

In conclusion, the majority of studied geriatric patients had a high treatment burden level, and nearly half of them had low chronic disease self-efficacy. There was a statistically significant relationship between geriatric patients' long-term conditions, multimorbidity burden, and their chronic disease self-efficacy.

Recommendations:

The following suggestions were highly recommend:

1. Providing routine multimorbidity checkup for elderly in all health care facilities.
2. Providing health education programs for geriatric patients about multimorbidity prevention, management, and ways to adapt.
3. Establish a self-management program for geriatric patients with multiple chronic

conditions (promoting adaptation and increasing functioning).

Study limitations:

The study has some limitations. First, participants in this study weren't selected randomly. Second, the sample was from one place in Egypt. Third, we didn't assess the treatment burden of each chronic disease separately. Therefore, further research is required to compare the different chronic diseases treatment burdens and their effects on self-efficacy.

Table 1: Frequency and percentage distribution of the studied geriatric patients' demographic characteristics

Demographic characteristics	No. (200)	%
Age		
Mean ± SD	71.7±6.32	
Range	60 – 93	
Age group		
▪ 60-70 years	108	54.0
▪ >70 years	92	46.0
Gender		
▪ Male	110	55.0
▪ Female	90	45.0
Residence		
▪ Rural	106	53.0
▪ Urban	94	47.0
Marital status		
▪ Married	150	75.0
▪ Divorced	22	11.0
▪ Widow	22	11.0
▪ Single	6	3.0
Education Level		
▪ Illiterate & read and write	80	40.0
▪ Primary education	16	8.0
▪ Preparatory education	14	7.0
▪ Secondary education	54	27.0
▪ University	36	18.0
Occupation		
▪ On retirement	88	44.0
▪ Housewife	58	29.0
▪ Business work	34	17.0
▪ Did not work	20	10.0
Monthly income		
▪ Less than 1000 Ep	104	52.0
▪ 2000 to 3000 EP	78	39.0
▪ 3000 to 5000 EP	18	9.0
Living arrangement		
▪ Living alone	16	8.0
▪ Living with others	184	92.0

Table 2: Frequency and percentage distribution of the studied geriatric patients' clinical data

Clinical data	No.(200)	%
Having health assurance		
▪ Yes	64	32.0
▪ No	136	68.0
Types of chronic diseases		
▪ Diabetes Mellitus	104	52.0
▪ Hypertension	100	50.0
▪ Osteoporosis	88	44.0
▪ Cardiac diseases	54	27.0
▪ Stroke	26	13.0
▪ Chronic Obstructive Pulmonary Diseases	22	11.0
▪ Liver diseases	16	8.0
▪ Renal diseases	14	7.0
No. of chronic diseases		
▪ Two	108	54.0
▪ Three	66	33.0
▪ Four	24	12.0
▪ More than five	2	1.0
Self-reported health status		
▪ Very Good	8	4.0
▪ Good	70	35.0
▪ Fair	74	37.0
▪ Bad	48	24.0

Table 3: Distribution of the studied geriatric patients' long-term conditions:

Long-term conditions questionnaire items:	Never		Rarely		Sometimes		Often		Always	
	No.	%	No.	%	No.	%	No.	%	No.	%
1. Able to cope well with health conditions	2	1	14	7	164	82	20	10	0	0
2. Able to fulfill responsibilities	4	2	12	6	84	42	98	49	2	1
3. Able to be as physically active as you want	0	0	6	3	56	28	138	69	0	0
4. Felt in control of daily life	0	0	10	5	78	39	102	51	10	5
5. able to take part in activities you enjoy	2	1	4	2	44	22	120	60	30	15
6. felt that your home is suitable for your needs	40	20	78	39	70	35	8	4	4	2
7. Felt safe at home	42	21	118	59	36	18	2	1	2	1
8. Felt safe outside the home	0	0	10	5	54	27	134	67	2	1
9. Felt bothered by symptoms	0	0	22	11	114	57	52	26	12	6
10. Felt more dependent on others than you wanted	4	2	30	15	90	45	68	34	8	4
11. felt lonely due to health conditions	4	2	24	12	102	51	62	31	8	4
12. Worried about being treated differently	4	2	36	18	88	44	66	33	6	3
13. found health/other services difficult to cope with	6	3	26	13	14	7	26	13	128	64
14. Found treatments difficult to cope with	6	3	26	13	12	6	16	8	140	70
15. felt that your health conditions made you unhappy	4	2	88	44	90	45	16	8	2	1
16. Felt you knew enough about your health conditions	16	8	28	14	126	63	30	15	0	0
17. Had enough social contact with people	26	13	114	57	40	20	14	7	6	3
18. Had enough support to cope well with health conditions	80	40	88	44	14	7	12	6	6	3
19. felt confident in managing health conditions	10	5	72	36	92	46	24	12	2	1
20. Able to live your life as you want	6	3	28	14	110	55	54	27	2	1

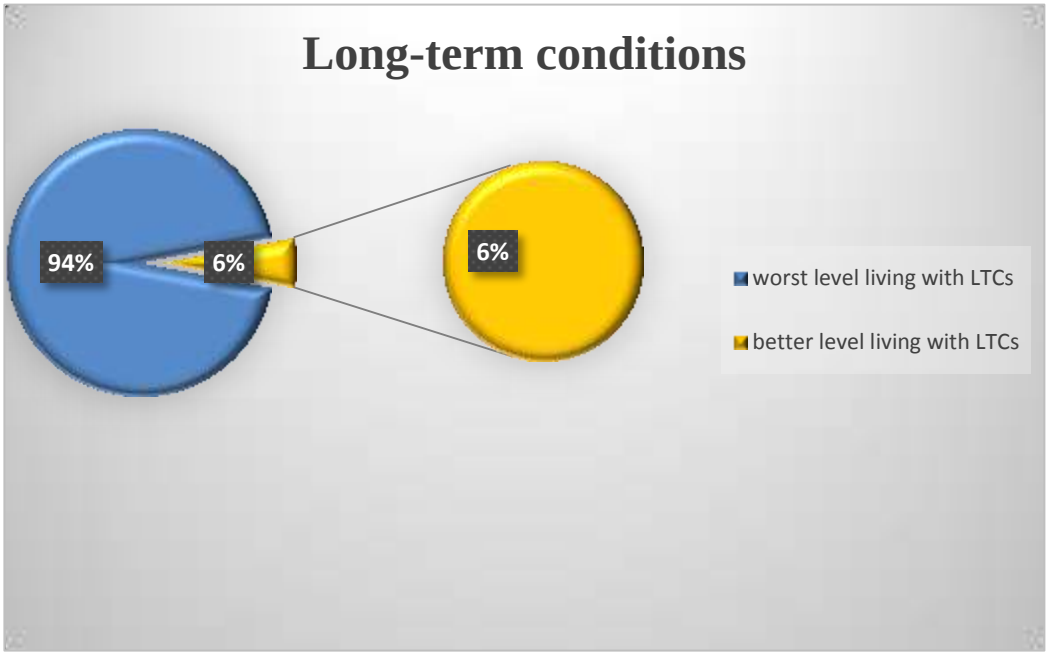

Figure 1: Percentage distribution of the studied geriatric patients' total score of long-term conditions

Table 4: Frequency and percentage distribution of the studied geriatric patients' multimorbidity treatment burden

Multimorbidity treatment burden items:	Not difficult		A little difficult		Quite difficult		Very difficult		Extremely difficult		Does not apply	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1. Taking lots of medications	0	0	10	5	128	64	26	13	4	2	32	16
2. Remembering how and when to take medication	0	0	2	1	2	1	22	11	140	70	34	17
3. paying for medications and treatment	2	1	36	18	62	31	64	32	12	6	24	12
4. Take medicine regularly	2	1	2	1	4	2	18	9	50	25	124	62
5. Monitoring your medical conditions (e.g. checking your blood pressure or blood sugar, monitoring your symptoms, etc.)	4	2	0	0	4	2	66	33	110	55	16	8
6. To see a doctor about a health issue	0	0	2	1	16	8	92	46	84	42	6	3
7. Go to see different doctors	6	3	56	28	88	44	28	14	18	9	4	2
8. Getting time off work, arranging transport, etc. to see doctors	40	20	4	2	6	3	38	19	102	51	10	5
9. Getting health care in the evenings and at weekends	30	15	2	1	2	1	28	14	119	59.5	19	9.5
10. Getting help from community services (e.g. physiotherapy, district nurses, etc.)	30	15	2	1	2	1	44	22	108	54	14	7
11. Obtaining clear and up-to-date information about your condition	8	4	10	5	10	5	36	18	110	55	26	13
12. Making recommended lifestyle changes (e.g. diet and exercise etc.)	2	1	6	3	18	9	18	9	22	11	134	67
13. Must rely on support from family members and friends	2	1	0	0	8	4	14	7	38	19	138	69

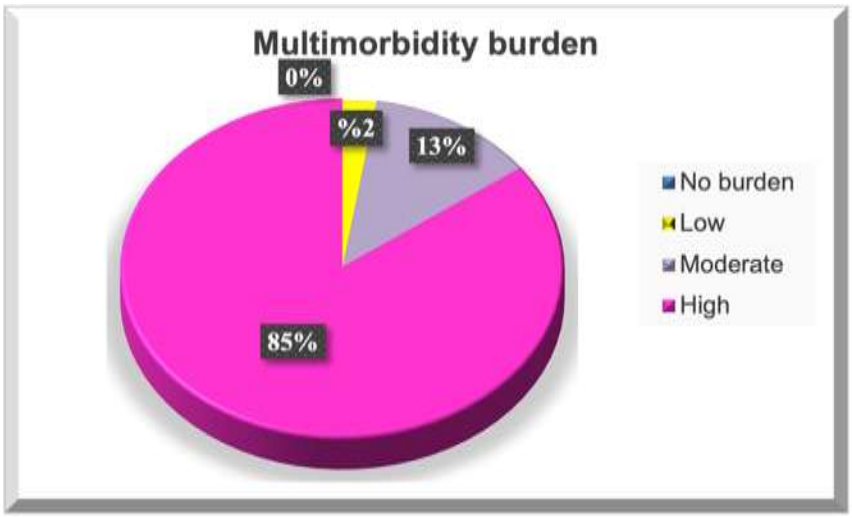

Figure 2: Percentage distribution of the studied geriatric patients' total score of multimorbidity treatment burden

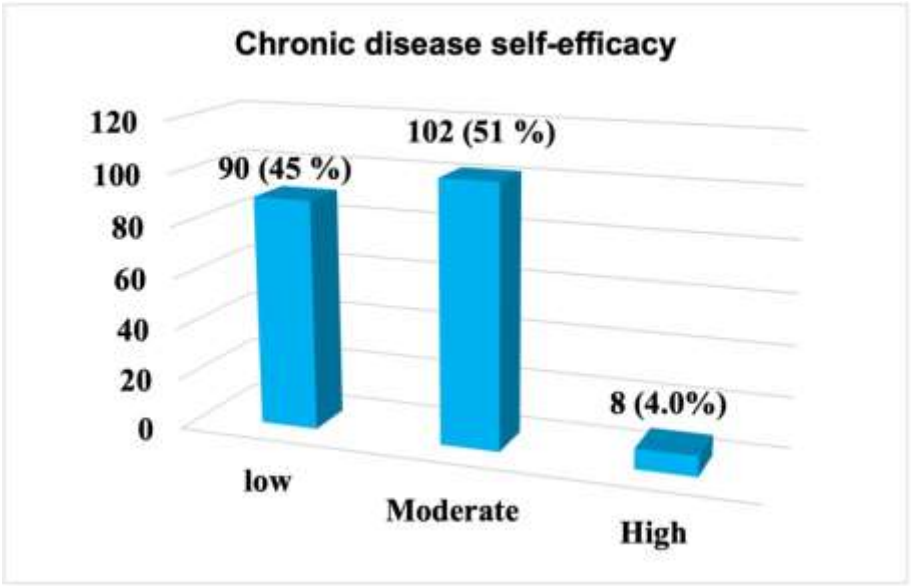

Figure 3: Percentage distribution of the studied geriatric patients' chronic disease self-efficacy

Table 5: Correlation Matrix between the studied geriatric patients' long-term conditions, multimorbidity burden, and their chronic diseases Self-efficacy

Correlations				
		Long-term conditions	**Multimorbidity burden**	**Chronic diseases Self-efficacy**
Long-term conditions	**Pearson Correlation**			
	Sig. (2-tailed)			
Multimorbidity burden	**Pearson Correlation**	**-.671****		
	Sig. (2-tailed)	**.000**		
Chronic diseases Self-efficacy	**Pearson Correlation**	**.457****	**-.477****	
	Sig. (2-tailed)	**.000**	**.000**	

****Correlation is significant at the 0.01 level (2-tailed).**

Table 6: Linear regression between the studied geriatric patients' long-term conditions, multimorbidity burden, and their chronic diseases Self-efficacy

	Chronic Diseases Self-Efficacy [a]								
	Unstandardized Coefficients		**Standardized Coefficients**			**F**	**Sig.**	**R Square**	**R Square Change**
Model	**B**	**Std. Error**	**Beta**	**t**	**Sig.**				
1 (Constant)	60.393	3.603		16.761	.000	52.381	.000 [b]	20.9%	
Long-term conditions	.691	.095	.457	7.237	.000				20.9%
2 (Constant)	31.348	8.497		3.689	.000	34.945	.000 [c]	26.2%	
Long-term conditions	.377	.125	.250	3.027	.003				20.9%
Multimorbidity burden	-.391	.104	-.309	-3.749	.000				5.3%

a. Dependent Variable: Chronic diseases self-efficacy

b. Predictors: (Constant), Chronic Conditions

c. Predictors: (Constant), Chronic conditions, Multimorbidity burden

Chronic Diseases Self-Efficacy = 31.348 + 0.377* Long-term Conditions - 0.391* Multimorbidity Burden

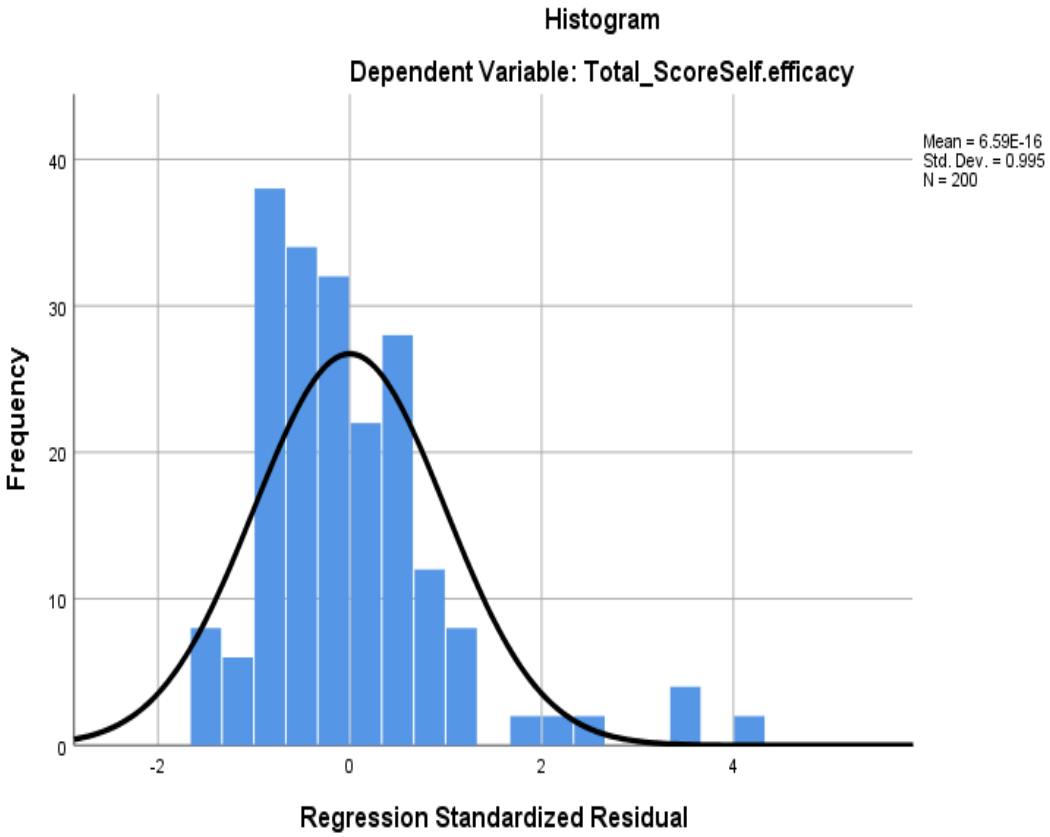

Figure 4: shows the normal distribution curve of the impact of the examined geriatric patients' chronic illnesses and multimorbidity burden on their self-efficacy in managing chronic diseases

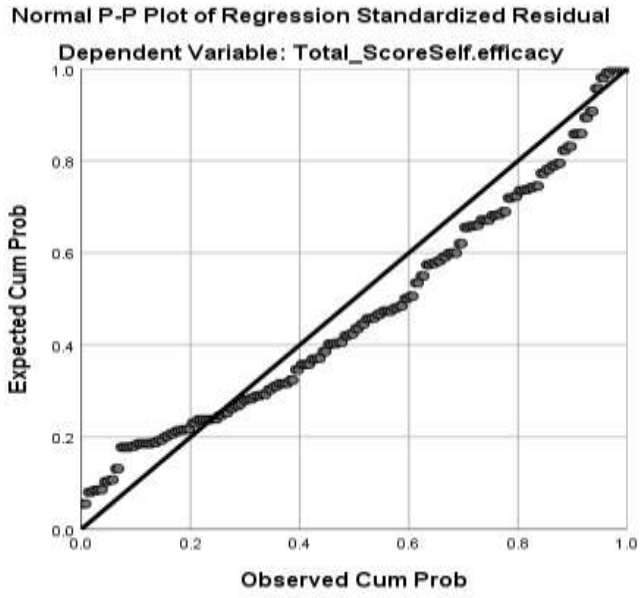

Figure 5: shows the typical P-P plot of the impact of the studied geriatric patients' multimorbidity burden and chronic illnesses on those patients' self-efficacy in managing those conditions

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