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Factors Associated with Family Caregivers Burden of Geriatric Patients with Cancer Receiving Chemotherapy

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Abstract: **Family caregivers of geriatric patients with cancer and receiving chemotherapy are facing many challenges in managing and caring for their patients. Objective: Determine factors associated with family caregivers burden of geriatric patients with cancer and receiving chemotherapy. Setting: Clinical Oncology and Nuclear Medicine department of the Main University Hospital, Alexandria, Egypt. Subjects: 80 geriatric patients aged 60 years and more and their family caregivers (80). Tools: Four tools were used for data collection: 1) Socio-demographic and clinical data for both geriatric patients and their family caregivers 2) Barthel index scale 3) Modified Caregiver Strain Index 4) Factors associated with family caregivers burden appraisal structured interview schedule. Results: The study family caregivers reported different levels of burden which are significantly correlated with geriatric patients current work status, their use of mobility aids and number of chemotherapy side effects. Also, family caregivers' age, occupation, and type of chronic disease is significantly associated with their burden. Conclusion: High level of burden reported by majority of the study family caregivers of geriatric patients with cancer and receiving chemotherapy is associated with several factors such as family caregivers age, place of residence, occupation, number of children, geriatric patient current work status and their use of mobility aids. Recommendations: Comprehensive assessment of family caregivers as a routine and basic procedure to the gerontological nurses in chemotherapy outpatient clinic of hospital. Develop continuing educational programs for family caregivers about cancer and its treatment especially with chemotherapy and how to manage its side effects.**

Keywords: **Cancer; geriatric patients; chemotherapy; side effects; family caregivers; burden; gerontological nurses.**

I. INTRODUCTION

Cancer is one of the predominant causes of mortality, and morbidity in older adults.[1] Worldwide, it is reported to be the second cause of death, while in Egypt, it becomes after cardiovascular diseases and diabetes mellitus.[2] In the Main University hospital in Alexandria, the incidence of cancer among older adults constitutes 33% of the total number of cancer cases admitted to the Clinical Oncology and Nuclear Medicine department during 2018. This is attributed to age-related changes and prolonged exposure to carcinogenic agents which increase older adults liability to cancer.[3]

Chemotherapy one of the most prevalent measures used to manage cancer in older adults.[4] It acts through attacking the cells that are dividing quickly, especially cancer cells, but it can't distinguish between cancer cells and other rapidly dividing healthy cells.[5]

Now-a-day, the need for family caregivers for geriatric patients with cancer patients increased particularly for those receiving chemotherapy, this is because cancer treatment switched to outpatient settings instead of inpatient settings.[6, 7]

Family caregivers have an important role in supervising treatment, managing side effects related to treatment, and offering emotional, social, and spiritual support to their geriatric patients with cancer and receiving chemotherapy.[8] Beside caring for their geriatric patients, family caregivers need to maintain their routine life style such as family responsibilities and work schedules.[9] This usually places them at a high risk for burden.

Caregiver burden is defined as the strain\ tenseness borne by somebody who takes care of a chronically ill, disabled, or elderly family member.[10, 11]. It can influence family caregivers' life physically, mentally, financially, and socially.[12] Physically, family caregivers are prone to increased morbidity and mortality associated with caregiving.[13] Fatigue, disturbed sleep, loss of physical and strength are the most prevalent physical problems reported by family caregivers.[14] From the mental health perspectives, sadness, distress, anxiety, and depression are commonly associated with family caregivers burden.[15] The financial burden also can be classified into; direct cancer care costs which include medications used in chemotherapy, and managing side effects of chemotherapy, while indirect cancer care costs include transportation, lost wages related to unemployment and reduced hours of work due to care demands.[16] Social burden include the negative outcomes of care provided on family caregivers holidays, time available for hobbies, and socializing.[13]

Several factors contribute to high burden among family caregivers. These include factors related to family caregivers themselves, geriatric patients, and caregiving process.[17] Factors associated with family caregivers include their personal characteristics and health condition. Geriatric patients related factors may include their age, income, level of physical mobility, income, level of education, living condition, and type of help required. Also, cancer type, treatment regimen and the type of chemotherapy agent can control the level of caregivers burden. Caregiving process related factors such as; duration of caregiving for the elderly patient with cancer, living with the patient or not, time spent in caregiving, and existence of other persons for help.

Gerontological nurses have an important role in assessing geriatric patients with cancer receiving chemotherapy and their family caregivers in order to determine factors linked with high caregivers burden and targeting appropriate interventions to help them to overcome the stressors associated with caregiving. Gerontological nurses have an educational role which include teaching family caregivers about cancer and how to transact with it and its treatment related manifestations.[18]

Aim of the study

The present study aimed to determine factors associated with family caregivers burden of geriatric patients with cancer receiving chemotherapy.

Research questions:

What are the factors associated with family caregivers burden of geriatric patients with cancer receiving chemotherapy?

II. MATERIALS AND METHOD

Materials

Design: The study followed a descriptive correlational research design.

Setting: The study was carried out at the Clinical Oncology and Nuclear Medicine department of the Main University Hospital, Alexandria, Egypt. The working hours are from 8:00 am to 2:00 pm every day except Friday.

Subjects: The study sample included 2 groups:

Group 1: Geriatric patients aged 60 years and more, diagnosed with cancer, attending the previous setting to receive chemotherapy session and discharged thereafter and those who received at least three previous sessions. Also, those who are able to communicate effectively and accept to participate in the study. Their number amounted to 80 geriatric patients.

Group 2: Family caregivers who accompany their geriatric patients to receive the chemotherapy session, and who are able to communicate effectively and accept to participate in the study. Their number amounted to 80 family caregivers.

The study sample size was calculated using the Epi info V 7.0 program based on the following statistical parameters ; Population size:225, expected frequency:50%, acceptable error:10%, confidence coefficient: 95%, minimum sample size =67.

The estimated minimum sample size is 67 of geriatric patients with cancer and their family caregivers. The actual sample size was 80 geriatric patients with cancer and their family caregivers.

Tools:

In order to collect the necessary data, four tools were used.

Tool (I): Socio–Demographic and Clinical Data of the geriatric patients with cancer and their family caregivers Structured Interview Schedule.

This tool was developed by the researcher and included two parts:

- Part 1: Data about the geriatric patients with cancer receiving chemotherapy:

A. Socio-demographic data: such as age, sex, marital status, level of education, occupation prior to retirement and income.

B. Clinical data: such as; medical health history, onset, type and duration of cancer, number of chemotherapy sessions received, and type of care required by the patient.

- Part 2: Data about family caregivers of geriatric patients with cancer:

A. Socio-demographic data: such as age, sex, relationship to the geriatric patient, marital status, level of education, occupation, income,

B. Clinical data: such as; medical health problems such as diabetes mellitus and hypertension.

Tool II: Barthel Index Scale (BIS)

This tool was developed by Barthel , 1965. It was used to assess elders' activities of daily living. The scale consists of 10 items namely feeding, bathing, grooming, dressing, , toileting, controlling bladder, controlling bowel, moving from chair to bed and return, getting on and off toilet, walking on level surface, and ascending and descending stairs. The total score of the scale is 20 which is classified into; score from 0 to 7 indicates dependent, score from 8 to 12 indicates partially dependent and score from 13 to 20 indicates independent. It was translated into Arabic language by Hallaj, 2007 and proved to be valid and reliable (r= 0.971). The Arabic version was used in the present study.

Tool III: Modified Caregiver Strain Index (MCSI)

Modified Caregiver Strain Index (MCSI) is a 13-item, self-administered scale developed by Thornton& Travis, 2003. to assess caregiver burden. It evaluates various major domains of caregiver burden; such as physical, psychological, social, employment, financial, and time domains. This scale is a more recent version of Caregiver Strain Index which was developed by Robinson et al., 1983. The response for this scale ranges from no response (zero), sometimes (2) and yes (3) with total score of 26. A Modified Caregiver Strain Index score 14 or higher is indicates high caregiver burden and score from 0 to 13 is indicates lower levels of caregiver burden. The MCSI is a valid tool and used in several studies in oncology (Donnelly, Anderson & Johnston , 2008& Lohne , Miaskowski & Rustoen, 2012).

Tool IV: Factors Associated with family Caregivers' burden of geriatric patient with cancer Appraisal Structured interview schedule.

This tool was developed by the researcher based on relevant literature to assess factors associated with family caregivers' burden of geriatric patients with cancer receiving chemotherapy. This tool included three domains;

1- Factors related to geriatric patients such as level of dependency, side effects of treatment, and the type of help needed by the patients.

2- Factors related to family caregivers such as type of care provided to the patient, available supportive persons and resources.

3- Factors related to caregiving process such as how many hours spent in daily care for the patient, duration of caregiving, and presence of received assistance in caring for the geriatric patients from others.

Method

1- Permission was obtained from the responsible authorities (Faculty of nursing, Main University Hospital Director and was from the Head of the Clinical Oncology and Nuclear Medicine department) to carry out the study. Also, approval from ethical committee was obtained.

2- Tool I, Socio–Demographic and Clinical Data of geriatric patients with cancer and their family caregivers Structured Interview Schedule, was developed by the researcher.

3- Tool II, Barthel Index Scale, the Arabic version was used to assess level of dependency in performing activities of daily living of geriatric patients with cancer receiving chemotherapy. It was retested for its reliability by the researcher using Cronbach coefficient alpha test (r = 0.90).

4- Tool III, Caregiver Strain Index, was translated into Arabic language by the researcher and tested for reliability using Cronbach coefficient alpha test, (r= 0.883)

5- Tool IV, Factors Associated with family Caregivers burden Appraisal Structured interview schedule, was developed by the researcher based on a thorough review of relevant literature to assess factors associated with family caregivers' burden of geriatric patients with cancer receiving chemotherapy.

6- The study tools were tested for content validity by 5 experts in the related field of the study.

7- A pilot study was carried out on 8 geriatric patients with cancer and their family caregivers (8) selected from the study setting. They were not be included in the study sample.

8- Each geriatric patient and his\her family caregiver fulfilling the inclusion criteria was interviewed individually in the oncology department to collect the necessary data.

9- The time of data collection started from mid-August 2019 to the end of October 2019. For statistical analysis, SPSS version 20 was used for and the level of significance was set as ≤ 0.05 level.

Ethical considerations:

An informed oral consent was obtained from each study subject included in the study after explanation of the study purpose. Anonymity and privacy of the study subjects was maintained and confidentiality of the collected data assured. The desire of the study subjects to withdraw from the study at any time was respected.

Statistical analysis:

Data collected were analyzed by computer using the Statistical Package for Social Sciences (SPSS) software version 20. Reliability of the tool was determined by Cronbach Coefficient alpha. Data were presented by descriptive statistics in the form of number and percentages for qualitative variables, and range(minimum and maximum), mean, standard deviation for quantitative variables. Student t-test and F-test (ANOVA) were used for testing relationship between variables. Significant difference was considered if $P \leq 0.05$. Standardized Coefficients (Beta) test and Confidence interval (C.I) test were used.

III. RESULTS

Table (I) illustrates the socio-demographic characteristics of the study geriatric patients. The table shows that, their mean age is 66.05 ± 66.05 years, 55.0% are females, 68.75% are married, 70% are illiterate. In relation to current work status a small percent, 8.7%, are current workers. Monthly income reported to be inadequate by 68.7% of the study geriatric patients.

Table (II) illustrates that, 87.5% of the geriatric patients with cancer are independent, 6.3% are partially dependent and 6.2% are totally dependent.

Table (III) illustrates that, 51.25% of the study geriatric patients reported suffering from different chronic diseases, while the rest 48.75% claimed having just cancer with no other chronic disease. The table also indicates that, 26.25% of the study geriatric patients are under-weight, 43.75% have normal body weight, 22.5% over-weight and 7.5% obese. Regarding to use of mobility aids, 27.5% of the geriatric patients use mobility aid as cane or crutches or wheel chair.

Majority of them, 76.25%, require assistance in IADLs followed by health care management, financial, emotional, social support 62.5%, 53.75%, 40.0%, and 33.75% respectively.

Table (IV) showed that, genitourinary system cancer is the most commonly reported type of cancer 38.75% followed by the gastrointestinal 27.5%, musculoskeletal 22.5%, thyroid gland and respiratory system 8.8% and 7.5% respectively. The number of received chemotherapy sessions by the geriatric patients ranges from 4 up to 15 sessions with a mean of 6.89 ± 2.96 session. The table shows that, 46.3% of the study geriatric patients received from 4 to 5 chemotherapy sessions, 23.8% received from 6 to 7 sessions, 5.0% from 8 to 9 sessions, and 25.0% from 10 to 15 sessions.

Table (V) illustrates that, 93.75% of the study geriatric patients experience chemotherapy related side effects. The most common side effects reported are fatigue and gastrointestinal disturbances, 98.6% for each. The number of chemotherapy side effects ranges from 2 to 13 side effects with a mean of 7.31±2.79. The table shows that, 68.0% of the study geriatric patients reported from 6 to less than 10 chemotherapy related side effects, the rest reported having either less than 6 or more than 10 side effects 20.0% and 12.0% respectively.

Table (VI) illustrates the socio-demographic characteristics of the study family caregivers of geriatric patients with cancer and receiving chemotherapy. The table shows that, their mean age is 43.10±12.48 years. The table shows 13.75% of the study family caregivers are older adults (60 years and more), 45% and 41.25% aged from 40 to less than 60 years or up to 40 years respectively. Females constitute 72.5%, and 85.0% of family caregivers are married. Illiteracy is prevailing among 32.5% of the study family caregivers. As regards occupation, 65.0% of the study family caregivers are a house wives\ not work, 15.0% skilled workers, 10.0% either employee or unskilled workers, and the rest 13.7% do not work. The monthly income is reported to be inadequate by 60.0%. For the majority of the geriatric patients, 87.5%, cared by their family members (first degree) as partner or son\daughter or sister\brother. For the rest 12.5% is either sons\daughter in law or patient relatives. Regarding having children, 86.25% of the family caregivers reported having children, 29.1%% of them have one or two children and 60.9% have three or more. The mean age of children is 16.77 ± 10.31 years.

Table (VII) illustrates that, 42.5% of the study family caregivers suffer from chronic diseases which include cardiovascular diseases 47.1%, endocrine diseases 35.3%, musculoskeletal diseases 26.5%, gastrointestinal diseases 14.7%, nervous system diseases 11.8%, respiratory system diseases 5.9%, and renal diseases 2.9%.

Table (VIII) illustrates that, 88.8% of family caregivers help their geriatric patients in IADLs and 70.0% in ADLs. Regard to availability of resources as (linens and detergents) and supportive person (psychologically), only 15.0% of the family caregivers reported unavailability of care requirements and 41.3% reported unavailability of supportive person.

Table (IX) illustrates that, family caregivers provide different activities either inside or outside home throughout the day of receiving chemotherapy session. In relation to inside home activities, 100% of the study family caregivers provide personal care and emotional reassurance for their geriatric patients, 16.25% care for their children before going to the hospital for chemotherapy session. Regarding to outside home activities, 100% of family caregivers offer transportation mean to their patients either through public transportation 72.5% or through renting a car or by their own care 27.5% of the study family caregivers. A hospital, 100.0% of family caregivers complete admission requirement for their patients and the same percent reported waiting for long period for receiving chemotherapy sessions due to medications preparation, inadequate beds number, large patients number, or inadequate number of medical staff. Also, 2.5% of family caregivers reported going to their work after returning their patient home after session.

Table (X) illustrates that, 60.0% of the study family caregivers care for their patients all time, followed by those who provide care only per day 36.3%, then per night 3.7%. 20.0% of the study family caregivers view that side effects of chemotherapy experienced by their geriatric patients are mild, 31.3% moderate, and 48.8% severe. 37.5% of the study family caregivers don't have any source of help in caregiving process.

Table (XI) illustrates that, 31.25% of the family caregivers have low level of burden and 68.75% reported high level.

Table (XII) shows that, a highly significant relation was observed between the family caregivers' burden and the current work status, place of residence, use of mobility aids, number of side effects reported by the geriatric patients, $t = 4.754$, $P = 0.001$, $F = 4.503$, $P = 0.006$, $t = 2.126$, $P = 0.037$, $f = 3.030$, $P = 0.055$ respectively.

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Table (XIII) illustrates the relation between family caregivers factors and their level of burden. The table shows that, the significant relation between family caregivers' burden and age, occupation, relation with geriatric patients (first or second degree relatives), availability of supportive person (psychologically), the age of family members' children, having respiratory diseases, caregiving timing, number of public transportation used to reach hospital, and availability of required resources, t =2.679, P =0.009, F = 6.373, P = 0.001, F = 3.237, P = 0.011, t = 2.133, P = 0.036, F = 2.596, P = 0.045, F = 2.768, P = 0.023 respectively.

Table (XIV) illustrates the relation between circumstances of caregiving process as reported by family caregivers and their level of burden. The table shows that, a significant relation between family caregivers' burden and caregiving timing, number of public transportation used to reach to the hospital, and availability of required resources for caregiving F=3.128, P= 0.049, t = 2.135, P = 0.037, t=2.325, P = 0.025 respectively.

Table (XV) illustrates predictors of family caregivers burden of geriatric patients with cancer and receiving chemotherapy. The table shows use of mobility aid by geriatric patients, number of side effects of chemotherapy, age of family caregivers, their occupation, their relation with their geriatric patients, availability of supportive person (psychologically), age of their children, presence of GIT system disease experienced by family caregivers, number of transportation used and availability of required resources predictors of family caregivers burden, P = 0.037, P = 0.026, P = 0.009, P = 0.003, P =0.036, P = 0.036, P = 0.008, P = 0.039, P = 0.037, P = 0.027 respectively.

Table I: Distribution of the study geriatric patients with cancer and receiving chemotherapy according to their socio-demographic characteristics.

Socio-demographic characteristics	N (80)	%
Age (years)		
60 –	**77**	**96.25**
75 – 84	**3**	**3.75**
Mean ±SD	66.05 ± 66.05	
Gender		
Female	**44**	**55.0**
Male	**36**	**45.0**
Marital status		
Married	**55**	**68.75**
Un married (widow\divorced)	**25**	**31.25**
Level of education		
Illiterate	**56**	**70.0**
Read and write	**9**	**11.3**
Basic education	**8**	**10.5**
Intermediate education	**7**	**8.8**
Occupation prior to retirement		
House wives	**36**	**45.0**
Skilled workers	**26**	**32.5**
Unskilled workers	**14**	**17.5**
Employee	**4**	**5.0**
Current work status		
No	**73**	**91.3**
Yes	**7**	**8.7**
Monthly income		
Inadequate	**55**	**68.7**
Adequate	**25**	**31.3**

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Table II: Distribution of the study geriatric patients with cancer and receiving chemotherapy according to their level of independency.

Level of independency	N (80)	%
Independent (13 – 20)	**70**	**87.5**
Partially dependent (8 – 12)	**5**	**6.3**
Dependent (0 – 7)	**5**	**6.3**

Table III: Distribution of the study geriatric patients with cancer receiving chemotherapy according to their clinical data and required care.

Clinical data and required care	N (80)	%
A–Presence of chronic diseases		
Yes	**41**	**51.25**
No	**39**	**48.75**
B–Body mass index (BMI) (kg\m2)		
Underweight (< 18.5 kg\m2)	**21**	**26.25**
Normal (18.5-24.9 kg\m2)	**35**	**43.75**
Over weight (25.0 – 29.9 kg\m2)	**18**	**22.5**
Obese (30.0 kg\m2 and above)	**6**	**7.5**
C–Use of mobility aids		
No	**58**	**72.5**
Yes	**22**	**27.5**
D-Type of required care by the patient#		
IADLs	**61**	**76.25**
Health care management	**50**	**62.5**
Financial support	**43**	**53.75**
Emotional support	**32**	**40.0**
Social support	**27**	**33.75**
Self-care (ADLs)	**20**	**25.0**
Spiritual support	**11**	**13.75**

More than one answer was allowed. ADLs: Activities of daily living IADLs: Instrumental Activities of Daily living

Table IV: Distribution of the study geriatric patients with cancer receiving chemotherapy according to their present clinical data about cancer.

Clinical data about cancer	N (80)	%
A–Site of cancer #		
Genitourinary system	**31**	**38.75**
Gastrointestinal system	**22**	**27.5**
Musculoskeletal system	**18**	**22.5**
Thyroid	**7**	**8.8**
Respiratory system	**6**	**7.5**
B–Duration of diagnosis		
Less than 1year	**65**	**81.25**
1+	**15**	**18.75**
Mean ± SD.	14.34 ± 19.34	

D-Type of chemotherapy received #		
Anti-metabolites	**44**	**55.0**
Alkylating agent	**17**	**21.25**
Miscellaneous agent	**9**	**11.25**
Texans	**8**	**10.0**
Others	**3**	**3.75**
E- Number of received chemotherapy sessions		
4-	**37**	**46.3**
6-	**19**	**23.8**
8-	**4**	**5.0**
10 +	**20**	**25.0**
Mean ± SD.	6.89 ± 2.96	

More than one answer was allowed.

Table V: Distribution of the study geriatric patients with cancer and receiving chemotherapy according to the presence chemotherapy related side effects

Chemotherapy side effects	N (80)	%
A- Presence of chemotherapy side effects #		
Yes	**75**	**93.75**
No	**5**	**6.25**
Fatigue	**74**	**98.6**
GIT side effects #	**74**	**98.6**
Anorexia	**56**	**74.7**
Change in taste	**56**	**74.7**
Dry mouth	**42**	**56.0**
Nausea and vomiting	**40**	**53.3**
Constipation	**27**	**36.0**
Diarrhea	**25**	**33.3**
Weight loss	**24**	**32.0**
Oral infection	**23**	**30.7**
Pain	**56**	**74.6**
Integumentary system side effects #	**47**	**62.7**
Hair loss	**45**	**95.7**
Skin change (dryness or burn)	**10**	**21.3**
Nervous system side effects#	**45**	**60.0**
Numbness and tingling sensation	**33**	**73.3**
Dizziness	**15**	**33.3**
Lack of concentration	**10**	**22.2**
Others #	**15**	**20.0**
Fever	**10**	**66.7**
Breathing difficulties	**5**	**33.3**
Number of side effects		
Less than 6	**15**	**20.0**
6 -	**51**	**68.0**
10+	**9**	**12**
Mean ± SD.	7.31±2.79	

More than one answer was allowed

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Family caregivers:

Table VI: Distribution of the study family caregivers of geriatric patients with cancer according to their socio demographic characteristics .

Socio-demographic characteristics	N (80)	%
Age		
< 40 years	**33**	**41.25**
40-	**36**	**45.0**
60-77	**11**	**13.75**
Mean ± SD.	**43.10 ± 12.48**	
Gender		
Female	**58**	**72.5**
Male	**22**	**27.5**
Marital status		
Married	**68**	**85.0**
Single	**6**	**7.5**
Divorced	**4**	**5.0**
Widowed	**2**	**2.5**
Level education		
Illiterate	**26**	**32.5**
Read and write	**5**	**6.3**
Basic and secondary education	**18**	**22.5**
Middle certification (2 years institutes)	**23**	**28.8**
University education	**8**	**10.0**
Occupation		
House wife\ not work	**52**	**65.0**
Skilled workers	**12**	**15.0**
Employee	**8**	**10.0**
Unskilled workers	**8**	**10.0**
Monthly income		
Not enough	**48**	**60.0**
Enough	**32**	**40.0**
Responsible person for patient caregiving		
Family members(first degree)	**70**	**87.5**
Other family members (second degree)	**10**	**12.5**
Having children		
No	**11**	**13.75**
Yes	**69**	**86.25**
No of children		
1-	**27**	**39.1**
3+	**42**	**60.9**
Children age		
<6	**10**	**14.5**
6-	**29**	**42.0**
18+	**30**	**43.5**
Mean ± SD.	16.77 ± 10.31	

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Table VII: Distribution of the study family caregivers of geriatric patients with cancer and receiving chemotherapy according to their health status .

health history	N (80)	%
Presence of chronic disease		
No	**46**	**57.5**
Yes	**34**	**42.5**
Type # N=34		
Cardiovascular diseases	**16**	**47.1**
Endocrine diseases	**12**	**35.3**
Musculoskeletal diseases	**9**	**26.5**
Gastro intestinal system diseases	**5**	**14.7**
Nervous system diseases	**4**	**11.8**
Respiratory system diseases	**2**	**5.9**
Renal diseases	**1**	**2.9**

More than one answer was allowed

Table VIII: Distribution of the study family caregivers according to Type of help and availability of resources.

Type of help and availability of resources	N (80)	%
Type of help provided to patient #		
IADLs	**71**	**88.8**
ADLs	**56**	**70.0**
Psychological support	**50**	**62.5**
Social support	**31**	**38.8**
Financial support	**30**	**37.5**
Spiritual support	**6**	**7.5**
Availability of resources		
Yes	**60**	**75.0**
No	**20**	**25.0**
Availability of supportive person		
Yes	**47**	**58.75**
No	**33**	**41.25**

More than one answer was allowed.

Table IV: Distribution of the family caregivers according to their activities\duties on the day the patient is receiving the chemotherapy session.

Activities\duties throughout the day of receiving chemotherapy session	N (80)	%
Type of activities #		
1-Inside home:#		
-Providing personal care for patient	**80**	**100.0**
-Providing emotional reassurance for patient	**80**	**100.0**
-Caring for their children before going to hospital	**13**	**16.25**
2-Outside home #	58	72.5
A transportation to the hospital	22	27.5
Public transportation		
Rented /taxi/ private car	33	56.9

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Activities\duties throughout the day of receiving chemotherapy session	N (80)	%
Number of public transportation used (n=58)	25	43.1
1-		
3+	67	83.7
Time from home to hospital in hours (n=80)	13	16.3
1-		
3+		
Mean ± SD.	1.86 ± 0.94	
A- Management of hospital routines	80	100.0
B- Waiting a long time for receiving patient chemotherapy session	80	100.0
C- Return to work after the session	2	2.5

More than one answer was allowed.

Table X: Distribution of the study family caregivers of geriatric patients according to their role in patient care after receiving chemotherapy session.

Family caregivers role in patient care after receiving chemotherapy session	N (80)	%
A- Duration of care\day		
-Caring for 24 hours	**48**	**60.0**
-During the day only	**29**	**36.3**
-At night only	**3**	**3.7**
B- Severity of chemotherapy side effects (as reported by the caregivers)		
Mild	**16**	**20.0**
Moderate	**25**	**31.3**
Severe	**39**	**48.8**
C- Difficulties in dealing with chemotherapy related side effects#		
-Psychological difficulties	**74**	**92.5**
-Financial difficulties	**69**	**86.3**
-Physical difficulties	**69**	**86.3**
-Lack of information about dealing with side effects	**47**	**58.8**
-Unsuitable housing condition	**17**	**21.3**
D- Presence of social visits		
No	25	**31.25**
Yes	55	**68.75**
The return from these social visits # (n=55)		
- Psychologically supported	52	**94.5**
-Physically exhausted	43	**78.2**
-Financially expensive	37	**67.3**
E- Availability of help in care providing		
Yes	**50**	**62.5**
No	**30**	**37.5**

more than one answer was allowed.

Table XI: Distribution of the study family caregivers according to their level of burden

./Level of burden	No.	%
Low level (0 – 13)	25	31.25
High level (≥14)	55	68.75

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Table XII: Relation between the study geriatric patients profile and the family caregivers' burden.

Geriatric patients profile	Family caregivers' burden M ±SD%.	Test of Sig.	P
Age (years)			
60 –	60.06 ±12.65	t = 1.734	0.087
75 – 84	47.22 ±9.62		
Gender			
Female	58.62 ±12.63	t = 0.747	0.457
Male	60.76 ±12.96		
Current work status			
No	60.39 ± 13.03	**t= 4.754**	**0.001***
Yes	51.19 ± 3.15		
Monthly income			
Inadequate	60.23 ± 12.90	t= 0.668	0.506
Adequate	58.17 ± 12.53		
Place of residence (Governorate)			
Alexandria governorate	56.73 ± 11.53		
Beheira	69.44 ± 13.24	**F= 4.503***	**0.006***
Kafr AL sheikh	59.03 ± 12.29		
Dakahlia	66.67		
Level of independency			
Independent (13 – 20)	59.29 ± 12.55	F= 0.170	0.844
Partially dependent (8 – 12)	62.50 ± 15.59		
Dependent (0 – 7)	60.83 ± 15.20		
Presence of chronic diseases			
No	61.65 ± 13.86	t=1.421	0.159
Yes	57.62 ± 11.41		
Body mass index (BMI) (kg\m2)			
Normal weight	57.74 ± 13.22	F=1.145	0.256
Abnormal weight	61.02 ± 12.31		
Use of mobility aids			
No	57.76±12.03	**t=2.126***	**0.037***
Yes	64.39±13.59		
G-Number of side effects			
Up to 5	53.06 ± 10.50	**F= 3.030***	**0.055***
6 - 10	61.11 ± 12.27		
More than 10	63.43 ± 13.63		

t: Student t-test **F: F** for ANOVA test ***:** Statistically significant at $p \leq 0.05$

p: p value for association between different categories **M ±SD%:** Percent score of mean and stander deviation

Table XIII: Relation between family caregivers socio-demographic characteristics& health history and their burden.

Socio-demographic characteristics& health history	Family caregivers' burden M± SD%.	Test of Sig.	P
Age			
<60	61.05±12.56	**t=2.679***	**0.009***
60+	50.38±10.11		

Socio-demographic characteristics& health history	Family caregivers' burden M± SD%.	Test of Sig.	P
Sex			
Female	57.97 ± 11.16	t=1.600	0.120
Male	63.83 ±15.72		
Marital status			
Married	60.60 ± 12.23		
Not married (single\widow\divorced)	53.82 ±14.59	t=1.721	0.089
Level education			
Educated	59.69 ± 12.83	t=0.097	0.923
Un educated	59.41 ± 12.82		
Occupation			
House wives	56.0 ± 8.69		
Skilled workers	70.83±16.19		
Not work	53.79 ± 11.70	**F=6.373***	**0.001***
Employee	69.79 ± 11.08		
Unskilled workers	58.85 ± 14.34		
Monthly income			
Not enough	61.20 ± 11.57	t=1.396	0.167
Enough	57.16 ± 14.17		
Responsible person for patient caregiving			
First degree family members	61.36 ± 13.55	**t=2.114***	**0.039***
Second degree	55.67 ± 9.91		
Availability of supportive person(psychologically)			
Yes	63.13 ± 13.22	**t=2.133***	**0.036***
No	57.09 ± 11.91		
Having children			
No	54.92 ± 17.95	t=0.966	0.354
Yes	60.33 ± 11.71		
No of children			
1-	63.12 ± 11.65	t=1.795	0.076
3+	57.78 ± 13.00		
Children age			
1-	50.0		
3-	62.04±10.71	**F=2.596***	**0.045***
6-	63.48±11.74		
12-	66.32±11.98		
18+	55.97±10.70		
Type of present chronic diseases			
Cardiovascular diseases	54.43 ± 9.80		
Endocrine diseases	56.60 ± 7.84		
Musculoskeletal diseases	61.11 ± 10.42	**F=2.768***	**0.023***
Gastro intestinal system diseases	66.67 ± 8.33		
Nervous system diseases	53.13 ± 8.59		
Respiratory system diseases	70.83 ± 0.0		
Renal diseases	41.67		

t: Student t-test **F: F** for ANOVA test ***:** Statistically significant at $p \leq 0.05$

p: p value for association between different categories **M ±SD%:** Percent score of mean and stander deviation

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Table XIV: Relation between circumstances of caregiving process as reported by family caregivers and their burden.

Caregiving process circumstances	Family caregivers' burden M ±SD%.	Test of Sig.	P
Caregiving timing			
-Caring for 24 hours	57.38 ± 12.49	**F=3.128***	**0.049***
-During the day only	61.78 ± 12.50		
-At night only	73.61 ± 8.67		
Duration of caregiving			
Less than 1year (n=65)	60.26 ± 12.67	t=0.983	0.328
1+ (n=15)	56.67 ± 13.06		
Type of transportation used to go to hospital:			
Public transportation			
Private transportation	58.69 ± 12.35	t = 1.015	0.313
	61.93 ± 13.75		
Number of public transportation used (n=58)			
1-	61.62 ± 11.73	**t=2.135***	**0.037***
3+	54.83 ± 12.31		
Time from home to hospital in hours (n=80)			
1+	59.39 ± 12.40	t=0.305	0.761
3+	60.58 ± 14.89		
Availability of required resources			
Yes	61.18 ± 13.32	**t=2.325***	**0.025***
No	54.79 ± 9.59		
Availability of help in care providing			
Yes	60.58 ± 12.69		
No	57.92 ± 12.87	t=0.905	0.368
Difficulties in dealing with chemotherapy related side effects			
Yes	60.96 ± 11.85	t = 1.540	0.128
No	56.16± 14.43		
Presence of social visits			
No	56.50 ± 12.68	t =1.470	0.146
Yes	60.98 ± 12.64		

t: Student t-test **F: F** for ANOVA test ***:** Statistically significant at $p \leq 0.05$

p: p value for association between different categories

M ±SD%: Percent score of mean and stander deviation

Table XV: Predictors of family caregivers burden of geriatric patients with cancer receiving chemotherapy.

Family caregivers' burden	Univariate		#Multivariate	
	B(95%C.I)	p	B (95%C.I)	p
Current work status	-9.198 (-19.084– 0.689)	0.068		
Place of residence (Governorate)	3.120 (-0.423– 6.663)	0.084		
Use of mobility aids	6.635 (0.420– 12.850)	0.037*	8.511 (-6.215– 23.237)	0.219
Number of side effects	5.683 (0.712– 10.654)	0.026*	-6.267 (-18.628– 6.094)	0.276
Age	-10.67(-18.60– -2.74)	0.009*	7.783(-22.264– 37.830)	0.567
Occupation	3.500 (1.239– 5.761)	0.003*	7.573 (-0.601–15.747)	0.065

Responsible person for patient caregiving	-6.424(-12.41– -0.439)	0.036*	3.813 (-8.117– 15.743)	0.482
Availability of supportive person(psychologically)	-6.039(-11.68– -0.403)	0.036*	-11.998 (-26.787– 2.79)	0.098
Children age	-0.362 (-0.624– -0.099)	0.008*	-0.732 (-1.223– -0.240)	0.009*
Type of present chronic diseases				
Cardiovascular diseases	-6.453 (-13.506– 0.601)	0.072		
Endocrine diseases	-1.926 (-9.651– 5.800)	0.615		
Musculoskeletal diseases	4.444 (-3.804– 12.693)	0.281		
Gastro intestinal system diseases	10.345 (0.564– 20.126)	0.039*	6.154(-11.379– 23.687)	0.442
Nervous system diseases	-5.347 (-16.690– 5.995)	0.344		
Respiratory system diseases	13.80 (-1.147– 28.75)	0.069		
Renal diseases	-16.67(-37.769 – 4.44)	0.117		
Caregiving timing	-2.339 (-5.291 – 0.612)	0.119		
Number of public transportation used	-6.783 (-13.15– -0.420)	0.037*	-6.784(-20.750 – 7.181)	0.295
Availability of required resources	-7.22 (-13.61 – 0-.835)	0.027*	10.561(-2.56 – 23.686)	0.101

R^2=0.774

Beta: Standardized Coefficients

C.I: Confidence interval

#: All variables with p<0.05 was included in the multivariate

*: Statistically significant at $p \leq 0.05$

IV. DISCUSSION

Worldwide, the increase in cancer cases is largely attributed to the fact that people live longer.[19] Aging is associated with increased exposure to carcinogenic factors for long period which result in the accumulation of genetic changes, which in turn result in generation of tumor. Therefore, age is the main risk factor for cancer.[20]

Chemotherapy is one of the most common treatment options of cancer in elderly. It is administered in outpatient clinics due to either increase in number of cancer cases or its easy administration which does not need hospitalization.[21] This usually interrupts not only the geriatric patients but also his family members' daily living pattern which may increase their burden in meeting their daily needs.[22] So, this study aims to identify factors associated with family caregivers burden of geriatric patients with cancer and receiving chemotherapy.

The present study results reveal that, all family caregivers of geriatric patients with cancer and receiving chemotherapy suffer from burden. More than two thirds of them reported high level of burden, and the rest had low level (table 11). This finding is in the same line with the findings of a study carried out in America which revealed that more than three quarters of family caregivers reported some levels of burden and only15% reported high level of burden.[17]

Among the factors associated with family caregivers burden, are factors related to geriatric patients, factors related to family caregivers and factors related to the caregiving process.

Age of geriatric patient has an impact on the level of burden of family caregivers. The present study reveals that, family caregivers whose age is less than 70 years reported higher level of burden than whose aged 70 years and more (Table 15). This may be because the majority (96.25%) of the study geriatric patients were less than 70 years old. The present study finding contradicts those conducted in Iran, where a positive relation exists between the advanced age of geriatric patients and burden of family caregivers.[23]

A statistically significant relation is observed between the current work status of the geriatric patients with cancer and receiving chemotherapy and their family caregivers burden (Table XII), where lower level of burden is observed among family caregivers of geriatric patients who are still working. This may be due to that, current workers are not totally dependent on their caregivers and can perform ADLs and assume different responsibilities in their care which help to alleviate caregivers of some of their duties and consequent decrease their burden. This in turn will improve the family financial status which is considered a significant factor associated with family caregivers burden. So, presence of financial support important in decreasing family caregivers burden. The same was reported by Lai, 2012.[24]

The distance between the geriatric patients home and hospital affect family caregivers burden. Where, higher level of burden was reported by family caregivers residing outside Alexandria governorate. This is because they need to take more than one transportation to reach the hospital (Table XII). This results in both financial and physical burden on the patient and his caregiver. The results of the present study support those of the study conducted by Billi eta l., (2007)[25] which revealed a positive correlation between long distance from hospital and caregivers burden.

A positive correlation is observed between the patient use of mobility aids and caregivers burden. Higher level of burden is observed among caregivers whose geriatric patients use mobility aids (Table XII). This is because these patients may need help in performing ADLS or IADLS which increase the level of burden among family caregivers. These results contradicts those of another study conducted in Canada which reported that, the use of assistive devices play an important role in decreasing family caregivers burden.[26] This is because mobility aids promote level of patient independency and reduce family caregivers time and energy in assisting or caring for the geriatric patients.

According to the present study results, family caregivers of geriatric patient with abnormal weight reported higher level of burden than those with normal weight (Table XII). Overweight or obese geriatric patients with cancer is considered an important determinant of family caregivers burden. This put additional burden in providing personal hygiene, ADLs, and mobility.[27]

The type of cancer affects the family caregivers burden. Family caregivers of geriatric patients with gastrointestinal particularly stomach and colo-rectal cancer and musculoskeletal cancers reported higher level of burden than those with other types of cancer (Table XII). These patients may require special care which increases the level of burden among family caregivers. The results support those of the study conducted in Thailand which stated that, stomach cancer, colon cancer and sarcoma are considered the most common types of cancer linked to greater level of family caregivers' burden.[28]

A statistically significant relation exists between number of side effects experienced by geriatric patients with cancer and receiving chemotherapy and their family caregivers burden. According to the present study finding, geriatric patients who experience more than 10 side effects reported the highest level of burden (Table XII). The main side effects experienced by these geriatric patients are fatigue, GIT side effects mainly anorexia, vomiting and pain. Also, Chemotherapy may affect taste buds causing low hungry sensation which in turn decrease amount of food intake. This put additional pressure on caregivers in order to deal with such side effects beside the routine care needed. These results support those of the study conducted by Chun, 2018[29] which revealed that fatigue, pain, nausea and vomiting are the most common side effects experienced by geriatric patients receiving chemotherapy and increasing their level of dependency on family caregivers and in turn increasing their level of burden.

The results of the present study reveal that, the age of the study family caregivers affected significantly the level of their burden. Where, younger family caregivers reported higher level of burden than older adults (Table XIII). This may be due to the fact that some of the younger family caregivers are married, have young children, and are still working which put additional responsibilities on them and in turn increase the level of burden. While, older family caregivers who reported low level of burden, may be because of the experience, wisdom and coping with long term care of geriatric patient with cancer. Also, they may be emotionally involved in the care and are sympathizing with the patient condition. Moreover, their children are grown up and are able to take care for themselves and may help in the care of the geriatric patients. The finding of the present study supports those reported in a study carried out in America where older family caregivers reported lower level of burden than younger ones.[17]

The family caregiver sex related significantly to the level of burden, where males showed higher level of burden than females(Table XIII). This can be justified by the fact that, males are mainly responsible for providing financial needs to their family. This may affect their career job leading them to decrease hours of work or assume part time jobs or even ask for early retirement. This will affect their financial status and will decrease their ability to meet financial needs of the patient which increase their burden. While females being housewives are responsible for household activities, child rearing, caring for family members either well or sick. This usually increases their ability to provide care and decrease their burden. The finding of the present study contradicts those of the study done in Vietnam which revealed that females reported higher level of burden than males.[30]

Marital status is considered one of the most important factors affecting the level of burden among family caregivers. The current study results reveal that, married family caregivers reported higher level of burden than those who aren't (Table XIII). This may be due to increased responsibilities toward their family members beside caring for their geriatric patients which puts additional stress and burden in order to provide the required care. This may be also aggravated if they work outside the home. These results contradicts those of another study conducted in Thailand where, the highest level of burden was documented among single family caregivers.[28]

Higher level of burden is reported among family caregivers who have children in the adolescence period (Table XIII). This may be because adolescents experience a variety of biological and emotional changes due to hormonal changes which may lead to many psychosocial problems that necessitate presence of family member for support, guide and protect them. So, adolescence called a "problem age".[31] The number of children is an important determinants of family caregivers burden where, family caregivers with three and more children reported lower level of burden than those who have less than three children (Table XIII). This may be due to the fact that the presence of children may help in caregiving in responsibilities which may decrease the caregivers' burden. The same was supported by Nguyen & Ta Ngoc Dan, 2015[30] and Austin, 2020. [32]

Occupation affected significantly the family caregivers' burden (Table XIII), where higher level of burden is seen among skilled workers and employees. This may be due to their inability to maintain a balance between work status and caregiving responsibilities. The results of the present study contradicts those of Sanuade & Boatemaa, 2015[33] which revealed that, employed caregivers reported lower level of burden than unemployed family caregivers.

Also, a statistical significant relation is found between the relationship of family caregivers with the geriatric patients where first degree members such as husband or wife, children reported high level of burden than second degree family caregivers (Table XIII).This may be due to the strong bond and intimate relation between both caregivers and the geriatric patient which increase their social and emotional tie which may increase their worry about loosing their patients and this in turn will lead to high level of burden.

Family caregivers in the present study who suffer from chronic diseases reported high levels of burden than healthy caregivers (Table XIII). These results support those conducted by Chindaprasirt et al., 2014 [28] and Nguyen & Ta Ngoc Dan, 2015[30] which revealed that family caregivers who have chronic diseases reported higher level of burden than those who haven't. Moreover, family caregivers who suffer from respiratory system diseases especially bronchial asthma reported higher level of burden than those with other chronic diseases. This is because the decrease in the amount of oxygen affects negatively their abilities to meeting of needs of their geriatric patients. The same was reported by Curie, 2019. [34]

Regarding to the ability of family caregivers to deal with chemotherapy related side effects experienced by geriatric patients, the present study results show that family caregivers who have difficulties in dealing with chemotherapy side effects reported the highest level of burden (Table XIV). This may be due to that family caregivers may be unprepared to manage these side effects which usually increase their level of burden.

The present study reveal that, family caregivers caring for geriatric patients at night reported the highest level of burden (Table XIV), this may be due to caregiver stress, disturbed sleep and fatigue. The results of the present study support those reported by Arber and Venn, 2011[35] which revealed that, night caregiving negatively impacted on family caregivers physically and psychologically.

Regarding to the availability of required resources for caregiving, although majority of the study family caregivers reported availability of required resources yet, they reported higher level of burden (Table XIV). This show that lack of resources is not the main cause of family caregivers burden, but their increased responsibilities both inside and outside home, their suffering from chronic diseases, and the specific health needs required by geriatric patients with cancer and receiving chemotherapy may be the cause.

V. CONCLUSION

Based on the results of the present study, it can be concluded that burden is a high complain among family caregivers of geriatric patients with cancer and receiving chemotherapy. Multiple factors lead to this burden. These include either factors related to geriatric patients such as current work of the geriatric patients, place of residence, transportation from home to hospital, use of mobility aids and number of side effects resulting from chemotherapy, or family caregivers factors such as age, presence of chronic diseases, and available someone for support. Also, the work of the caregiver particularly outside home, or caregiving process which include night care and availability of required resources for caregiving process.

VI. RECOMMENDATIONS

Based on the results of this study, the following recommendations are suggested:

1- Comprehensive assessment of family caregivers of geriatric patients with cancer and receiving chemotherapy in order to identify early those at risk to develop burden and implement appropriate interventions to overcome and prevent further complains and suffering. This can be achieved through teaching and guiding family caregivers about available community resources for help such as respite care, and support services such as adult day care, home health care and home-delivered meals and support groups.

2- Comprehensive assessment of the knowledge of family caregivers about cancer and its treatment in order to identify lack of knowledge. This will help to institute appropriate nursing intervention to provide them with up to date knowledge to help them to deal efficiently with the different aspects of care. This in turn will help to decrease caregivers' burden.

3- Develop continuing educational programs using pictures, educational posters and brochures for family caregivers about cancer and its treatment especially chemotherapy and how to manage its side effects.

4- Gerontological nurses should help family caregivers to cope with burden. This can be achieved through emphasizing the importance recreation, social and emotional support.

The further researches in this field could be:

1- Effect of nursing educational program about the management of chemotherapy side effects of geriatric patients with cancer receiving chemotherapy on family caregivers burden.

2- Effect of nursing interventions on the level of burden among family caregivers of geriatric patients with cancer and receiving chemotherapy.

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