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## Assessment of Medication Burden and knowledge Regarding polypharmacy among elderly Patients at Sohag University Hospital

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### Abstract

**Background:** Polypharmacy is the use of multiple medications, and it is common among elderly because of chronic diseases resulting in medication burden. **Aim:** to assess elderly patient's medication burden and their level of knowledge regarding Polypharmacy. **Design:** A descriptive research design was used. **Setting:** The study carried out at outpatients' clinics of Sohag university hospital that included (urology clinic, heart and chest clinic, internal medical clinic, neurology clinic and orthopedic clinic). **Sample:** Quota sample was used in this study, **Tools:** three tools were used: **Tool I:** Interview questionnaire form included demographic and medical data, **Tool II:** Geriatric patient's knowledge questionnaire about poly pharmacy, and **Tool III:** Living with Medicines Questionnaire version 3. **Results:** The results revealed that 54.3% of the studied elderly patients were < 70 years, majority of sample were taking from 5-9 medications per day, about two thirds of them had poor knowledge regarding polypharmacy, highly statistical significant p value (p=0.000\*) between knowledge score about polypharmacy and living with medications score. **Conclusion:** Elderly patients level of knowledge regarding polypharmacy and their medications were poor. In addition to, there was negative correlation and highly statistical significant between knowledge about polypharmacy, and medication burden. **Recommendation:** Designing health education programs for elderly and their families to increase knowledge regarding polypharmacy and alleviate their medication burden.

**Key words:** Geriatric patients, knowledge Medication burden & polypharmacy.

### Introduction

Since aging is a critical period in human life, society must comprehend the issues, needs, and diseases related to it (Kalstad and others, 2021). The World Health Organization (WHO) defines an elderly person as someone who is 65 years of age or older. Many elderly people live in developing countries, and as healthcare and treatment technologies advance, the global elderly population is increasing; this phenomenon is referred to as the "demographic revolution." (Rajati and others, 2023). The World Health Organization predicts that by 2020, there will be 727 million older people worldwide, and by 2050, there will probably be over 1.5 billion (Michel and others, 2021).

According to the Central Agency for Public Mobilization and Statistics' most recent census, 6.9 million Egyptians are above 60 years of age, making about 6.6% of the country's overall population (Central Agency for Public Mobilization., 2023)

Despite the fact that aging is not a sickness, research has shown that over 80% of the elderly have one or more disorders or diseases that affect their physical, psychological, social, and economic well-being (Kalstad et al., 2021). The rise in the senior

population is linked to a rise in illness prevalence and reliance on daily activities (Rabati et al., 2023). Polypharmacy could be a developing open wellbeing issue which is influencing hoards around the world. This rising open wellbeing issue is characterized as the schedule utilize of five or more drugs by an person understanding. Numerous analysts believe that the predominance of polypharmacy is aiming to keep expanding since more individuals are being analyzed with constant illnesses (Dovjak., 2022). The incidence of polypharmacy among the elderly is steadily rising, which could lead to unfavorable outcomes such possible interactions between drugs and diseases. Patient safety is still greatly hampered by these adverse effects, which have a major effect on death and incidence rates (Chen et al.,2021). The concurrent use of several medications, such as over-the-counter, prescription, and nutritional supplements, is known as polypharmacy. It is well recognized that polypharmacy lowers quality of life and raises the risk of adverse drug responses, drug-drug interactions, and dosage errors (Novak et al., 2022).

The factors associated with the patient (socio-demographic parameters like age, sex, income, place of residence, ethnicity, and behavior), the disease

(specific diseases like cardiovascular or metabolic disease, multiple comorbidity status), the healthcare system, or the doctor were among the factors that determined polypharmacy ( Guillot et al., 2020).

The definition of the burden of medication was given as learning to live with the challenges of taking numerous prescriptions, with the inconvenience and disputes that come with them, and coming up with coping strategies for issues relating to routines. Elderly people have a larger burden of illness for which prescription prescriptions are issued, in addition to having a higher risk of adverse drug responses. Reduced functional capacity, which is associated with a marked decline in the ability to perform instrumental activities of daily life, as well as impaired physical functioning, adds to the burden of utilizing numerous medications (Alqallaf et al., 2022).

The physiological decline associated with aging affects all of the body's tissues, cells, and organs (Soto-Perez-de-Celis and associates, 2018) As a result, this influences how well the body processes and absorbs medications. Consequently, a medication's mechanism of action in an elderly patient may be different from that of a younger patient. As an illustration, the liver's capacity can decrease by 70% in the aged, which has an impact on the body's ability to digest drugs. Furthermore, renal function deteriorates with age, impacting the body's capacity to excrete drugs( Drenth-van Maanen and associates, 2020).

Accompanying an increase in renal disorders that impair renal function is an age-related decrease in renal mass, blood flow, tubular secretion/reabsorption, and estimated glomerular filtration rate (eGFR). The likelihood of adverse drug reactions (ADRs) is increased when drugs that are cleared by the renal system are less cleared (Juan et al., 2022).

Because of the risks and burden that polypharmacy and PIMs pose to patients and the health care system, it is incumbent on health care providers to use patient-centered approaches to optimize patient function and quality of life, reducing polypharmacy and the use of PIMs when possible. Nurses have the opportunity to empower patients via knowledge and supportive interventions to use prescribed and over-the-counter agents appropriately ( Kim& Parish., 2021).

Nurses play an important role in helping to identify people with polypharmacy and facilitating risk reduction. An integrative review identified three features regarding the role of nurses during medication management of transitional care: (1) implementation of medication reconciliation, (2) collaborating with other health care professionals,

and (3) supporting health care recipients ( Cheng et al., 2023).

### Significance of study

Polypharmacy in the elderly is a global problem that has recently worsened (Gutierrez-Valencia, et al., 2018). Older adults most significantly affected by polypharmacy due to impaired hepatic and renal clearance of drugs(Sharma 2019).

Older persons are prone to polypharmacy. Among patients 65 years of age or older, over 30% were taking five or more medications, and when over-the-counter (OTC) medications were taken into account, the number rose to 53.6% (Aljawadi et al., 2022).

Several research works have assessed the frequency of multiple drug usage in the elderly population. In developed nations, the range was between (39%) and (45%). According to an Egyptian survey, it was 85.3% in Benha and 56% in rural communities.. (Eltaher & Araby 2019).

### Aim of study

The current study aimed to assess elderly patient's medication burden and their level of knowledge regarding Polypharmacy.

### Research questions:

In order to address the study purpose, the following study question was formulated:

1. What is the level of geriatric patient's knowledge regarding polypharmacy phenomena?
2. What is the medication burden of geriatric patients?
3. Is There a relation between the studied geriatric patient's level of knowledge about polypharmacy and socio-demographic data ?

### Subjects and method

#### Research design

Descriptive research design was used in this study.

#### Setting

The study carried out at outpatients clinics of Sohag university hospital where located in the urban setting of the small city of Nasser City, that included (urology clinic, heart and chest clinic, internal medical clinic, neurology clinic and orthopedic clinic); there is one to two physicians and one nurse at each outpatients clinic and high flow rate from elderly patients to this clinics with acceptable price compared with private outpatients clinics or hospitals.

**Study subjects**

The geriatric patients aged 60 years and more attending the previous mentioned setting.

**Inclusion criteria**

- 1) The elderly patients are 60 years and above.
- 2) the elderly patients with chronic diseases.
- 3) Able to communicate and agree to participate in the study.
- 4) The elderly patients not have any cognitive impairment or psychiatric disorders.

**Exclusion criteria**

- 1) The patients are under 60 years.
- 3) the patients are not able to communicate and are not agree to participate in the study.
- 4) The elderly patients have cognitive impairment or psychiatric disorders.

**Sample size**

Quota sample was used and the sample size was calculated using the EPI info 2000 statistical package. The calculation was done using the expected frequency of good knowledge from previous studies using 95% confidence interval, 80% power of the study, 84.2% good knowledge and worst acceptable result 5%. The sample size calculated according to the above criteria was 204 participants which increased to 245 by adding 20% to safeguard against non- response and dropout.

**Tools of the study**

**It included three tools : Tool( I ):interview questionnaire: to assess personal data and medical history of geriatric patients: It consist of two parts:**

**Part(1): personal data** of geriatric patients it consist of 6 items such as: (age, sex, marital status, level of education, residence , the caregiver).

**part(2): Medical history which included:** (presence of chronic disease, number of medication, use of Over-the-counter medicine" OTC").

**Tool(II):Questionnaire of geriatric patient's polypharmacy knowledge :( Appendix III)**

It was developed by researcher after review literatures to assess knowledge about polypharmacy phenomena among geriatric patients The questionnaire contained a total of eight items includ (definition , causes, risk factors, effects, complications, side effects, prevention and perceived general health status) with multiple choice questions, the patients were asked to choose one or more correct answer. The elderly patient was given one degree if he choose correct answer and given zero

degree if the patient choose "I don't know" with total scores 43grades

**scoring system of the questionnaire :**

which includes 7 questions each question has multiple choice questions choices grade 1 for each choice and zero for incorrect and don't know.

- **Poor level of knowledge:** <50% ( < 22degree\scores)
- **Faire knowledge level:** 50%-<60% (22- 26 degree\scores)
- **Good knowledge level:** 60%- 100% ( 27-44 degree\scores).

**Tool(III): Living with Medicines Questionnaire version 3 (LMQ-3) it was developed by (Katusiime et al., 2018) :** To measure the medication burden of long-term use of multiple medication conceptualized as medicine burden, The instrument consists of 41 statements accompanied by eight domains were identified through factor analysis, relating to: perceptions about effectiveness, concerns about medicine use, patient-provider relationships and communication about medicines, practical difficulties, interferences to daily life, autonomy/control over medicine, side effects, and cost related burden, all areas which have been cited by users of long-term medicines as burdensome.

**Scoring system:**

The scale has 5-point Likert-type scoring system ranging from one to five starting from strongly agree to strongly disagree for some statements(from 1=strongly agree to 5= strongly disagree) and starting from strongly disagree to strongly agree for some statements (from 1=strongly disagree to 5= strongly agree). **Categorized into:**

- **Low burden** = <50% ( 41-<103 scores),
- **Moderate burden**= 50%<70% (103-143 scores),
- **High burden**= 70%-100% (144-205 scores).

**Validity of tools**

Study tools (I, II, III) were tested for content validity by a jury of five experts in the fields of Gerontological Nursing (no recommend modifications)

**Reliability of tools**

Tool II and III (questionnaire of geriatric patient's polypharmacy knowledge and Living with medications Questionnaire ) was translated by the researcher into Arabic language. The reliability of tool (II,III) were assured by means of **Cronbach's Alpha** (Cronbach's coefficient alpha is one of the most frequently used ways of estimating internal consistency of reliability) ( $\alpha$ ) = 0.851, ( $\alpha$ ) = 0.867, respectively that demonstrating acceptable result.

### Administrative phase

An official letter of approval was obtained from the Dean of the faculty of nursing at Sohag University to the director of Sohag University Hospital. This letter included permission to carry out the study and explained the purpose and the nature of the study.

### Pilot study

The pilot study was carried out before starting data collection on 10% of the sample who included in the study to examine the clarity of questions and time needed to complete the study tools. Based on the results, no modifications were done so the pilot study sample were included in the total sample of the study.

### Ethical considerations

Ethical approval was taken from the Research Ethics Committee of the Faculty of Nursing – Assuit University. Geriatric patient's verbal consent to participate in the study obtained after an explanation of the aim, nature, benefits and risks. Privacy of the study subjects and confidentiality of the collected data was assured and were only used for the study. Each older adult patient was assured that the participation is voluntary, and they have the right to withdraw from the study without any consequences or penalty.

### Field of work

- Data were collected in six months from the beginning of March to the end of August 2023.
  - Before meeting the geriatric patients, the investigator met the staff of outpatients' clinics, introduce herself and explaining the purpose of the study. The investigator introduces the agreement letters of the director of hospital, asking of their permission for data collection in the clinics. Also she asked for support from nurses as well as the agreement with elderly patients.
  - The investigator met the geriatric patients in the waiting hall of the outpatients clinics. Introduce herself and the purpose of the study the asked the geriatric patients to participate in the study after assuring the confidentiality of their data. The time was needed to fill the questionnaire (about 15 to 20 minutes) depending on their understanding and response.
- The investigator attended three days per week; (3 – 4) sheets were completed every day where the investigator met 4 patients per day for sheet completing.

### Statistical analysis

Data entry and data analysis were done using SPSS version 22 (Statistical Package for Social Science). Data were presented as number, percentage, mean, and standard deviation. Chi-square test was used to compare between qualitative variables. Pearson correlation was done to measure correlation between quantitative variables. P-value considered statistically significant when  $P < 0.05$ .

### Results

**Table (1):** Describes the distribution of older adults' patients according to their demographic characteristics. As regard age, it was found that the age of studied older adults was ranged from 61 to 93 years with Mean  $\pm$  SD  $70.30 \pm 6.71$ , (54.3%) patients aged less than 70 years, while (45.7%) of them were more than 70 years. In addition female more prevalent (54.7%) than males, more over (58%) of the studied older adults were married. regarding educational level, it was noticed that (62.4%) of them were illiterate

**Figure (1):** demonstrate the percentage of chronic diseases among studied geriatric patients, showed that, (92.7%, 72.7% and 65.3%) of studied geriatric patients were suffering from hypertension, Diabetes mellitus and Osteoarthritis respectively.

**Figure (2):** Demonstrate the percentage of polypharmacy categories among studied geriatric patients. It was noticed that, (6.5%) were taken equal or less than 4 medications per day, (84.1%) were taking from 5 to 9 medication per day, (9.4%) of them take more than 9 medications per day in the last six months.

**Table (2):** Shows number and percentage distribution of the studied geriatric patients knowledge level about polypharmacy, as regard causes of polypharmacy, the current study demonstrate that, (46.9%, 13.9%, 10.2%) of the studied geriatric patients stated that multiple diseases, Psychological and social contributions and Duplication of treatment as cause of polypharmacy respectively. Regarding risk factors of polypharmacy, it was noticed that (39.6%, 30.6%) of studied geriatric patients stated that get older and gender respectively considered as risk factors of polypharmacy. There were (61.6%, 28.6%) of the studied geriatric patients reported that using medications for treating their diseases cause desired therapeutic effects and economic effects as effects of polypharmacy respectively.

**Figure (3):** exhibits geriatric patients level of knowledge about polypharmacy phenomena; showed that, 63.3% of study subjects had poor level of knowledge about their medication, while 30.2% of

them had fair knowledge and only 6.5% had good knowledge.

**Table (3):** Illustrate relation between studied geriatric patients personal data and total level of knowledge about polypharmacy, it was showed that there was a statistical significance between level of studied geriatric patients knowledge and their education level (0.004\*)

**Table (4):** Revealed mean and standard deviation distribution of geriatric patients according to medication burden subscales, it was noticed that, Mean  $\pm$  SD : Interferences with day-to-day life of studied geriatric patients was (3.09  $\pm$  0.62), while Patient-doctor relationships and communication about medicines of studied geriatric patients was (2.73  $\pm$  0.70). Regarding lack of effectiveness of studied geriatric patients was (3.06  $\pm$  0.65). As regard to general concerns about medicines of studied geriatric patients was (3.78  $\pm$  0.65), also side effects of studied geriatric patients was (2.75  $\pm$  0.63). According to practical difficulties of studied

geriatric patients was (3.11  $\pm$  0.40), more over Cost-related burden of studied geriatric patients was (3.15  $\pm$  0.76) and Lack of autonomy/ control of medicine use of studied geriatric patients was (2.05  $\pm$  0.53).

**Figure (4):** The percentage of studied geriatric patients' medication burden level. This figure reveals total scores of the studied geriatric patients medication burden. Demonstrate that, (44.1%) of studied geriatric patients had moderate medications burden, (40.0%) of them had high medication burden and only (15.9%) of them had low medication burden.

**Figure (5):** clarifies that Correlation between living with medications score( medication burden) and knowledge score about polypharmacy; it was observed that there were negative correlation( $r=0.297$ ) and highly statistical significant p value ( $p=0.447^*$ ) between knowledge score about polypharmacy and living with medications score.

## Results

**Table (1): Distribution of the studied geriatric patient's demographic data (No=245)**

Personal data	No. (245)	%
<b>Age: (years)</b>		
< 70	133	54.3%
$\geq$ 70	112	45.7%
Mean $\pm$ SD (Range)	70.30 $\pm$ 6.71 (61.0-93.0)	
<b>Sex:</b>		
Male	111	45.3%
Female	134	54.7%
<b>Educational level:</b>		
Illiterate	153	62.4%
Literate	92	37.6%
<b>Marital status:</b>		
Single	4	1.6%
Married	142	58.0%
Widow	90	36.7%
Divorced	9	3.7%
<b>Residence:</b>		
Urban	101	41.2%
Rural	144	58.8%
<b>The caregiver of geriatric patients:</b>		
By himself	29	11.8%
Husband/ wife	95	38.8%
One of the sons	119	48.6%
Others (Daughter-in-law - brother's wife)	2	0.8%



Figure (1): demonstrate the percentage of chronic diseases among studied geriatric patients.

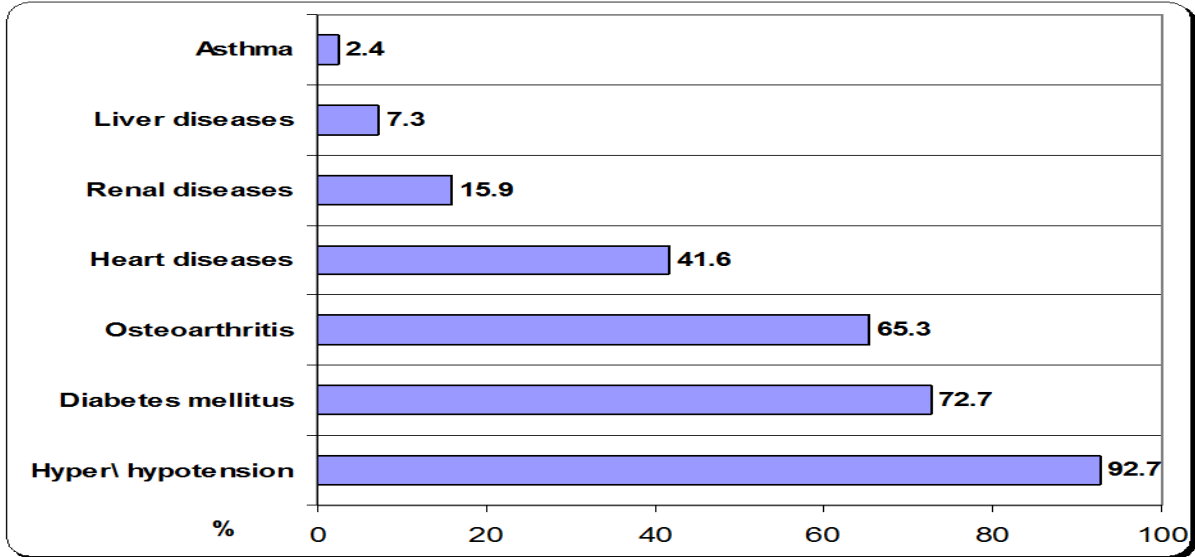
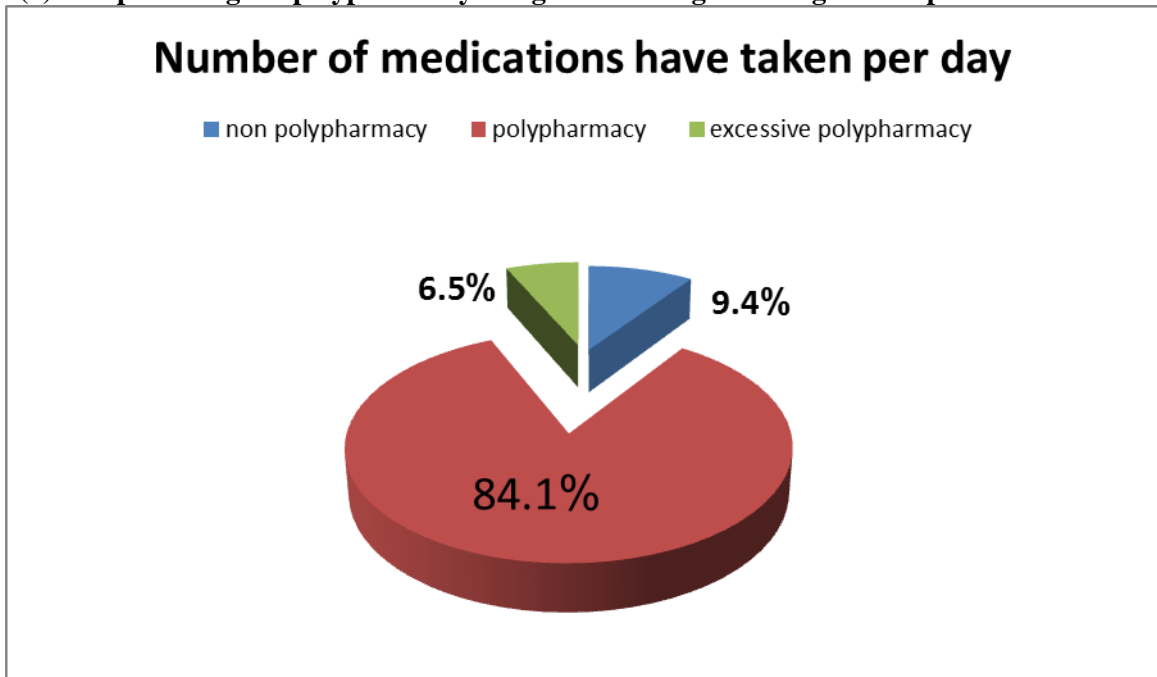


Figure (2): the percentage of polypharmacy categories among studied geriatric patients.



**Table (2): Number and percentage distribution of the studied geriatric patients Knowledge level about polypharmacy (N=245)**

<b>Knowledge about polypharmacy</b>	<b>No. (245)</b>	<b>%</b>
<b>Definition of polypharmacy:</b>		
Incorrect	197	72.2%
Correct	58	27.8%
<b>Causes of polypharmacy:(#)</b>		
Do not know	69	28.2%
Multiple diseases	115	46.9%
Multiple physicians	31	12.7%
Use of Over- The- Counter medicine "OTC"	14	5.7%
Side effects of medication	19	7.8%
Duplication of treatment	25	10.2%
Psychological and social contributions	34	13.9%
Lack of adherence to medication	20	8.2%
<b>Risk factors of polypharmacy:(#)</b>		
Do not know	83	33.9%
Get older	97	39.6%
Use of other medications and nutritional supplements	23	9.4%
Gender	75	30.6%
Inappropriate drug prescriptions	19	7.8%
<b>The effects of polypharmacy:(#)</b>		
Do not know	74	30.2%
Desired therapeutic effect	151	61.6%
Unwanted side effects	65	26.5%
Economic effects	70	28.6%

\*( #): more than one answer was allowed

Table ( 2 ): Cont.

<b>Knowledge about polypharmacy</b>	<b>No. (245)</b>	<b>%</b>
<b>the side effects that may occur due to the use of many medicines:(#)</b>		
Do not know	58	23.7%
The fall	27	11.0%
Delirium	16	6.5%
Gastrointestinal disorders (such as nausea, vomiting and diarrhea)	43	17.6%
Itching and rash	19	7.8%
Headache	21	8.6%
Feeling sleepy or tired	73	29.8%
Un wellness (a general feeling of illness or discomfort)	21	8.6%
Unexplained or mysterious muscle aches	13	5.3%
Changes in sleep patterns	18	7.3%
Visual disturbances	37	15.1%
Difficulty urinating	25	10.2%
Any perceptible change in mood or mental function	32	13.1%
<b>The complications that may result from polypharmacy:(#)</b>		
Do not know	73	29.8%
Memory problems	72	29.4%
Accidents and osteoporosis	38	15.5%
Renal failure	76	31.0%
Liver failure	45	18.4%
Hospitalization	22	9.0%
Arrhythmia	40	16.3%
Death	31	12.7%
Hypertension	19	7.8%
Deficiency of the body's immunity	22	9.0%

\*( #): more than one answer was allowed

Table ( 2 ): Cont.

<b>Knowledge about polypharmacy</b>	<b>No. (245)</b>	<b>%</b>
<b>The methods that must be followed to reduce the side effects of polypharmacy:(#)</b>		
Do not know	91	37.1%
Keep a list of medications	58	23.7%
must know how do you take medications	42	17.1%
Do not stop medication without the doctor's approval, even if it is a lot	41	16.7%
need to know what do you do with the occurrence of side effects or drug interactions	53	21.6%
Not taking medications based on personal, family or community recommendations	37	51.1%
Go to an educated pharmacist while dispensing or giving medicine	31	12.7%
<b>the general health status of people who use polypharmacy From your point of view, is?</b>		
Good	20	8.2%
Bad	225	91.8%



Figure (3): Total scores of studied geriatric patients knowledge level of polypharmacy.

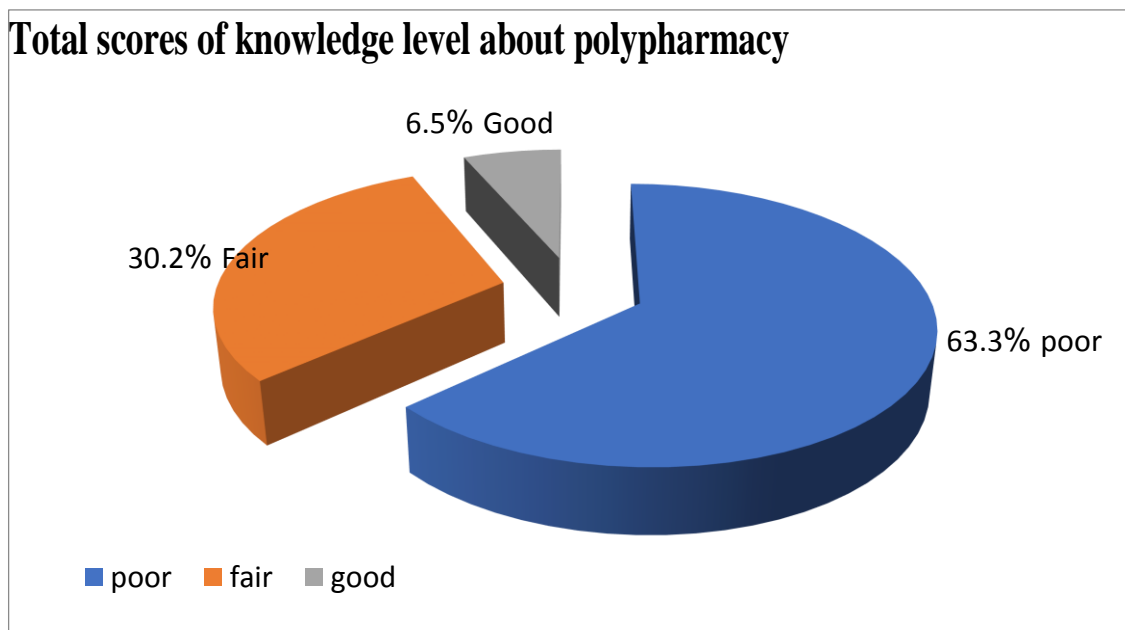


Table (3): Relation between studied geriatric patients personal data and total level of knowledge about polypharmacy (N=245)

Personal data	Knowledge level about polypharmacy						P-value
	Poor		Fair		Good		
	No.	%	No.	%	No.	%	
<b>Age: (years)</b>							
< 70	90	67.7	36	27.1	7	5.3	0.279
≥ 70	65	58.0	38	33.9	9	8.0	
<b>Sex:</b>							
Male	69	62.2	34	30.6	8	7.2	0.908
Female	86	64.2	40	29.9	8	6.0	
<b>Educational level:</b>							
Illiterate	107	69.9	41	26.8	5	3.3	0.004*
Literate	48	52.2	33	35.9	11	12.0	
<b>Marital status:</b>							
Married	95	66.9	40	28.2	7	4.9	0.287
Not married	60	58.3	34	33.0	9	8.7	
<b>Residence:</b>							
Urban	66	65.3	28	27.7	7	6.9	0.775
Rural	89	61.8	46	31.9	9	6.3	

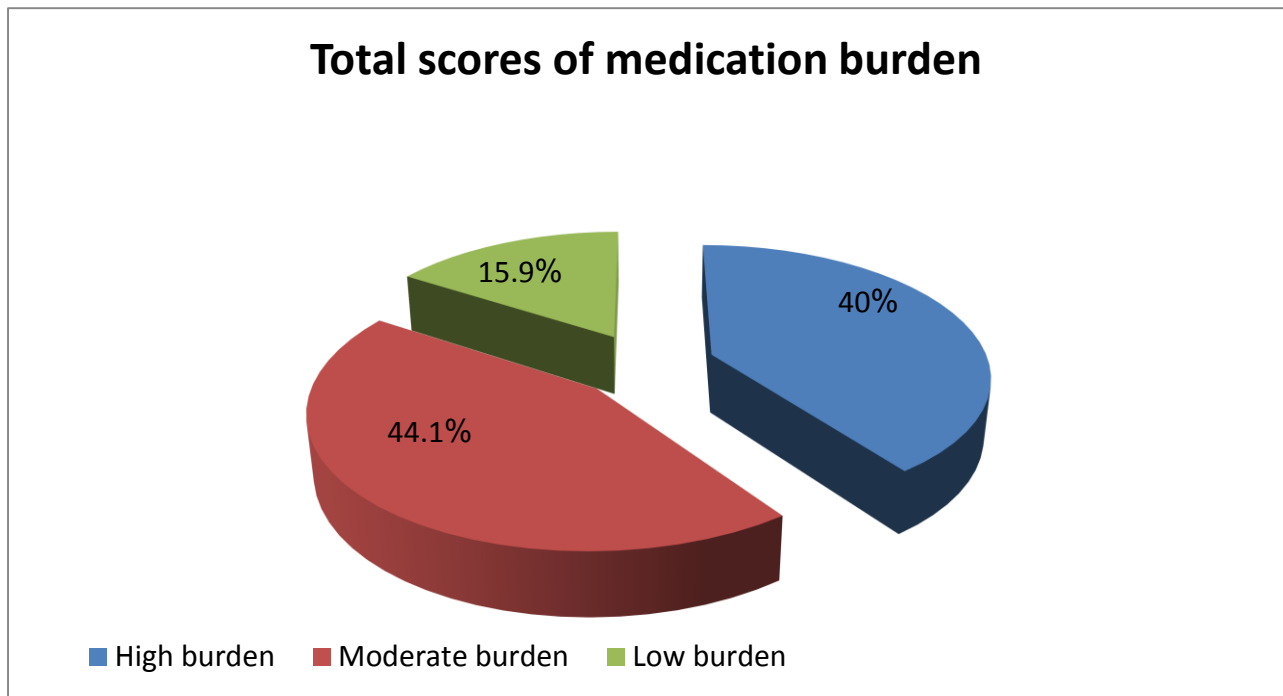
(\* ) there is a statistical significance difference ( P<0.005)

- chi-squire test

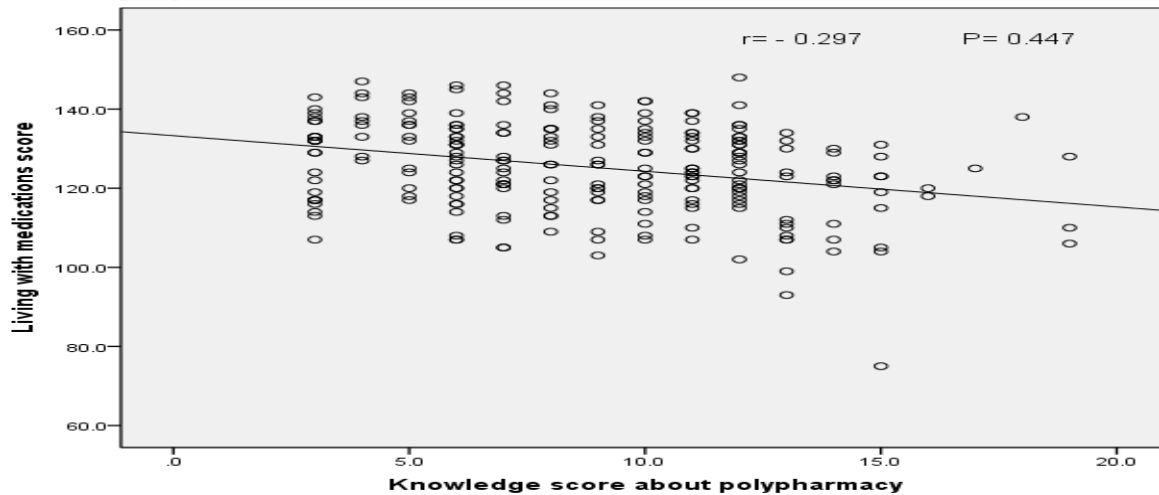
**Table (4): Mean and standard deviation distribution of studied geriatric patients regarding medication burden subscale (N=245)**

Domains of living with medicines questionnaire	Mean ± SD	Range
Interferences with day-to-day life	3.09 ± 0.62	1.3-5.0
Patient-doctor relationships and communication about medicines	2.73 ± 0.70	1.0-4.4
Lack of effectiveness	3.06 ± 0.65	1.0-4.3
General concerns about medicines	3.78 ± 0.65	2.0-5.0
Side effects	2.75 ± 0.63	1.0-5.0
Practical difficulties	3.11 ± 0.40	2.0-4.1
Cost-related burden	3.15 ± 0.76	1.0-5.0
Lack of autonomy/ control of medicine use	2.05 ± 0.53	1.0-4.0

**Figure (4): The percentage of studied geriatric patients medication burden level.**



**Figure (5): Correlation between living with medications score (medication burden) and knowledge score about polypharmacy.**



### Discussion

The older population experiences multimorbidity and chronic illnesses, which necessitate the use of more medications to address, increasing the burden of medication. (Mohamed et al., 2022 and Wastesson, et al.,(2019).

While medications are often necessary to manage acute and chronic health conditions, polypharmacy can be a significant problem related to prescribed medications. Polypharmacy refers to a situation where an individual uses multiple medications simultaneously. The World Health Organization (WHO) defines polypharmacy as “the administration of many drugs at the same time or the administration of an excessive number of drugs“ (Delara et al., 2022).

Poly-pharmacy can be clinically necessary for managing multiple conditions, in particular to treat symptoms or slow progression, yet there is a growing concern that many adults and older adults living with multi-morbidity are using an inappropriately high number of medications in which the intended benefit is exceeded by the cumulative harm (Nicholson et al., 2024).

the current study revealed that, the mean age of the studied geriatric patients was  $70.30 \pm 6.71$  years, with rang of (61.0-93.0). This study is in agreement with study done in Japan by Kojima et al., (2023) who studied "Association of disability level with polypharmacy and potentially inappropriate medication in community dwelling older people" they showed that, the frequency of multiple medication use increased with people aged  $\geq 65$  until 85–89 with mean age  $77.2 \pm 7.9$  years old.

The current study showed that the percentage of females was more than the percentage of males. This

result may be due to, females were suffering from multiple chronic diseases than males which increase number of medications Females were the most frequent visitors to the outpatient clinics of the University Hospital. This result agree with study done in Egypt by Metwaly& Aly., (2020) who studied Prevalence of Polypharmacy among Egyptian Patients with Type 2 Diabetes Mellitus, they founded that multiple medication use was higher in females than males also these finding agree with study done in Córdoba, Spain by Cebrino & Portero., (2023) who studied Polypharmacy and associated factors: a gender perspective in the elderly Spanish population they reported that, The prevalence of multiple medication use in women was higher (28.1%) than in men (17.2%) ( $p < 0.001$ ).

In relation to the sample distribution regarding the medical history of the subjects, the current study illustrated that, the majority of the studied geriatric patients suffer from hypertension, diabetes multiuse and Osteoarthritis respectively. This result is supported by a study done in India by Chaudhari& Chaudhary., (2022) who studied Association of Chronic Illness And Prevalence of Polypharmacy among Older Patients, they revealed that more than half of the studied geriatric patients suffering from hypertension.

The current study revealed that less common diseases was asthma. This result similar to study done in Egypt by Hassan et al., (2021) who studied Control Poly-Pharmacy: Elderly Patients’ Practices, reported that, the least reported diseases were respiratory problems Regarding number of medications the findings revealed that, the majority of studied geriatric patients took between 5-9 medications per day. This result may be due to older people may have been taking regular

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medicine for long period due to multiple diseases . Similar result reported by **Chaudhari& Chaudhary (2022)** who studied Association of Chronic Illness And Prevalence of Polypharmacy among Older Patients. and study done in Saudi Arab by **(Alshammari et al.,2021)** who studied patients' attitude towards deprescribing among elderly inpatients with polypharmacy at tertiary academic hospital, they showed that 66 % of participants took 5–8 regular medicines, and 34% took nine medicines or more.

In contrast study done in Singapore by **Tan et al., (2019)** who studied polypharmacy among community-dwelling elderly in Singapore: prevalence, risk factors and association with medication non-adherence, they showed that, weighted prevalence of polypharmacy among community dwelling elderly Singaporeans was 14.5% also lower incidences of polypharmacy were found in Nigerian study on Geriatrics (23.40%) by **Wuraola & Olufemi 2018)** who studied Polypharmacy and factors associated with their prevalence among older patients attending a geriatric centre in South-West Nigeria.

As regard to causes of polypharmacy the findings of the present study showed that, less than one third of studied geriatric patients did not know causes of polypharmacy this may be due to low level of education and limited health education programs about polypharmacy. This result is in the same line with study done in Italy by **Galazzi et al., (2016)** who studied Attitudes towards polypharmacy and medication withdrawal among older inpatients, they showed that older patients were less aware of the causes of polypharmacy, and study done in Netherlands by **(Bosch-Lenders et al.,2016)** who studied factors associated with appropriate knowledge of the indications for prescribed drugs among community-dwelling older patients with polypharmacy showed that only 15% of the patients could correctly recall the purpose of polypharmacy.

Concerning with risk factors of polypharmacy, the current study showed that, about two fifth of studied geriatric patients reported that getting older is from potential factors that can lead to polypharmacy. This result may contributed to the perception of relation between getting older and incidence of chronic diseases. This result is in agreement with study done in Canada by **(Delara et al., 2022)** who studied Prevalence and factors associated with polypharmacy: a systematic review and meta-analysis they showed that, older age were associated with a higher prevalence of polypharmacy. Additionally the current study revealed that, one thirds of studied geriatric patients did not know risk factors of polypharmacy. In contrast result done in Egypt by **Badr Elden et al., (2022)** who studied knowledge and practices used by

old age patients to control polypharmacy. they showed that, (23.7%) were aware of the Polypharmacy contributing factors.

Concerning side effects of polypharmacy less than fifth of studied geriatric patients reported side effects related to GIT this may be due to limited knowledge regarding polypharmacy. This study is in agreement with study done in Egypt by **Badr Elden et al., (2022)** showed that more than two-thirds were either partially or totally unaware of the GIT consequences. On the other hand the current study revealed that, less than one thirds of studied geriatric patients did not know any of side effects of polypharmacy. In contrast result done by **(Ali et al., 2023)**who studied Patient knowledge about prescribed medication in older adults. they showed that, Most patients, 85.38%, did not know the main side-effects that may resulting from polypharmacy.

Concerning with complications of polypharmacy, the present study showed that more than one quarter of studied geriatric patients reported memory problems as complication of polypharmacy, this due to long term use of multiple medications can lead to forget of taking medications. This result is in the same line with study done by **(Maher et al., 2014)** who studied clinical consequences of polypharmacy in elderly, showed that, 22% percent of patients taking 5 or less medications were found to have impaired cognition as opposed to 33% of patients taking 6-9 medications and 54% in patients taking 10 or more medications.

As regard with methods to control side effects of medications. The present study revealed that, less than one third of studied geriatric patients report need to know how to deal with side effects as method to control side effects of medications. This result may be due to elderly patients take more of non-prescribed medications for several causes as pain( headache, arthritis, back pain.....ect) and lack information provided by health care providers. This result is in agreement with result done in Thailand by **(Jiraporncharoen et al., 2020)** who studied Exploring perceptions, attitudes and beliefs of Thai patients with type 2 diabetes mellitus as they relate to medication adherence at an out-patient primary care clinic in Chiang Mai., they showed that, allaying fears of medication side effects, clear open discussions between patients and their physicians in the event of side effects is essential.

According level of knowledge regarding polypharmacy the present study revealed that, the most of participants had poor knowledge about polypharmacy. This result may be due to lower educational level and limited health education programs provided to older patients to gain more knowledge and information about polypharmacy. This result similar to study done in Egypt by **Badr Elden et**

al., (2022) who revealed that more than two-thirds of the study sample either had an incomplete understanding or even did not mean at all of the meaning of Polypharmacy. And study done by (Ali et al., 2023) who studied Patient knowledge about prescribed medication in older adults they showed that, knowledge about polypharmacy is poor among older adults

The present study showed that, there is statistical significance between level of studied geriatric patients knowledge about polypharmacy and their education level (0.004\*). This result is in agreement with study done by (Hassan et al., 2021) who studied Control Poly-Pharmacy: Elderly Patients' Practices, they showed that, knowledge about polypharmacy among the elderly is significantly affected by the level of education.

The long-term use of multiple medications for elderly patients diagnosed with chronic diseases, medication problems are prominent, which seriously reduces their quality of life. The burden of medications of patients critically affects their medication beliefs, behaviors and disease outcomes ( Wang ., 2021).

Concerning with domains of medication burden, the current study showed that, main domains that causing burden were side effect domain, concerns about medicine use and cost related burden. This result due to side effects that caused by medicines adversely affect well-being of patients, the patients need more information about their medicines and the patients have to pay more than they can afford for their medicines. This results in the same line with study done in by (Alqallaf et al., 2022) showed that, the main drivers of burden were: (i) concerns about medicine use (ii) side effect burden, and (iii) interference in day-to-day life.

Concerning the correlation between the elderly patient's level of knowledge about polypharmacy and living with medication( that determine medication burden level). The current study pointed that total level of knowledge about polypharmacy were negatively correlated with medication burden. This result can be due to the fact that elderly patients with low level of knowledge about polypharmacy resulting in high level of medication burden.

### Conclusion

Based on the results of the present study and answer of research hypothesis, it can be concluded that, knowledge of older adults about polypharmacy was poor. there is a statistical significant relation between educational level and knowledge level about polypharmacy. The majority of the studied older adults suffering from moderate to high medication burden. Finally there was negative correlation

between medication burden and knowledge level about polypharmacy.

### Recommendations

#### Recommendations related to patients:

- Continuous educational program for elderly patients with chronic diseases and take multiple medications should be applied periodically to improve knowledge of geriatric patients about polypharmacy and prescribed medications.

#### Recommendations related to health care services and researchers:

- Application of nursing guidelines should be initiated in wide health services to control polypharmacy among geriatric patients.
- More research should be done to determine what factors contribute to medication burden and management of medication burden.

### References

- 1- Ali, O., Mati, A., O'Reilly, A., Killeen, E., Stenson, C., Smith, W., & Martin, A., (2023): Patient knowledge about prescribed medication in older adults.
- 2- Aljawadi, M., Khoja, A., Alaboud, N., AlEnazi, M., Al-Shammari, S., Khoja, T., & Alwhaibi, M., (2022): Prevalence of Polypharmacy and Factors Associated with it Among Saudi Older Adults—Results from the Saudi National Survey for Elderly Health (SNSEH), *Saudi Pharmaceutical Journal*, Vol. 30 No. (3), PP. 230-236.
- 3- Alqallaf, S., M., Matar, L., Ghuloom, K., Alabbad, K., Alshaikh, F., & Alhaddad, M., (2022): Medication-related burden from the perspective of the elderly, *Medicine and Pharmacy Reports*, Vol. 95, No(3), PP. 320
- 4- Alshammari, S., Albarrak, R., Alajmi, A., Alsomali, N., Alaqil, A., & Alenezy, N., (2021): Patients' attitude towards deprescribing among elderly inpatients with polypharmacy at tertiary academic
- 5- Badr Elden, S., Hassan, H., & Hafez, S., (2022): Knowledge And Practices Used By Old Age Patients To Control Polypharmacy, *NILES journal for Geriatric and Gerontology*, Vol. 5, No. (1), Pp. 80-91.
- 6- Bosch-Lenders, D., Maessen, D., Stoffers, H., Knottnerus, J., Winkens, B., & van den Akker, M., (2016): Factors associated with appropriate knowledge of the indications for prescribed drugs among community-dwelling older patients with polypharmacy, *Age and ageing*, Vol. 45, No. (3), PP. 402-408).
- 7- Cebrino, J., & Portero de la Cruz, S., (2023): Polypharmacy and associated factors: a gender



- perspective in the elderly Spanish population (2011–2020), *Frontiers in Pharmacology*, Vol. 14, Pp. 1189644
- 8- **Central Agency for Public Mobilization and Statistic., (2023): Central Agency for Public Mobilization and Statistic Annual Report. Cairo:**  
[https://www.capmas.gov.eg/Admin/News/PressRelease/2022929134228\\_333.pdf](https://www.capmas.gov.eg/Admin/News/PressRelease/2022929134228_333.pdf) [Last accessed on 2023 Jan 22].)
  - 9- **Chaudhari, D., & Chaudhary, H., (2022):** Association Of Chronic Illness And Prevalence Of Polypharmacy Among Older Patients, *Journal of Pharmaceutical Negative Results*, Pp.10985-10989
  - 10- **Chen, C., Feng, Z., Fu, Q., Wang, J., Zheng, Z., Chen, H., & Feng, D., (2021):** Predictors of polypharmacy among elderly patients in china: the role of decision involvement, depression, and taking Chinese medicine behavior. *Frontiers in Pharmacology*, Vol. (12), Pp. 745688.
  - 11- **Cheng, C., Yu, H., & Wang, Q., (2023):** Nurses' Experiences Concerning Older Adults with Polypharmacy: A Meta-Synthesis of Qualitative Findings, In *Healthcare*, (Vol. 11, No. 3, p. 334). MDPI.
  - 12- **Delara, M., Murray, L., Jafari, B., Bahji, A., Goodarzi, Z., Kirkham, J., ... & Seitz, D., (2022):** Prevalence and factors associated with polypharmacy: a systematic review and meta-analysis, *BMC geriatrics*, Vol. 22, No. (1), Pp. 601
  - 13- **Dovjak, P., (2022):** Polypharmacy in elderly people, *Wiener Medizinische Wochenschrift*, Vol. (172), No. (5-6), PP. 109-113.
  - 14- **Drenth-van Maanen, A., Wilting, I., Jansen, P., (2020):** Prescribing medicines to older people – how to consider the impact of ageing on human organ and body functions, *British Journal of Clinical Pharmacology*, Vol. 86, Pp.1921-1930. Doi: 10.1111/bcp.14094.
  - 15- **Eltaher, S., & Araby, E., (2019):** Prevalence and factors associated with polypharmacy among elderly persons, *The Egyptian Journal of Community Medicine*, Vol. 37, No(3), Pp. 55-61.
  - 16- **Galazzi, A., Lusignani, M., Chiarelli, M., Mannucci, P., Franchi, C., Tettamanti, M., ... & Nobili, A., (2016):** Attitudes towards polypharmacy and medication withdrawal among older inpatients in Italy, *International journal of clinical pharmacy*, Vol. 38, Pp. 454-461.
  - 17- **Guillot, J., Maumus-Robert, S., & Bezin, J., (2020):** Polypharmacy: a general review of definitions, descriptions and determinants. *Therapies*, Vol. (75), No(5), Pp. 407-416.
  - 18- **Gutierrez Valencia M., Izquierdo M., Cesari M., Casas-Herrero A., Inzitari M.,and Martinez-Velilla N., ( 2018):** The relationship between frailty and polypharmacy in older people. a systematic review, *Br J Clin Pharmacol*, Vol. (84) , No(7), Pp. 1432–44.
  - 19- **Hassan, H., Badr Elden, S., Hamdi, S., & Aboudonya, M., (2021):** Control Poly-Pharmacy: Elderly Patients' Practices, *American Journal of Pharmacological Sciences*, Vol. 9, No. (2), Pp. 56-62.
  - 20- **iraporncharoen, W., Pinyopornpanish, K., Junjom, K., Dejkriengkraikul, N., Wisetborisut, A., Papachristou, I., ... & Angkurawaranon, C., (2020):** Exploring perceptions, attitudes and beliefs of Thai patients with type 2 diabetes mellitus as they relate to medication adherence at an out-patient primary care clinic in Chiang Mai, Thailand, *BMC family practice*, Vol. 21, Pp. 1-9.
  - 21- **Juan, T., Keld, P., Eva, D., Anne, G., Elisabetta, C., Dobromir, D., Gianluigi, S., Patrick, S., Giuseppe, R., Claudio, B., (2022):** Cardiovascular Pharmacotherapy, *European Heart Journal*, Vol. 8, No.(4), P.P. 406–419.
  - 22- **Kalstad, P., Myhre, K., Laake, S., Tveit, E., Schmidt, P., Smith, et al., (2021):** Effects of n-3 fatty acid supplements in elderly patients after myocardial infarction: a randomized, controlled trial *Circulation*, Vol. 143, No. (6), Pp. 528-539.
  - 23- **Kim, J., & Parish, A. L., (2021):** Nursing: polypharmacy and medication management in older adults, *Clinics in Integrated Care*, Vol. 8, <https://doi.org/10.1016/j.intcar.2021.100070>
  - 24- **Maher, R., Hanlon, J., & Hajjar, E., (2014):** Clinical consequences of polypharmacy in elderly, *Expert opinion on drug safety*, Vol. 13, No. (1), Pp. 57-65.
  - 25- **Maness, C., (2023):** Improving Polypharmacy and Medication Review in the Elderly, <https://scholarworks.uvm.edu/fmclerk>
  - 26- **Metwally, T., & Aly, H., (2020):** Prevalence of Polypharmacy among Egyptian Patients with Type 2 Diabetes Mellitus, *Suez Canal University Medical Journal*, Vol. 23, No (1) Pp. 41-50.
  - 27- **Michel, M., Leonardi, M., Martin, M., ( 2021):** Prina WHO's report for the decade of healthy ageing 2021–30 sets the stage for globally comparable data on healthy ageing *Lancet Healthy Longevity*, Vol. 2, No. (3), Pp. e121–e122)
  - 28- **Mohamed,E., Soheir, A., Hanan, E., Sameer, H., (2022):** Knowledge And Practices Used By Old Age Patients To Control Polypharmacy, *NILES journal for Geriatric and Gerontology*,



- 29- **Nicholson, K., Liu, W., Fitzpatrick, D., Hardacre, K. A., Roberts, S., Salerno, J., ... & Mangin, D., (2024):** Prevalence of multimorbidity and polypharmacy among adults and older adults: a systematic review. *The Lancet Healthy Longevity*.
- 30- **Novak, J., Goldberg, A., Dharmarajan, K., Amini, A., Maggiore, R. J., Presley, C. J., & Nightingale, G., (2022):** Polypharmacy in older adults with cancer undergoing radiotherapy: A review, *Journal of geriatric oncology*, Vol. 13, No. (6), Pp. 778-783.)
- 31- **Rajati, F., Rajati, M., Rasulehvandi, R., & Kazeminia, M., (2023):** Prevalence of stroke in the elderly: A systematic review and meta-analysis, *Interdisciplinary Neurosurgery*, Pp. 101746.
- 32- **Sharma ,K., ( 2019):** Study of adverse drug reactions and clinical profile of elderly in relation to polypharmacy, *Asian Journal of Medical Sciences*, Vol. 10, No. (6).
- 33- **Soto-Perez-de-Celis, E., Daneng, L., Yuan, Y., et al., ( 2018):** Functional versus chronological age: geriatric assessments to guide decision making in older patients with cancer, *Lancet Oncology*, Vol. 19, Pp. e305-316. Doi: 10.1016/S1470-2045(18)30348-6
- 34- **Tan, Y., Suppiah, S., Bautista, M., & Malhotra, R., (2019):** Polypharmacy among community-dwelling elderly in Singapore: Prevalence, risk factors and association with medication non-adherence, *Proceedings of Singapore Healthcare*, Vol. 28, No. (4), PP. 224-231.
- 35- **Wang, Y., Li, X., Jia, D., Lin, B., Fu, B., Qi, B., & Zhang, Z., (2021):** Exploring polypharmacy burden among elderly patients with chronic diseases in Chinese community: a cross-sectional study, *BMC geriatrics*, Vol. 21, No(1), P.P. 308.
- 36- **Wastesson, J., Morin, L., Laroche, M., & Johnell, K., (2019):** How chronic is polypharmacy in old age? A longitudinal nationwide cohort study, *Journal of the American Geriatrics Society*, Vol. 67, No. (3), Pp. 455-462.
- 37- **Wuraola Akande-Sholabi, L., Olufemi, O., (2018):** Polypharmacy and factors associated with their prevalence among older patients attending a geriatric centre in South-West Nigeria, *West African Journal of Pharmacy*. Vol. 29, No(1). PP. 35-45. doi: 10.2139/ssrn/.3508232