



KNOWLEDGE AND ASSOCIATED FACTORS OF POLYPHARMACY AMONG ELDERLY PATIENTS

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Article History: Received: 10-05-2023 Accepted: 5-05-2023 published online: 10-05-2023

Abstract

Background: Older adults are more prone to polypharmacy that much more complex than just the number of medications. polypharmacy leads to increased hospitalization, poor quality of life and represents an economic burden especially in developing countries like Egypt.

Aim: The present study aimed to assess knowledge and associated factors of polypharmacy among elderly patients.

Design: A descriptive design was utilized to conduct the present study.

Setting: The study was conducted at the outpatient clinics at Zagazig University Hospitals.

Sample: A purposive sample composed of 200 elderly patients.

Tools: three tools were used in the present study.

Tool I: A structured interview questionnaire.

Tool II: Elderly's knowledge of polypharmacy interview questionnaire.

Tool III: Associated factors of polypharmacy interview questionnaire.

Results: the present study results revealed that 92% of the studied elderly had poor score of knowledge about polypharmacy and 77.5% of the studied elderly had high score of polypharmacy associated factors.

Conclusion: There was a statistically significant negative correlation between polypharmacy knowledge and associated factors.

Recommendations: Development of Educational programs to raise the older adult's awareness and familiarity of their medication to gain apposite health outcomes with minimally number of medications.

Keywords: Knowledge, Associated Factors, Polypharmacy, Elderly Patients

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DOI: 10.53555/ecb/2023.12.Si12.326

Introduction

Hughes, (2021) define polypharmacy is the use of multiple drugs by a patient at the same time. Polypharmacy may be appropriate and inappropriate polypharmacy. In some literature, taking 2–4 drugs at the same time is classified as minor polypharmacy, whereas taking 5 or more drugs is classified as major polypharmacy, and the use of 10 or more drugs daily is classified as excessive polypharmacy or hyper polypharmacy.

Khezrian et al. (2020) mentioned that the prevalence of polypharmacy is common in older populations and ranges between 45 and 65% in the USA and up to 90% in some populations worldwide.

Eltaher& Araby, (2019) stated that the prevalence of polypharmacy in the elderly had been assessed by many studies. It ranged between 39 and 45% in developed countries. Egyptian study estimated it to be 56% in rural communities.

According to **Castilho et al. (2018)** Polypharmacy is influenced by a variety of health-related factors, such as obesity, frailty, chronic pain, poor self-rated health, cognitive impairment, poor physical and mental health, depression, coronary heart disease, and diabetes. Smoking, alcohol consumption, and physical inactivity are the individuals' behaviors that contribute to Polypharmacy.

Park et al., (2017) stated that polypharmacy increases risk of geriatric syndrome, incidence of fall, number and rate of hospital stay, length of stay, frequent hospitalizations, readmission, and the death rate in elderly population.

Schenker et al., (2019) stated that polypharmacy might affect a patient's well-being. Patients with high levels of medication use had lower health related quality of life and higher levels of psychological distress compared with patients with low levels of medication use.

Dahal & Bista (2023) mentioned that polypharmacy becomes problematic, such as when patients are prescribed too many medications by multiple healthcare providers working independently of each other. Added to this is the ease of obtaining medicines in pharmacies without prescriptions.

Gerontological nurses should be able to recognize problems and report concerns regarding Polypharmacy. To recognize problems, Gerontological nurses require skills to build close relationships with patients. Gerontological nurses play an essential role in maintaining patient's safety and well-being. Gerontological nurses educate and motivate patients to increase compliance through educational interventions

which can minimize the incidence of adverse reactions and non-compliance (**Walker, 2020**).

Significance of the study:

Polypharmacy increases the risk of adverse drug-related effects in older people. First, a higher number of drugs is associated with a higher risk of harmful drug-drug interactions; second, the aging process is associated with physiological changes e.g., weight loss, deterioration of liver and renal excretion, and decreased cardiac output (**Aboudonya et al., 2022**). Polypharmacy also creates a tremendous burden for patients and their families, who need to understand the purpose of the many prescriptions written by multiple providers, take each medication at the correct time of day, and recognize side effects (**Saljoughian, 2019**).

Aim of the Study

The current study aimed to assess knowledge and associated factors of polypharmacy among elderly patients.

Research Questions:

1. What is the level of knowledge of polypharmacy among elderly patients?
2. What are the factors associated with polypharmacy among elderly patients?

Subjects and Methods:

• **Research design:** a descriptive design was utilized to conduct the present study. **Setting:** the study was conducted at the outpatient clinics at Zagazig University Hospitals (cardiac clinic, internal medicine clinic, orthopedic clinic, and chest clinic), Sharkia governorate, Egypt. **Subject:** a purposive sample of 200 elderly patients from the above-mentioned setting **who fulfilled the following criteria:** age: 60 years and older, able to communicate, willing to participate in the study, having chronic diseases, and elderly patients receiving ≥ 2 medications.

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• Tools for data collection:

Three tools were utilized to collect the required data:

Part 1: Demographic characteristics:

This part was used to assess demographic characteristics of the studied elderly patients and included: (Age, sex, marital status, level of education, residence, etc).

Part 2: Medical history of the studied elderly:

This part concerned with the medical history of the studied elderly. It involved questions about: having chronic diseases and types of chronic

diseases. In addition to smoking habit and measuring of weight and height.

Part 3: Medication history of the studied elderly:

This part concerned with the medication history of the studied elderly. It involved questions about: number of medications taken on a regular basis, number of medications taken on irregular basis, most common types of medications taken, and do you take all medications prescribed.

Tool II: Elderly's knowledge of polypharmacy interview questionnaire:

This questionnaire was developed by the researcher and guided by **Shawkey et al. (2022) and Aboudonya et al. (2022)**. It was used to assess elderly patient's knowledge regarding polypharmacy. It consisted of questions related to definition of polypharmacy, medications that fall under polypharmacy, people more susceptible to polypharmacy, purpose, age-related changes in pharmacokinetics and pharmacodynamics, strategies to reduce polypharmacy.....etc. Each correct answer was allotted one grade with total grade for all questions ranged from one to five and zero for wrong answer or don't know.

Tool III: Associated factors of polypharmacy interview questionnaire:

This questionnaire was developed by the researcher and guided by **Valenza et al., (2017)**. It was used to assess associated factors of polypharmacy among elderly patients. It consisted of three domains which include, elderly patient related factors (eight items), physicians related factors (seven items), and system level related factors (three items). Items were scored 2 for the response yes, 1 for the response no, and zero for don't sure.

Administrative design and Ethical considerations:

The administrative design implemented through submission of a formal letter containing aim of the study from the post-graduate department at Faculty of Nursing Zagazig University to the director of Zagazig University Hospitals. which in turn referred it to the manager of Zagazig University Hospitals for final approval to request permission and cooperation to conduct the study.

Firstly, the study proposal was approved by the research ethics committee (Rec) of the Faculty of Nursing at Zagazig University. Then, the elderly patients received a verbal description of the objectives of the study, and non-participation or withdrawal rights at any time without giving any

explanations. Also an informed consent for participation was taken verbally from each of the elderly patients after full explanation of the aim of the study. The elderly patients were informed that their participation in this study was voluntary. They were also assured that any information taken from them would be confidential and used only for research purposes.

Pilot study:

A pilot study was carried out on a sample of 20 elderly patients (10% of the calculated sample). They were selected randomly from outpatient clinics at Zagazig University Hospitals (cardiac clinic, internal medicine clinic, orthopedic clinic, and chest clinic). The purposes of the pilot study were to test clarity, feasibility, applicability of the study tool, and to determine the time needed to fill out the questionnaire sheet. All participants received a clear clarification for the study purpose. Since there was a modification in the data collection tools after conducting the pilot study, the pilot elderly patients were excluded later from the main studied sample.

Validity and Reliability:

The tools were revised by three experts in the field of (community health nursing Faculty of Nursing, Ain shams University, community health nursing Faculty of Nursing, Zagazig University, and endemic diseases Faculty of Medicine, Zagazig University), where the panel reviewed the tools content for relevance, clarity, comprehensiveness, and understandability. All recommended modifications were applied.

The reliability of the items of the tools was assessed using cronbach's alpha test, its results was 0.743 for elderly knowledge regarding polypharmacy and 0.763 for associated factors which indicate an accepted reliability of the tool.

Statistical analysis:

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows (SPSS Inc., Chicago, IL, USA 2011). Quantitative data were expressed as the mean \pm SD and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Percent of categorical variables were compared using Chi-square test or Fisher's exact test when appropriate. Spearman correlation coefficient was calculated to assess relationship between study variables, (+) sign indicate direct correlation & (-) sign indicate inverse correlation. Best fitting multiple linear regression was also used to predict factors which affect total scores of knowledge, related factors and adverse outcomes. Cronbach alpha coefficient

was calculated to assess the reliability of the scales through their internal consistency. P-value < 0.05 was considered statistically significant, p-value < 0.001 was considered highly statistically significant, and p-value \geq 0.05 was considered statistically non-significant.

Result

Table (1) represents demographic characteristics of the elderly patients. It was revealed that 85% of the studied elderly patients were from 60 to 70 years old with mean age 66.29 ± 3.904 , male (60.5%), married (59%), rural residents (86%), and lived with their families (91.5%). In addition, 32.5 % of studied elderly didn't read or write. All of them were not working. Concerning income, their income was sufficient (78%). Pension was the current source of income in 89% of them.

Table (2) displays that 40.5% of the studied elderly took three medications on a regular basis and 48.5% of them took four medications. While, 33% of them took one medication on irregular basis and 55.5% of them took two medications on irregular basis. The table also reveals that, the most commonly medications used were blood pressure lowering medications (97.5%) followed by blood sugar lowering medications (66.5%) and cholesterol and triglyceride lowering medications (62%). As well, 59 % of the studied elderly took all medications prescribed, compared to 41% took medications without a prescription.

Figure (1) represents that 92% of the studied elderly had poor score of polypharmacy knowledge compared to 5.5% and 2.5% had average and good scores respectively.

Figure (2) illustrates that 77.5% of the studied elderly had high score of polypharmacy associated factors compared to 22.5% had low score.

Table 3 indicates a statistically significant negative correlation between polypharmacy knowledge and associated factors ($p < 0.001$).

Table 4 indicates that age, being married, and educational level had statistically positive correlation with elderly's score of knowledge. While, score of associated factors was significantly negatively correlated with residence and positively with living with whom.

Discussion

Polypharmacy is a significant and growing public health threat worldwide. A high rate of polypharmacy is, in part, a consequence of the increasing proportion of multimorbidity in the ageing population worldwide (Okpechi et al., 2021).

The present study showed that most of the studied elderly patients aged from 60 to 70 years old with

mean age 66.29 ± 3.904 and three fifths of them were male. This might be related to this age group was the targeted population for this study and might reflect a demographic trend or an increasing population within this age range. This result was supported by Mugada et al., (2021) who conducted a study in India and reported that the mean age of elderly patients was 65.90 ± 5.48 years and more than half of them were males.

In addition, the current study revealed that more than half of the studied elderly were married and most of them were rural residents. This result is in a harmony with a study carried out by Priya et al., (2021) in India and reported that the 64% of the studied elderly were rural residents.

Moreover, the present study demonstrated that, more than half of the studied elderly had low level of education and most of them lived with their families. This could be due to their old ages; as in the past time, most people didn't care for the educational level of their children especially in agricultural environments like the study sitting. Furthermore, most elderly individuals live with their families may be related to social dynamics and support networks available to this population.

In the same line, Aljawadi et al., (2022) who conducted a study in Saudi Arabia reported that the 42.6% of the studied older adults were illiterate and 85.2% of them live with their family. These findings were partially congruent with Eltahir & Araby, (2019) in Egypt whose study stated that 69.1% of the studied elderly live with their family, while more than one third of them had University education.

As well, the current study represented that all of the studied elderly were not working and more than three quarters of them had sufficient income. Pension was the current source of income among most of them. This result was congruent with a study conducted by Nitya et al., (2021) in India and reported that more than 67.8% of the studied elderly had sufficient income and pension was their source of their income. Also, Abdulkader et al., (2023) who carried out a study in Iraq mentioned 86% of the studied elderly were not working and pension was their source of income.

Related to medication history of the elderly, the present study declared that slightly more than two fifths of them took three medications on a regular basis and nearly half of them took four medications. This may be related to the higher incidence of chronic health conditions among elderly. This finding was matched with Sheikh-Taha & Asmar, (2021) who conducted a study in Lebanon and found that 43% of the studied elderly took less than 5 medications per day.

Moreover, the current study displayed that about one third of the studied elderly took one medication on irregular basis and more than half of them took two medications on irregular basis. This could be attributed to that medications may be prescribed not only for curative purposes but also for improving the quality of life and managing symptoms associated with aging. This can include medications for pain relief, sleep or vitamins. In the same concern, this result is consistent with a study carried out by **Assefa et al., (2020)** in Ethiopia, found that 52.6% of the studied elderly used 2 medications irregularly.

Additionally, the present study reflected that the majority of medications that used by the studied elderly were blood pressure lowering medications followed by blood sugar lowering medications, then cholesterol and triglyceride lowering medications. This might be related to the high prevalence of cardiovascular diseases and diabetes within this population.

This result is compatible with **Mugada et al., (2021)** in India whose study mentioned that the most frequently prescribed drugs were blood pressure and blood sugar drugs 67.8%. In the same respect, a study conducted in Iraq by **Abdulkader et al., (2023)** stated that hypertension and hyperlipidemia drugs were the two most common drugs (82.6%) that used by elderly.

As well, the present study revealed that more than half of the studied elderly took all medications prescribed, compared to slightly more than two fifths of them took medications without a prescription. This may be due to various factors influencing the medication adherence patterns among the studied elderly population. One plausible explanation is the perceived importance of prescribed medications in managing their health conditions. Also, this could be attributed to the guidance and supervision provided by health care professionals.

In agreement with this study result, a study performed by **Gupta et al., (2018)** (26) in India stated that 60.3% of the studied elderly used the prescribed medications. Also, a study carried out by **Priya et al., (2021)** in India reported that 54.6% of the studied elderly used their drugs as prescribed by the physician.

Concerning elderly's knowledge of polypharmacy among the studied elderly, the current study represented that most of the studied elderly had poor score of knowledge compared to minority of them had average and good scores respectively with mean 11.34 ± 4.18 . This might be attributed to the low level of education among most of the studied elderly as well as their cognitive abilities, which could be affected by the aging process and

having difficulties with reading, memorizing, and understanding instructions, as well as poor understanding of the information provided by health care workers. Also, rural areas are characterized by limited medical services.

This result was congruent with a study carried out by **Didone et al., (2021)** in Brazil, who stated that 58% of the studied participants had inadequate knowledge regarding polypharmacy. Also, a study carried out by **Ali et al., (2023)** in Ireland found that 61.7% of the studied elderly patients had poor knowledge about polypharmacy.

Pertaining associated factors of polypharmacy, the current study revealed that more than three quarters of the studied elderly had high score of associated factors compared to less than one quarter of them had low score. This might be due to the fact that as individuals age, they often develop multiple chronic conditions that require ongoing management, leading to the prescription of multiple medications. Additionally, healthcare providers may prescribe additional medications to address symptoms or complications associated with existing conditions. Furthermore, limited coordination and communication among healthcare providers.

This result agreed with a study conducted by **Ishizaki et al., (2020)** in Tokyo reported that 58.7% of the studied elderly had high level of polypharmacy associated factors. Likewise, **Delara et al., (2022)** in Canada affirmed that 52% of the studied participants had high risk related factors of polypharmacy.

Pertaining to correlation between total scores of knowledge and associated factors, the current study highlighted that there was a statistically significant negative correlation between polypharmacy knowledge and associated factors. This could be interpreted as the lower knowledge, the higher associated factors.

In the same respect, these findings were in harmony with a study carried out by **Ali et al., (2023)** in Ireland indicated that there was a significant negative correlation between elderly patient's knowledge of their regular medications and its associated factors and they clarified that with higher levels of knowledge are less likely to experience associated factors.

Pertaining correlation between elderly polypharmacy knowledge and associated factors, and their characteristics, the current study revealed that age and educational level had statistically positive correlation with elderly's score of knowledge. While, score of associated factors was significantly negatively correlated with residence. This result is in accordance with a study carried out by **Shawkey et al., (2022)** in Egypt stated that

knowledge about Polypharmacy was positively significantly correlated with age and educational level. This result is in a harmony with a study carried out by **Priya et al., (2021)** in India reported that residence was significantly negatively correlated with polypharmacy associated factors.

Conclusion

Based on the findings of the present study, it was concluded that most of the studied elderly had poor score of knowledge. Meanwhile, more than three quarters of the studied elderly had high score of polypharmacy associated factors. Eventually, there was a statistically significant negative correlation between knowledge and associated factors of polypharmacy.

Recommendations

- Development of Educational programs to raise the older adult's awareness and familiarity of their medication to gain apposite health outcomes with minimally number of medications.
- Future studies on larger sample studies at different geographic regions in Egypt are recommended to obtain more comprehensive data on polypharmacy among elderly people.

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Table (1): Demographic characteristics of the elderly patients(n=200).

Demographic characteristics	No.	%
Age		
60-<70	170	85.0
≥70	30	15.0
Mean ± SD	66.29 ±3.904	
Range	(60-75)	
Gender		
Male	121	60.5
Female	79	39.5
Marital status		
Married	118	59.0
Widower	82	41.0
Educational levels		
Not read or write	65	32.5
Read and write	31	15.5
Basic education	45	22.5
Secondary education	54	27.0
University education	5	2.5
Current occupation		
Not work	200	100.0
Work	0	0.0
Residence		
Rural	172	86.0
Urban	28	14.0
Living with whom		
Family	183	91.5
Alone	17	8.5

The monthly income of the elderly		
Sufficient	156	78.0
Insufficient	31	15.5
Sufficient and saving	13	6.5
Current source of income		
Pension	178	89.0
Children help	17	8.5
Ministry of Solidarity and Social Justice	5	2.5

Table (2): Medication history of the elderly (n=200).

Items	No.	%
Number of medications taken on a regular basis		
Two	7	3.5
Three	81	40.5
Four	97	48.5
Five or more	15	7.5
Number of medications taken on irregular basis		
One	66	33.0
Two	111	55.5
Three	23	11.5
The most common types of medications taken		
Blood pressure lowering medications	195	97.5
Blood sugar lowering medications	133	66.5
Cholesterol and triglyceride lowering medications	124	62.0
Chest allergy medications	34	17.0
Acidity medications	135	67.5
Painkillers	106	53.0
Anti-inflammatory	70	35.0
Vitamins and nutritional supplements	70	35.0
Do you take all medications prescribed?		
Yes	118	59.0
No	82	41.0
If not, how many medications do you take without a prescription?		
0	118	59.0
1	42	21.0
2	40	20.0

@ Responses are not mutually exclusive

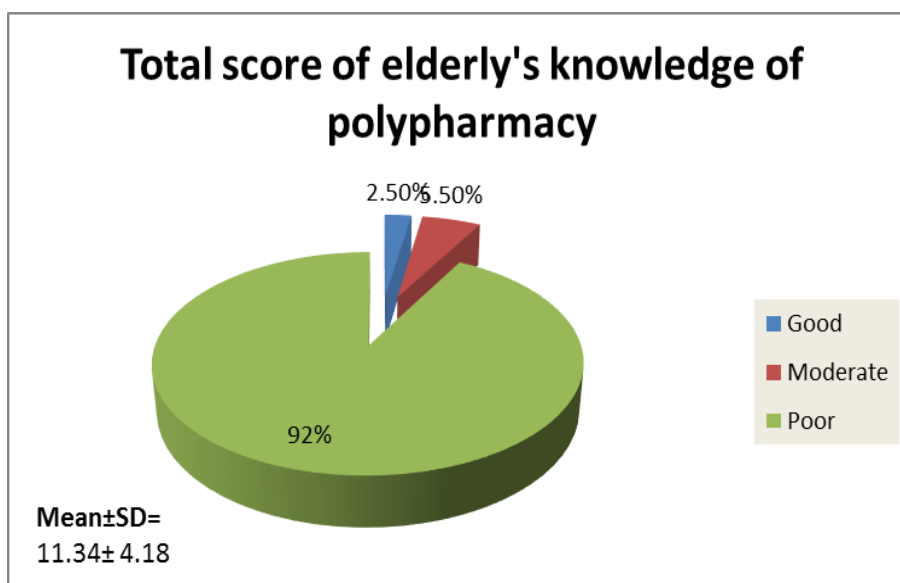


Figure (1): Total score of elderly's knowledge of polypharmacy

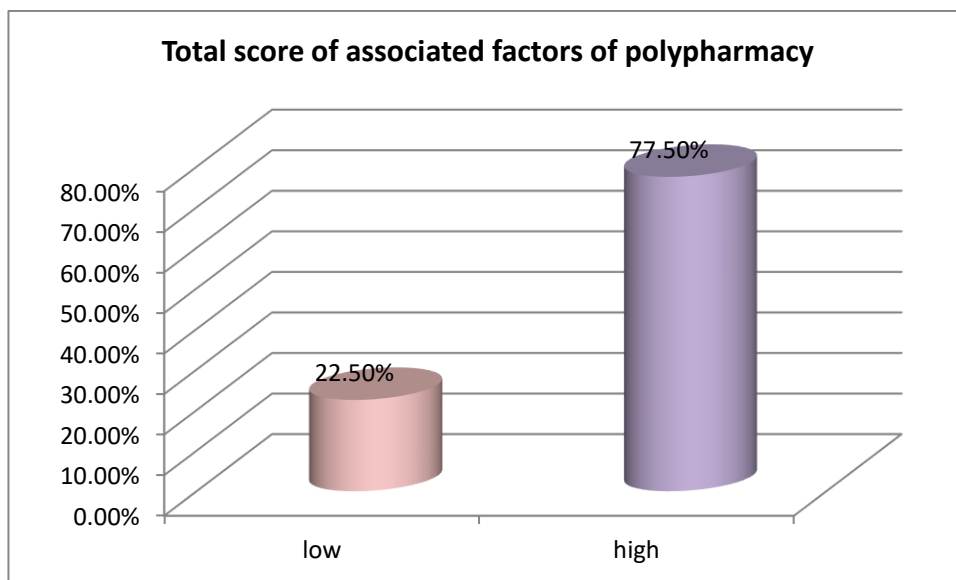


Figure (2): Total score of associated factors of polypharmacy (n=200).

Table (3): Correlation between total scores of knowledge and associated factors of polypharmacy.

Items	%	Knowledge		Associated factors	
		R	P	R	P
Knowledge					
Associated factors		-0.149	0.035%		

*: significant(p<0.05), **: statistically highly significant (p<0.001), r: correlation coefficient

Table (4): Correlation between elderly's polypharmacy knowledge and associated factors and their characteristics.

	Knowledge		Associated factors	
	R	P	R	P
Age	0.176	0.013*	-.111	0.117
Gender	0.089	0.211	0.043	0.541
Marital status (married)	0.231	0.001**	0.011	0.878
Educational levels	0.430	0.001**	0.049	0.490
Residence (rural)	0.112	0.115	-0.542	0.001**
Living with whom (Family)	0.084	0.235	0.164	0.020*
Monthly income	0.137	0.054	0.079	0.264
Current source of income	0.091	0.198	-0.027	0.703

*: significant(p<0.05), **: statistically highly significant (p<0.001), r: correlation coefficient