Evaluation of Polypharmacy Protocol for Elderly in Middle East

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ABSTRACT

Background: The study was aimed to review the commonly prescribed drugs for elderly in Middle East (ME) and to assess the protocol used for elderly with polypharmacy in Middle ME East comparing to the US protocol.

Methods: Two hundred and fifty patients aged ≥ 40 years who are attended to different Hospitals were enrolled in this study. A history was taken for each patient including: name, gender, age, current drugs use, doses, using time (before or after meals), and duration of treatment with each drug. Statistical comparison of drugs prescribed for ME and US patients were established.

Results: The percentage of drug prescription for certain drugs was higher in ME comparing to US, these include; cardiovascular drugs ($P<0.001$), Antibiotics/anti-invectives ($P<0.001$), Gastrointestinal tract ($p<0.0001$), Respiratory tract ($p<0.0001$), Dermatologic ($P<0.01$), Nutrients/supplements ($P<0.001$), Hypoglycemics ($P<0.05$), Steroids ($P<0.0001$), Anticoagulants ($P<0.0001$).

Conclusion: The protocol used by the physicians in ME needs simple modification. Food- drug and drug-drug interaction was present and requires patient education and follow-up.

Keywords: polypharmacy; elderly; therapeutic protocol; Middle East

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INTRODUCTION

Polypharmacy is the administration of four drugs or more by the patient.[1] Elderly is most commonly associated with polypharmacy; the affected older adults were about 40%, additionally, adult patients with mental disability are commonly associated with polypharmacy.[2] Multiple drug administration is associated with higher rate of adverse effect and possibility of drug-drug interaction. Moreover, polypharmacy can result in reduction of quality of life, interfering with mobility and mental behavior.[3]

The prediction of adverse drug reaction with polypharmacy is very difficult and some time can be associated with significant variability in clinical effect. Evaluation of medical protocol for each patient is well accepted to determine the therapeutic results, although some patients has unpredictable side effect with polypharmacy. [4]

There are huge challenges to the clinicians to match the complex pathology of elderly and disease-specific clinical practice guidelines. In some cases, 12 medications are recommended to treat some patients; like older female patient with T2DM, COPD, arthritis and hypertension. [5]

More systematic approach is required to arrange medical protocol for each patient. The most important one is the balance between medical regimen and goals of therapy. This involve a precise decision for substitution or discontinuation of specific medication.[6]

Human aging is a real biological process and it is out of human control. However, it is also affected by society sense constructions for elderly. The age of older than 60 years, the retirement ages in most of developed countries, considered the beginning of old age. The chronological time in the developed countries plays an important role. However, in developing countries, the chronological time has less consideration for the advanced age. Other socially constructed meanings of age are more significant such as the roles assigned to older people; in some cases it is the loss of roles accompanying physical decline which is significant in defining old age. Therefore, in contrast to the chronological milestones, which mark life stages in the developed world, old age in many developing countries is seen to begin at the point when active contribution is no longer possible.[7]

Old age comprises "the later part of life; the period of life after youth and middle age *ect*, usually with reference to deterioration".[8]

When old age begins cannot be universally defined because it shifts according to the context. The United Nations has agreed that 60+ years may be usually denoted as old age [(9)], and this is the first attempt at an international definition of elderly. Similarly, the WHO confirmed that the definition of old age in the developing countries as the time of loss of previous young age employment outcomes. [10]

In western countries, the age range between 60-65 was considered as the age of retirement. However, other countries take the age of 45-70 years as the time of old age. [11]

Furthermore, the widespread of populations with age over 80 years has changed the principle of elderly. [12]

Gerontologists have recognized the very different conditions that people experience as they grow older within the years defined as old age. The activity and health state of most people at the age of 70 years are still appropriate and are able to protect themselves.[13] However, after 75, they will become increasingly frail, a condition marked by serious mental and physical debilitation.[14] Therefore, rather than lumping together all people who have been defined as old, some gerontologists have recognized the diversity of old age by defining sub-groups. One study distinguishes the young old (60 to 69), the middle old (70 to 79), and the very old (80+).[15]

However, at the moment, there is no United Nations standard numerical criterion, but the UN agreed cutoff is 60+ years to refer to the older population.

Finally, most developed world countries have accepted the chronological age of 65 years as a definition of 'elderly' or older person.[16]

The aim of this study was to:

1. Know the drugs usually used by elderly in ME.
2. Assess the physician protocol of elderly treatment in ME.
3. Compare between the drugs used by local elderly and that in USA.
4. Find if there was Food-drug interaction for those elderly patients.
5. Find if there was drug-drug interaction in the daily used drugs by those elderly patients.

METHODS
Subjects
Patients: Two hundred and fifty elderly patients of age range from 40 years and older who attended to different Hospital were enrolled in this study since the 22 of September 2018 to the 30th of August 2019. Some of those patients were attended to the hospital for receiving drugs in the Out Patients Departments and others were admitted in the Internal Medicine Departments for treatment. The Patients were divided according to:

a. Their ages into five groups:
1. Group A of 10% Patients was 40-49 years old.
2. Group B of 10% Patients was 50-59 years old.
3. Group C of 42% Patients was 60-69 years old.
4. Group D of 26% Patients was 7079 years old.
5. Group E of 12% Patients was 80-91 years old.

b. Their gender into two groups:
1. Group A of 34% Patients was males.
2. Group B of 66% Patients was females.

c. Smokers or not into two groups:
1. Group A of 18% Patients was smokers.
2. Group B of 82% Patients was not smokers.

A history was taken for each patient regarding: name, sex, age, drugs on currently use, doses, time of usage (before or after meals), periods of treatment of each drug and so on.

MATERIALS
The documents of each elderly patient were checked with the patient and/or his relatives to get the write information about the diseases and treatment and other information.

METHODS
A questionnaire (Attachment) was used to have the complete history and information about each patient and the diagnosed diseases of each patient and the drugs used by each one. In addition to age, sex, residence, occupation body weight and BMI were obtained.

Statistical analysis
All the data has been processed and analyzed by the use of the statistical package SPSS ver. 18 (Chicago Inc., Ill). A p-value ≤ 0.05 was considered statistically significant. The Z-test was used to compare the proportional differences in medication uses between USA and ME samples.

RESULTS
There are statistical significant differences between the percentage of users of certain medications in USA and in ME these include; cardiovascular drugs (P<0.001), Antibiotics/anti-invectives (P<0.001), Gastrointestinal tract (p<0.0001), Respiratory tract (p<0.0001), Dermatologic (P<0.01), Nutrients/supplements (P<0.001), Hypoglycemics (P<0.05), Steroids (P<0.0001), Anticoagulants (P<0.0001) (Table 1).

On the other hand, there are no significant differences between the percentage of users of certain medications in USA and in ME these include; Diuretics, Opioids, Antihyperlipidemic, Nonopioid analgesics, Ophthalmics and Antigout drugs (p > 0.05 for each) (Table 1).

Other medication mentioned in Table 1.1 could not be compared with that in ME due to our small sample size, which can give unreliable results so not mentioned in table 1.

The mean age ± (SD); for males 69.41± (3.45) years, for females 65.75± (2.75) years and for whole 67± (2.21) years. The difference was statistically not significant (p-value > 0.5) (Table 2).

Table 1. Comparison of the medication categories and percentage of enrollees receiving prescriptions in the USA & ME.

Drugs	Percent of users (USA) N= 250	Percent of users (ME) N=250	Z-score	P-value	Significance
Cardiovascular	53.2%	86%	-4.22	<0.001	HS
Anti-infective	44.5%	84%	-5.11	<0.001	HS
Diuretics	29.5%	34%	-0.61	0.5	NS
Opioids	21.9%	12%	1.60	0.1	NS
Antihyperlipidemic	21.7%	14%	1.21	0.2	NS
Nonopioid analgesics	19.8%	18%	0.26	0.7	NS
Gastrointestinal tract	19.0%	62%	-6.35	<0.0001	VHS
Respiratory tract	15.6%	48%	-4.43	<0.0001	VHS
Dermatologic	14.8%	2%	2.48	<0.01	S
Nutrients/supplements	12.3%	34%	-3.80	<0.001	HS
Hypoglycemics	11.5%	22%	-2.07	<0.05	S

Steroids	9.7%	30%	-3.91	<0.0001	VHS
Ophthalmics	9.6%	2%	1.77	0.07	NS
Anticoagulants	7.0%	32%	-5.19	<0.0001	VHS
Antigout	3.2%	4%	0.45	0.65	NS

NS: Not significant, S: Significant, HS: highly significant, VHS: Very highly significant.

Table 2. Distribution of patients according to age and gender.

Age groups	Males N= 85		Females N= 165		Total N= 250	
	No.	%	No.	%	No.	%
40-49 years	10	11.76%	15	9.09%	25	10%
50-59 years	5	5.88%	20	12.12%	25	10%
60-69 years	40	47.06%	65	39.30%	105	42%
70-79 years	30	35.29%	35	21.21%	65	26%
80-91 years	-	-	30	18.18%	30	12%

Table 3. Distribution of patients according to smoking

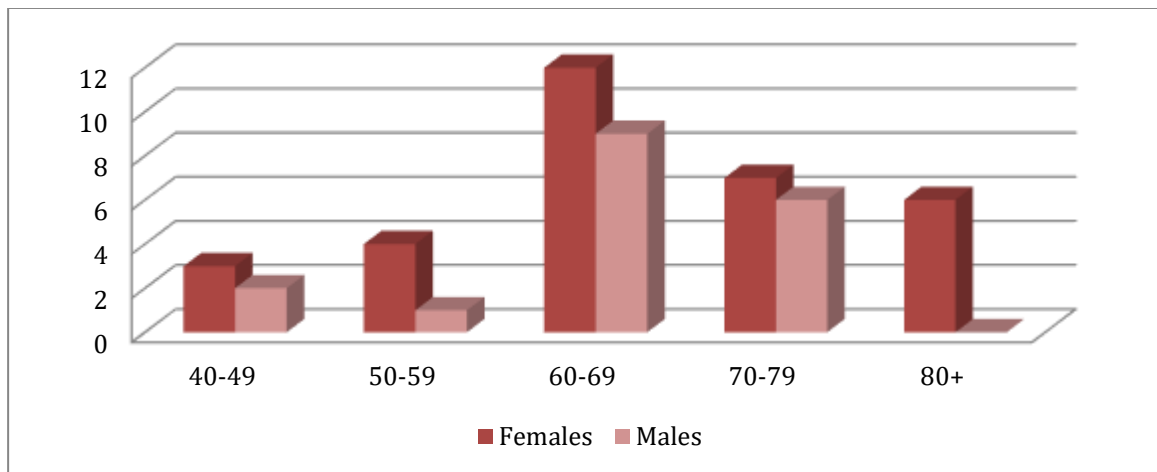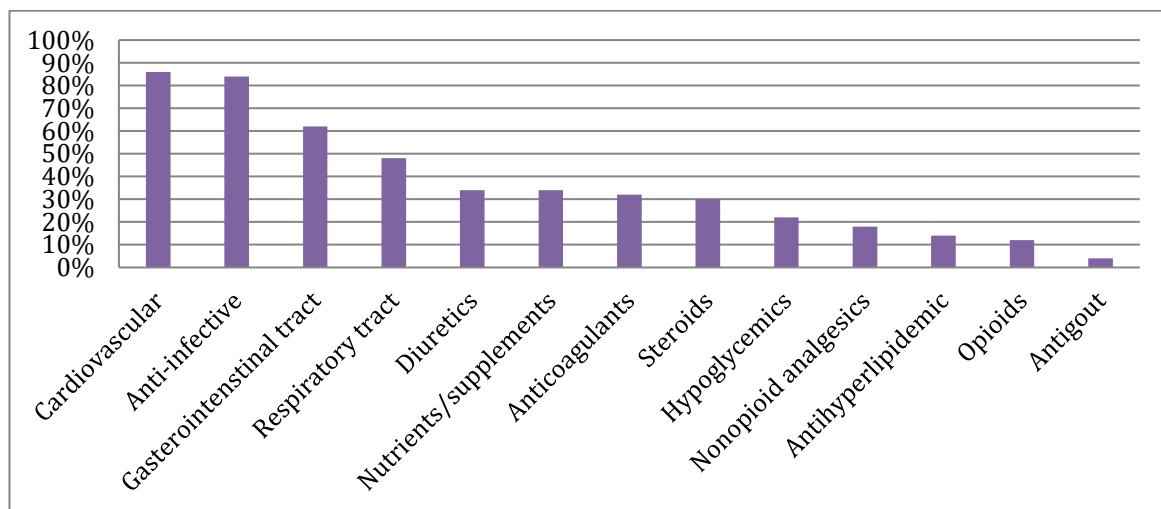| Smoker elderly patients	Non-smoker elderly patients
45	205

Figure 1. Histogram shows the mean age

Figure 2. Shows the medication categories and percentage of enrollees receiving prescriptions in ME
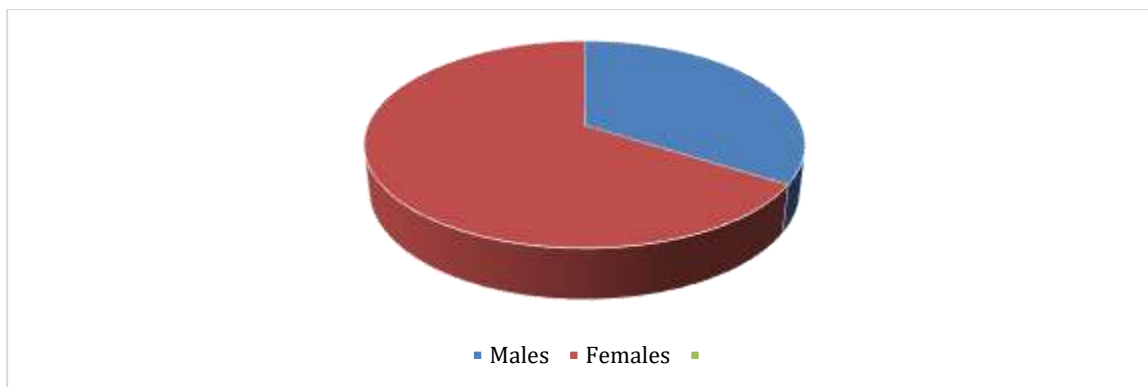
Figure 3. Pie shows the percentage of males and females patients enrolled in this study (66% females and 34% males)
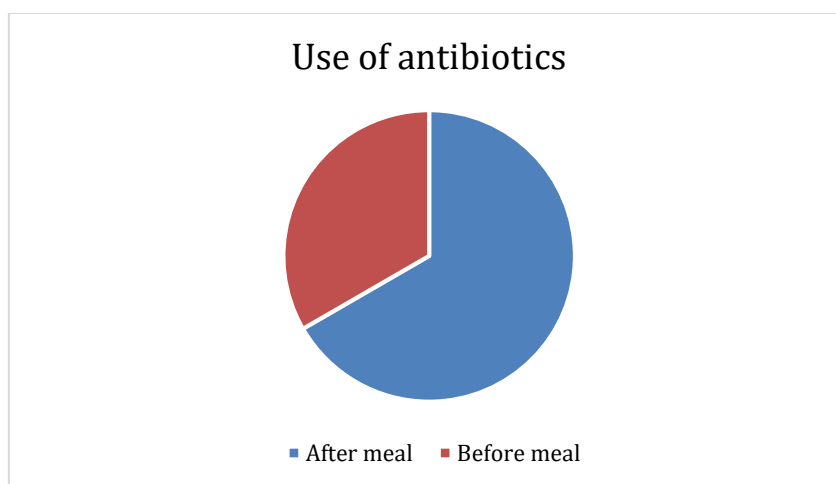

Figure 4. Pie shows the percentage of used antibiotics in relation to meals (66.6% after and 33.3% before meals)

DISCUSSION

The drugs used in ME by elderly patients were accounted and classified according to the diseases upon which they act on and the percentage of drugs in each class is shown in table 1.

Concerning the cardiovascular drugs; it is found that it is the first class of drugs used by elderly similar to that in USA, but there was a significant increase in the percentage of this class of drugs used by elderly in ME (p< 0.001) (Table 1) when compared with that of elderly patients in USA.[17] This may be accounted due to the types of unhealthy diet that are usually filled with huge amount of fats.

The second class of drugs used by patients in our locality (the Antibiotics and anti-infectives) is also in the same sequence as in USA elderly patients,[17] but there is a significant increase in the percentage of users of these medications in our locality (p< 0.001) (Table 1). This may be accounted due to that most elderly patients in our locality may be attended to the hospital due to an infection when they enrolled in this study.

In this study the GIT drugs were the third class while GIT drugs were the seventh in western;[17] however a significant increase in the percentage of these drugs in our locality (p< 0.0001) (Table 1). This may be accounted to the type of diet, which is known to be unhealthy and dirty used by all citizens including elderly patients in ME.

Respiratory drugs form the fourth class of drugs used in our locality, however this grade is not in the same rank with that of elderly patients in USA,[17] In addition to that a significant differences was found (p< 0.0001) (Table 1) when compared with the percentage of respiratory drugs used by elderly in USA. This may be accounted to the presence of petroleum product gases and dusty atmosphere in ME.

Diuretics was the fifth class of drugs used in our locality which is almost similar to that in USA and the percentage in both localities was almost similar [no significant difference (p> 0.05)] (Table 1).

The sixth class of elderly drugs used in our locality was the Nutrients/ Supplement, however it is the 12th class in USA[17] and a significant difference was found (p< 0.001) (Table 1) when compared with percentage of that drugs used by elderly in USA. This may be due to the malnutrition of much of the poor elderly patients in ME.

The next class of elderly drugs used in our locality was the anticoagulants, however it is the 19th class in USA,[17] and there was a significant difference (p< 0.0001) (Table 1) when compared with percentage of that drugs used by elderly in USA.

Steroids class of drugs was the 8th in the classification of this study, while it is the 14th in USA elderly patients.[17] Anyhow, a significant difference (p< 0.0001) (Table 1) was found when compared with percentage of that drugs used

by elderly in USA. This may be accounted to the high and inappropriate usage of steroids.

The 9th class of drugs used in ME is the hypoglycemic agents, whereas in USA it is the 13th class.[17] However there is just significant increase in the percentage of these agents than in USA elderly (p< 0.05) (Table 1) and this may be accounted to the high level of diabetes in ME which might be due to the high quantity of sugar used in the daily normal diet.

Non-opioid analgesics are the 10th class of drugs used by the participant elderly patients while it is the 6th class in USA elderly patients.[17] (Table 1). Any way almost the same percentage was found in both societies, as there is no significant difference in both.

Antihyperlipidemic was the 11th class in this study, while it is the fifth class in USA study.[18] (Table 1) and there were a decreased percentage of users in our locality than is USA although this decrease is not significant. This decrease might be due to that usage of Antihyperlipidemic drugs in our locality is still controversy.

Opioids class drugs here is the 12th one whereas in USA it is the 5th one (Table 1), however this decreased percentage of users was not significant. This advanced rank of drugs used in USA study may be accounted to the increased level of addiction in western countries. Anti-gout was the next class in ME elderly patients, whereas it was the 23rd one in USA.[19] No significant difference was found in the percentage of use in both localities (Table 1). This can be accounted to similarity in usage of proteins sources diet in both areas.

Anticonvulsant, Antihistamine, Dermatology, Muscle relaxant, Neuroleptics, Ophthalmic, Thyroid drugs and other classes of medications could not be compared with that in ME due to our small sample size which can give unreliable results so not mentioned in table 1.

Concerning food drugs interactions; after accurate notifications for the drugs used by the elderly in ME and discussion with patients and sometimes with their relatives no food drug interactions were noted except that high percentage of patients using antibiotics (about 66.6%) were used their oral antibiotic doses after meals, whereas it is advised to be taken before meals.[20, 21] So we give this notification directly to the patients and to their relatives and concentrate on this point in our discussions with resident doctors and pharmacists to remind the patients for this note.

Concerning drug- drugs interactions; after accurate notifications for the drugs used by the elderly in ME and discussion with patients and sometimes with their relatives no drug-drug interactions were noted except in two cases when the patients who used antibiotics, they were concurrently used an antacid (Rennie chewable tablet) which may prevent the antibiotics from being absorbed into the blood stream.[22]

CONCLUSION

In conclusion of this study the following were obtained:

1. The most groups of drug used in ME are as follows: Cardiovascular, Antibiotics /Anti-infectives, Gastrointestinal, Respiratory tract, Diuretics, Nutrients/ Supplements, Anticoagulants, Steroids, Hypoglycemic, Non-opioid analgesics, Anti-hyperlipidemics, Opioids, Anti-gout, and Ophthalmic drugs which were more or less in similar consequence to that in USA.

2. The protocol used by the physicians in these hospitals in prescribing the drugs for elderly patients is almost good with very minute notification, which can be easily corrected.

3. The percentage of most drugs used by the elderly patients in ME is significantly differing than in western countries.

4. There are limited food drug interactions that can be easily avoided through the directions given to the patients or their relatives directly.

5. There are limited drug- drug interactions that can easily be avoided through the directions given to the patients or their relatives directly.

RECOMMENDATIONS

1. The doctors and pharmacists have to confirm on patients attention to the use of certain drugs before meals as in the use of antibiotics or after meals as in the use of NSAIDs (Non-opioid analgesics).

2. The doctors and pharmacists have to confirm on patients attention not to use certain drugs together whenever an interaction is possible as in the use of antacids and oral antibiotics.

3. The important recommendation of this study is to use the only very necessary drugs in polypharmacy, in order to avoid as possible the drug-drug interactions, to decrease the possible side effects of the drugs and to decrease the cost of treatment.

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