

Medication Adherence: A Comparative study between Institutionalized and Community Dwelling Elderly, Alexandria, Egypt

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Abstract: Older adults receive more prescriptions per-capita than any other group yet non adherence to prescribed medications is a major public health problem among them. This study aimed at comparing medication adherence among a group of institutionalized and community dwelling elderly in Alexandria. A comparative cross sectional study was carried out on 50 community dwelling elderly in Sokina village, a slum area in Alexandria and 50 institutionalized elderly randomly selected from two governmental elderly homes. The majority of the elders (76.6%) were adherent to their treatment regimen and adherence was better among institutionalized elders. The reasons mentioned for non adherence were mainly cost of medication, avoidance of side effects, forgetfulness and inaccessibility to purchase of medications. It is concluded that medication adherence is better among institutionalized elders. We recommend further research for non-studied determinants of non adherence, namely depression scores and perception of treatment benefits. [Heba Mahmoud El Kady, Moataza M. Abdel Wahab and Noha Shawky Mustafa **Medication Adherence: A Comparative study between Institutionalized and Community Dwelling Elderly, Alexandria, Egypt**] Journal of American Science 2012; 8(6): 305-312].(ISSN: 1545-1003). <http://www.americanscience.org>.38

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1. Introduction

Roughly half of patients across all age groups who require medications are non-adherent to their medication regimen as, preventing them from receiving the full benefit of treatment and perhaps leading to devastating complications. This is a particularly serious problem among older adults who often require medications for multiple chronic conditions, but who may have limited memory, coping, and problem-solving skills, along with patterns of personal and cultural beliefs that hinder their ability to follow medication regimens [1].

Adherence with medication is a complex and intriguing behavioral issue which has been the focus of much debate. **Horne et al.**[2] define adherence “as the extent to which the patients’ behavior matches agreed recommendations for the prescriber”. Non-adherence with medication can be classified as intentional, often related to the need to avoid drug-related adverse effects or unintentional related to cognitive or visionary impairment; poor cognition or due to poor educational achievement or forgetfulness [3].

The World Health Organization (WHO) [4] recognizes that adherence embraces a range of health behaviors, beyond taking prescribed medications. Medication adherence relates to the extent to which an individual takes prescribed medications within a designated regimen of dosage and frequency and monitoring strategies associated with their pharmacotherapy. Adherence to treatment has been defined simply as adhering to health or medical advice [5].

People do not take approximately half of the medicine prescribed to them for chronic conditions, which undermines their care and leads to increased health care costs, morbidity, and mortality. Prescription non-adherence has been linked to potentially avoidable hospitalization, emergency department use, and institutionalization for the frail elderly. Furthermore, non-adherence to medications reduces treatment benefits and can confound the clinician’s assessment of therapeutic effectiveness, and is thought to account for 30% to 50% of cases where drugs fall short of their therapeutic goals [6].

Although numerous factors have been identified as impacting on medication adherence, the WHO has categorized these into 5 dimensions: (1) healthcare team/health system, (2) socioeconomic factors, (3) therapy related, (4) patient related, and (5) condition related, providing a useful overview to assist in exploring reasons for non adherence and developing and testing interventions to address barriers to adherence [5].

Possible influential factors include anthropological, psychological, biomedical parameters as well as the patients’ perceptions of illness and medication beliefs.[7] Factors attributed to non-adherence include; access to medicines, polypharmacy, multiple morbidity, undiagnosed dementia and alcohol problems, complexity of regimens, uncertainty about physician instructions, the risk of adverse drug effects, dexterity problems, lack of social support, poor relationship with health care providers, poor communication between prescriber and patient, inadequate follow-up processes, unclear medical

instructions and inadequate titration of treatment doses.[8]

There are many reasons why the elderly may be non-adherent, including the high number of medications (and complexity of regimen) used by this population, increased sensitivity to side effects, the high cost of medications, and forgetting or confusion about dosage schedule.[9]

Because the number of adults requiring long-term care is rapidly growing, it is important to identify commonly occurring and potentially dangerous errors in long-term care settings. Most nursing home residents have multiple medical conditions that require numerous medications. Polypharmacy among elderly nursing home residents has been a long-standing concern for clinicians and policy makers. It was asserted that, among Americans, "the institutionalized elderly" used the most medications.[10]

There has been growing recognition of quality of care issues in institutional care provided to older people, primarily in nursing and residential homes. Prescribing of medication has been a focus of many studies as nursing home residents are characterized by multiple co-morbidities (medical conditions) and polypharmacy.[11] Prescribing is one of the most common medical interventions experienced by older residents in nursing homes, yet it has been widely recognized as being poor in quality, particularly with overuse of inappropriate drugs and underuse of beneficial therapies. Some researchers have recognized the importance of "intelligent" or "intentional non-adherence" i.e. to avoid side-effects. It was found that elderly patients were often non-adherent for reasons that had a rational basis [12].

Patients may alter the dose of medication to avoid adverse effects because the dose was excessive, therapy inconvenient, yet obtain the desired therapeutic effect. These concepts raise interesting and important dilemmas for residents in nursing homes who are frail, and receiving multiple (and not always appropriate) medications, but who will have little control in determining which medications they receive [13]. Older people in the community may be able to exercise 'intelligent non-adherence'. However, in the nursing home environment, residents may experience 'enforced adherence' where medication is administered in a rigid, regimented basis (e.g. set administration times). This could give rise to side-effects and adverse effects which may be compounded by the fact that a resident will often receive medication for an excessive duration without review of dosage and appropriateness [14].

Covert administration (medications concealed in food and drink) has been practised in nursing homes, and not always for justified medical reasons. Conversely, residents may experience erratic compliance/adherence because of inconvenient administration times for staff or difficult and time-

consuming administration instructions (e.g. medication must be taken with the patient sitting upright; on an empty stomach; ½ hour before food, drink, or other medications; or with 200ml of water). Clearly, there will be residents who may not be able to make decisions about adherence to medication because of dementia, but others may wish to do so. [15]

Although the importance of drug adherence is well-known, there are little data concerning drug adherence among the elderly, who are the main sufferers of chronic diseases and some grey areas still exist in the understanding of factors related to poor compliance in elderly population. This study aims at comparing the medication adherence among institutionalized and community dwelling elderly.

2. Methods

Sample and Setting:

A comparative cross sectional study was carried out in Sokina village (a slum area in Alexandria) and two governmental elderly homes in Alexandria, Egypt. The study included 50 community dwelling elderly interviewed as a part of the annual health survey conducted by the High Institute of Public Health (HIPH) to slum areas. It also included 50 institutionalized elderly selected by simple random sampling from two governmental elderly homes. The sample included all elders who were able to communicate, and accepted to participate in the study.

Data collection

All elders were interviewed using a pre-scheduled questionnaire designed by the researchers containing data about socio demographic characteristics, source of income and treatment fees. It also included medical history namely the chronic diseases from which the elder complained, the number and route of administration of medications he took daily, the person responsible for administration of these medications and who prescribed them. The main outcome was self reporting degree of adherence to treatment regimens through a question: *How many times did you miss taking any medications during the last week? and why?* Answers of only once and never were considered adherent and answers of two times or more or were considered non adherent.

Each elder was interviewed individually after explanation of the purpose of the study and confidentiality was secured. Each individual interview took about 30 minutes. Data were collected during a period of four months from the beginning of April 2011 to August 2011.

Ethical considerations

The study was approved by the Ethics Committee of the High Institute of Public Health, Alexandria University before the start of the study and written approvals from the elders were taken before interviewing.

Statistical analysis:

Data management and computations of descriptive statistics and prevalence were performed using SPSS version 16. Differences of a *P* value of less than 0.05 or 0.01 were considered statistically significance. Statistical analyses were performed using z test of proportion and logistic regression. There were no missing data.

3. Results

The study comprised two equal groups of people aged 60 years and above. On the average, those institutionalized aged 72 years 95%CI (70-74) and those free living aged 68 years 95% CI (66-70). Percentage of females was higher among institutionalized (72.5%) than community dwelling elders (38%) ($z=3.636$). Half of the elders were widowed, with a higher percent (62%) among institutionalized than community dwelling elders (36%). About one third of the elders (34%) were females with a higher percent among community dwelling (62%) than institutionalized elders (6%), the difference was statistically significant ($p=0.0001$).

As regards educational level, 40% of the elders were illiterate, with a higher percent (45%) among institutionalized than among community dwelling elders (26%). About half of community dwelling elders (46%) were living with their spouse and offsprings, 22% were living with their offsprings only, 14% with their spouse only, 10% were living alone and 8% were living with their relatives.

Table (1) shows medical history of the study sample. It shows that 15% of the elders were not complaining of any chronic disease. The highest percentage of elders in both groups (42%) suffered from hypertension, 37% from locomotor diseases, and 28% from diabetes mellitus. Eleven percent of the sample complained of respiratory diseases, with a higher percent (18%) among community dwelling than institutionalized elders (4%) ($z= 2.295$). On the average, elders were taking 2 medications daily; community dwelling elders used to take 3 medications and institutionalized elders used to take 2 medications, yet the difference was not statistically significant ($p=0.060$).

In all cases, medications taken were prescribed by a physician, except for one male and one female among community dwelling elders who took medications on their own. Most of the elders (82%) were taking medications via oral route and only 15% via parenteral route with a higher percent (22%) among community dwelling elders ($z= 19.992$). About two thirds of the elders (67%) were responsible for administration of their own medications and there was no significant difference between the two groups. Nurses were responsible for drug administration in 14% of

institutionalized elders and spouse or offsprings were responsible in 28% of community dwelling ones.

Concerning the source of treatment fees, 44% used personal savings, 33% used health insurance with a higher percent (48%) among community dwelling elders ($z =3.366$), and 17% of the sample received free medications with a higher percent among institutionalized elders (30%) ($z= 3.688$).

Herbs and folk medicine were used by 15% of the sample; the distribution did not significantly vary among community dwelling and institutionalized elders. The most common reasons mentioned for using such herbs were dyspepsia, common cold, to raise their immunity or for gastric acidity.

Figure (1) shows adherence to treatment plan among institutionalized and community dwelling elders. It shows that the majority of those taking medications (76.6%) (42 in community dwelling and 43 in institutionalized elders) were adherent to their treatment plans. Adherence was better among institutionalized (81.4%) than community dwelling elders (73.8), yet the difference was not statistically significant ($z = 0.8416$).

Table (2) shows the reasons mentioned for non adherence among the study sample. The reasons mentioned were mainly cost of medication, avoidance of the side effects, forgetfulness or inaccessibility medication purchase. There was no significant difference between community dwelling and institutionalized elders as regards these reasons.

Table (3) shows relation between medication adherence and the different studied variables. The table shows that adherence was almost the same among males and females. It also shows that adherence was more prevalent among all divorced and among 81.0% of widowed elders. As regards educational level, adherence was more prevalent among elders who finished their preparatory and postgraduate studies. Adherence was most prevalent among institutionalized elders followed by elders who lived alone or with their spouse only (80.0%). Adherence was also more prevalent among elders whose source of income was pension (83.6%) followed by those who received social support (71.4%). As for chronic diseases, adherence was more prevalent among elders who had hypertension (87.8%), followed by those who had urological diseases (85.7%). It was also prevalent among all elders who had tumors and neurological diseases. Adherence was more prevalent among elders whose source of treatment fees was health insurance (85.2%) followed by those who had free medications (83.3%). As for route of administration, adherence was more prevalent among elders who used to take oral medications (78.8%) and those whose spouse, offsprings or nurse were responsible for administration of medication.

All factors were not statistically significant except for few factors that favored adherence, namely, having preparatory or postgraduate education, depending on pension for income, complaining of hypertension or neurological disease and lastly, having one of the offsprings or a nurse responsible for administration of medication.

Meanwhile, entering all significant factors, together with being institutionalized or community dwelling, in a logistic regression model revealed that none of them was a significant predictor for adherence to treatment.

Table (1): Medical history of the study sample

	Group				Total No. (n=100)
	Community dwelling (n=50)		Institutionalized (n=50)		
	No.	%	No.	%	
Chronic diseases ♦					
None	8	16	7	14	15
Diabetes	14	28	14	28	28
Hypertension	21	42	21	42	42
Cardiac	13	26	10	20	23
Locomotor	20	40	17	34	37
Tumors	1	2	-	-	1
Neurological	-	-	4	8	4
Gastrointestinal	6	12	8	16	14
Respiratory *	9	18	2	4	11
Urological	2	4	5	10	7
Number of medications used daily					
Median		3		2	2
(min-max)		(0-10)		(0-10)	(0-10)
Route of medication administration ♦					
Oral	41	82	41	82	82
Parental *	11	22	4	2	15
Others	5	10	-	-	5
Person responsible for administration					
Himself/ herself	32	64	35	70	67
Relatives	2	4	1	2	3
Spouse	6	12	-	-	6
Offsprings	8	16	-	-	8
Nurse	-	-	7	14	7
Source of treatment fees ♦					
Health insurance *	24	48	9	18	33
Personal saving	21	42	23	46	44
Family members	6	12	4	8	10
Free *	2	4	15	30	17
Use of Herbs					
No	42	84	42	84	85
Yes ♦	8	16	8	16	15
<u>For:</u> Common cold	5	10	1	2	6
Mild pains	2	4	-	-	2
Dyspepsia	6	12	2	4	8
Constipation	1	2	2	4	3
Hyperacidity	2	4	2	4	4
Immunesuppression	3	6	2	4	5
Neuropathy	-	-	2	4	2

♦ Multiple responses

* Significant difference (p<0.05)

Table (2): Reasons for non adherence among the study sample

Reason ♦	Group					
	Community dwelling		Institutionalized		Total	
	No.(n=8)	%	No.(n=7)	%	No.(n=15)	%
Cost	8	100.0	6	85.7	14	93.3
Side effects	2	25.0	3	42.9	5	33.3
Impaired memory	1	12.5	1	14.3	2	13.3
Inaccessibility to purchase	1	12.5	1	14.3	2	13.3
No benefit perceived	1	12.5	-	-	1	6.7
Multiple doses	1	12.5	-	-	1	6.7
Fear of being dependent on it	1	12.5	-	-	1	6.7

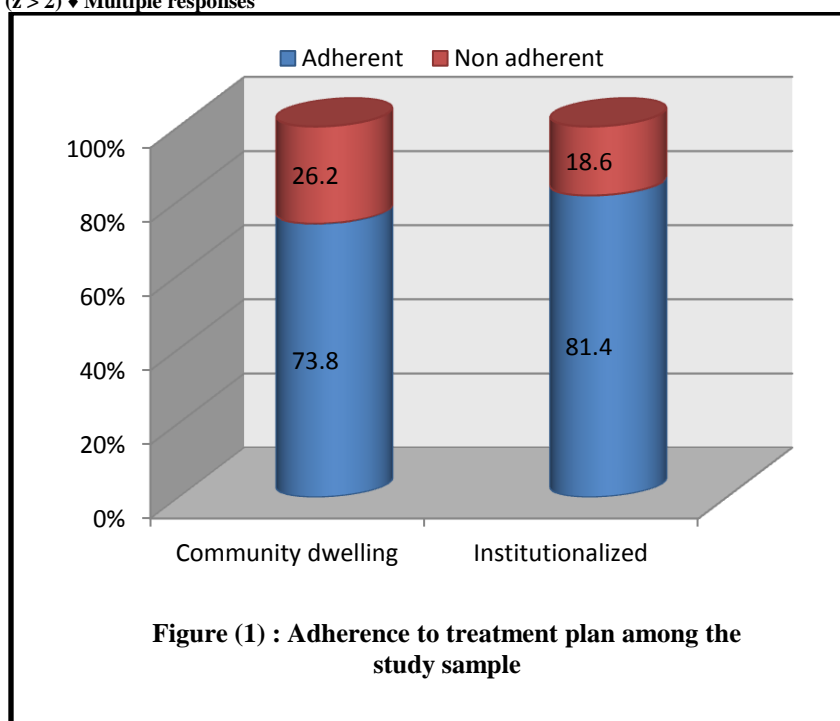
Multiple responses

Table (3): Relation between medication adherence and the different studied variables

	Adherence			
	Adherent		Not adherent	
	No. (n=66)	%	No. (n=19)	%
Sex				
Male	28	77.8	8	22.2
Female	38	77.6	11	22.4
Marital status				
Married	21	75.0	7	25.0
Widowed	34	81.0	8	19.0
Divorced	3	100.0	-	-
Single	8	66.7	4	33.3
Educational level				
Illiterate	26	76.5	8	23.5
Read and write	12	60.0	8	40.0
Preparatory*	7	100.0	-	-
Primary	2	66.7	1	33.3
Secondary	9	90.0	1	10.0
University	4	80.0	1	20.0
Postgraduate*	6	100.0	-	-
Living condition				
Alone	4	80.0	1	20.0
Spouse only	4	80.0	1	20.0
Spouse and offsprings	17	77.3	5	22.7
Offsprings only	5	62.5	3	37.5
Relatives	1	50.0	1	50.0
Institutionalized	35	81.4	8	18.6
Source of income				
Pension*	56	83.6	11	16.4
Work	1	33.3	2	66.7
Family support	4	66.7	2	33.3
Social support	5	71.4	2	28.6
Others	-	-	2	100.0
Chronic disease ♦				
Diabetes	23	82.1	5	17.9
Hypertension *	36	87.8	5	12.2
Cardiac	18	78.3	5	21.7
Locomotor	25	71.4	10	28.6
Tumors	1	100.0	-	-
Neurological*	4	100.0	-	-
Gastrointestinal	11	84.6	2	15.4
Respiratory	9	81.8	2	18.2
Urological	6	85.7	1	14.3

Source of treatment fees ♦				
Health insurance	23	85.2	4	14.8
Personal savings	30	75.0	10	25.0
Family members	6	66.7	3	33.3
Free	10	83.3	2	16.7
Route of medication administration ♦				
Oral	63	78.8	17	21.2
Parenteral	10	76.9	3	23.1
Others	3	60.0	2	40.0
Person responsible for administration				
Himself/ herself	49	74.2	17	25.8
Relatives	1	50.0	1	50.0
Spouse	3	100.0	-	-
Offspringss *	6	100.0	-	-
Nurse *	7	100.0	-	-

* Significant difference ($z > 2$) ♦ Multiple responses



4. Discussion

As average life expectancy increases, so do the incidence of chronic diseases and the number of persons receiving long-term drug therapy. Thus elderly patients' non-adherence with medication regimens has the potential for sweeping medical and economic consequences and is likely to become increasingly important in the design of disease-management programs for this population [16].

Self-reporting, used in the present study as a method of measuring adherence, although has the disadvantage of recall bias, of eliciting only socially accepted responses and hence may overestimate adherence, it is a simple, economically feasible and the most useful method in clinical settings [17].

Medication adherence measured in the present study was (76.6%) in the total sample, with higher percentage in institutionalized (81.4%) than in community dwelling elders (73.8%) with an evident difference in adherence level between both studied groups. Yet, this difference was not statistically significant may be due to the similarity of the socioeconomic level of both groups. This goes with another study carried out in Egypt which assessed the determinants of treatment adherence among institutionalized elderly patients and reported (74.1%) adherence rate. [18] On the other hand, lower adherence rates were reported among a group of Chinese community dwelling elders [19]. The increased percentage of adherence in institutionalized

group could be due to the full time presence of a caregiver who supervises medication usage.

Concerning the reasons of non-adherence, as mentioned by the interviewed elders in the present study, the cost of the medication was found to be the primary cause among both groups. Most of the non-adherent respondents (93.3%) reported simply that they couldn't afford the regular supply of the long term medications and this claim was supported by the significant difference of the adherence level in those depending on pension as a main source of income. This is in accordance with another study in USA on a group of Medicare enrollers which found that as many as one third of older adults reported taking less medications than prescribed due to cost pressure. [20]

The present study also revealed that side effects of the medications were the second mentioned reason (33.3%) for non-adherence followed by forgetfulness (13.3%). This was in accordance with another study by a study conducted by Nair, et al [21] which revealed that the majority of respondents reported side effects and forgetting to take their medication (if they were too busy or if they experienced disruption in their daily routine) among the reasons for poor adherence in a nationally representative sample in the United States.

In agreement with another study in California [17], the present study revealed that non-adherence was neither affected by gender nor by living arrangements whether living alone or with someone. This may be attributed to the fact that adherence is influenced by the personal characteristics of the elderly and his perception of the importance of the medications prescribed rather than the need for someone to help him take his medication.

In contrast to **Boelho et al** [22] who found no association between education and adherence level, the present study revealed that adherence level was significantly associated with preparatory and postgraduate education. This may be attributed to the fact that the higher an elder is educated, the more aware he becomes of the importance of commitment to medication regimens.

As regards chronic morbidities, the current study revealed that hypertension and neurologic diseases were significantly associated with adherence level. This may be due to the fact that these two diseases are life threatening and painful and strongly impacting daily life, thus they gain a perceived importance and enhance adherence. Meanwhile, **Baret et al.** [23] found that the general trend was to use lower doses than prescribed mostly from neurological, the musculoskeletal, and the respiratory categories.

A significant difference of the adherence level among the elders in the present study in relation to having offsprings or nurse responsible for drug administration rather than being self reliant or dependent on a spouse who is himself dependent and

needs assistance was reported. This goes with another study carried out in Athens [24] which revealed that increasing self-reliance in old age was found to decrease adherence. This may be explained by the fact that elders usually have impaired memory or other physical constraints which may hinder the process of medications intake.

Nevertheless, all factors were found to be non-significant predictors for medication adherence as shown by logistic regression model in both groups whether institutionalized or community dwelling elders.

Limitations

First, like any other cross-sectional study, this investigation suffered from not having recorded the longitudinal impact of putative associations on study variables at different time points. Second, the use of self-reported omissions might underestimate the true incidence of non-adherence. Third, the effort done to shorten the time needed to fill the questionnaire in a trial not to exhaust the interviewed elders lead to the limitation of number of questions resulting in non-coverage of all domains of adherence predictors. Lastly, the small sample size and the socioeconomic level of it limit the generalization of the results.

Conclusion and Recommendations

Based on self reporting, medication adherence was better among institutionalized than among community-dwelling elderly, yet the difference was not statistically significant. Sex, marital status, income, education, and living with someone were not significant determinants for adherence; neither were the type of disease, number of medications, their route to the pharmacy, nor expenses.

We recommend further research for non-studied determinants, namely, psychological aspects, depression scores, and perception of treatment benefits.

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