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Review article

Assessment of adherence in elderly patients in primary care☆

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A B S T R A C T

Objective: To identify the prevalence of non-adherence to drug therapy for elderly patients in primary care in Blumenau, SC, Brazil.
Methods: This is a cross-sectional, population-based epidemiological study. A randomly selected sample of users who attended the pharmacies of 14 units of primary healthcare answered the questionnaire's study variables. The prevalence of non-adherence was measured using a self-reported questionnaire. A logistic regression model to calculate odds ratio was performed to estimate the association between risk factors and non-adherence.
Results: Of the 151 elderly individuals interviewed, 84.1% reported continuous use of their medicines. The average age of the participants was 69.04 years. Regarding the characteristics of the medications, an average of 4.3 medicines were used by the elderly, and diseases of the circulatory system were the most prominent (43.3%). The prevalence of non-adherence was 35.4%. Logistic regression showed an association between non-adherence and "prior stopping treatment because of lack of medication" and "inappropriately prescribed medication use" ($p < 0.005$).
Conclusion: The results reinforce the need to improve public policy and management processes aimed at ensuring people's access to essential medicines and qualify the process of prescribing health professionals as a way to improve treatment adherence in the elderly.

Avaliação da adesão terapêutica em idosos atendidos na atenção primária

Palavras-chave:
Idoso
Adesão à medicação
Atenção primária a saúde
Acesso aos serviços de saúde

R E S U M O

Objetivo: Identificar a prevalência de não adesão à terapia medicamentosa dos idosos atendidos na atenção primária de Blumenau, SC, Brasil.
Métodos: Estudo epidemiológico observacional, seccional, de base populacional com amostra aleatória de usuários que compareceram às farmácias de 14 unidades de atenção primária à saúde e responderam o questionário com as variáveis de estudo. A prevalência de não adesão foi medida por meio de um questionário autorrelatado. A associação entre variáveis de estudo e não adesão foi estimada pelo *odds ratio* por meio de modelo de regressão logística.

☆ Study conducted at Department of Medicine, Universidade Regional de Blumenau, Blumenau, SC, Brazil.

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Resultados: Dos 151 idosos entrevistados, 84,1% referiram utilizar medicação contínua. A média de idade foi de 69,04 anos. Com relação às características médico-assistenciais, a média de medicamentos utilizados foi de 4,3, e patologias do aparelho circulatório apareceu como destaque (43,3%) entre as doenças de base. A prevalência de não adesão foi de 35,4%. As variáveis "interrupção prévia por falta de medicamento" e "uso de medicamentos com prescrição inadequada" se mostraram associadas à não adesão ($p < 0,005$).

Conclusão: Os resultados reforçam a necessidade de melhorar as políticas públicas e os processos gerenciais que visem garantir o acesso da população aos medicamentos essenciais, bem como qualificar o processo de prescrição dos profissionais de saúde como forma de melhorar a adesão terapêutica em idosos.

Introduction

According to the World Health Organization (WHO), the number of older adults will be higher than the number of children worldwide by 2025.[1] Brazil, with a current life expectancy of 72.9 years,[2] is also following that global trend and thus might rank sixth among countries with the largest number of older adults by that time.[1] Physiological and biochemical changes occur together with age,[3] which might favour the development of diseases, including many chronic diseases,[4-6] and thus behave as predictors of pharmacological treatment.[4,7]

Pharmacological agents make a significant contribution to healthcare, and thus are a part of most therapeutic approaches. However, patients must adhere to the treatments prescribed so that outcomes meet expectations. For this reason, adherence to pharmacological treatment is one of the indicators of the effectiveness of healthcare services and programmes.[6-9]

WHO defines adherence as "the extent to which a person's behaviour corresponds to agreed recommendations from a healthcare provider",[7] thus emphasising the collaboration between the target of care and the care provider.[4,10-12]

The rates of non-adherence to pharmacological treatments are estimated to vary from 41 to 74% among individuals older than 60 years old. Non-adherence accounts for approximately 10% of hospital admissions[11] and has clinical and economic consequences, such as falls and exacerbations of disease.[10,11,13]

Several factors contribute to successful adherence, including the patient and/or caregiver's socioeconomic level, the presence or absence of motor and cognitive deficits, patient's understanding of disease, and a satisfactory doctor-patient relationship.[10,11,14,15] Understanding the factors that promote adherence or non-adherence is crucial to improve the care provided to older adults.[7]

The aim of the present study was to identify the frequency of medication use in older adults attending primary care and the factors associated with use.

Methods

The present study was a cross-sectional, quantitative, observational, epidemiological, population-based study conducted with users of primary care services affiliated with the Unified Health System (*Sistema Único de Saúde* – SUS) in Blumenau, SC. In this county, primary care is provided through two modalities: at General Outpatient Clinics (GOCs), and by Family Health Strategy (FHS) teams. The latter comprises a doctor, a nurse, nursing technicians, and community health agents, whereas the GOCs include general practitioners, paediatricians, obstetrician-gynaecologists, nurses, psychologists, and social workers. Both modalities also include oral healthcare providers.

To estimate the prevalence of non-adherence, the sample size was calculated based on an expected prevalence of 50% with 5% of precision, a 95% confidence interval, and a design effect of 2, which corresponded to a total of 768 participants. It was estimated that 15% of that population was of older adults, i.e., 115 individuals who reported being older than 60 years old, which is the age range that WHO attributes to older adults in developing countries.

The sample was obtained in two stages (units and users) and proportionally stratified as a function of the total number of users at each FHS and GOC unit. Users who visited the pharmacies at 14 centres (three GOC and 11 FHS units) were randomly selected, signed an informed consent form and were interviewed by previously trained investigators who applied a questionnaire that addressed the variables under study. Following the stage of data collection, the questionnaires were reviewed, and the data were entered twice into an electronic database (EpiData version 3.1 – public domain).

Non-adherence to treatment was considered the independent variable. The prevalence of non-adherence was calculated based on a previously tested and validated questionnaire[16] comprising four close-ended questions to be answered as yes or no: 1) Do you sometimes forget to take your medication? 2) Are you sometimes careless in the use of your medication? 3) When you feel better, do you sometimes stop taking your medication? and 4) If you feel worse when you take your medication, do you sometimes stop taking it? Whenever any of the four questions answered affirmatively, the individual was considered non-adherent to treatment.

The remainder of the variables corresponded to medical care issues (type of healthcare centre, primary disease, length of treatment, number of drugs, drugs prescribed, reported adverse reactions, previous treatment discontinuance,

information given on the medication, and access to medication) and socio-demographic characteristics (age in years, gender, self-reported skin colour/ethnicity, marital status, school attendance in years, and consumer class).

The volunteers' economic level was assessed using the criteria for economic classification formulated by the Brazilian Association of Market Research Companies[12] (*Associação Brasileira de Empresas de Pesquisa* - ABEP).

Inappropriate drug prescription was assessed by comparing the medications prescribed by doctors and the medications included in the Beers-Fick criteria. The criteria are distributed across two tables: one lists 48 drugs and/or classes of drugs that should be avoided in older adults and the causes for concern, independently from diagnoses or conditions, while the other lists the medications that should be avoided in older adults corresponding to 20 diagnoses or conditions.[17]

The data were processed and tabulated using the software STATA 9.0. The initial tables described the sample's socioeconomic and medical care-related characteristics. Then, the prevalence of non-adhesion was calculated. The association between proportions was assessed by means of the chi-squared or Fisher's exact test as befitting. In the case of continuous variables, the measures of central tendency and dispersion were calculated, and the means were compared using Student's *t*-test.

The association between the outcome variable "non-adherence" (categorical) and each independent variable (univariate analysis) was investigated by calculating odds ratios (ORs) with the corresponding 95% confidence interval (CI). In multivariate analysis, the ORs were calculated by means of unconditional logistic regression. All of the variables that exhibited p-values < 0.20 on univariate analysis were included in the model. By means of backward stepwise selection, variables were gradually removed from the model, and only the ones with p-values < 0.05 or that contributed to a better fit of the final model remained.

The significance level was established at $p < 0.05$.

The study complied with the Declaration of Helsinki and was approved by the research ethics committee of the Regional University of Blumenau Foundation (Fundação Universidade Regional de Blumenau - FURB), ruling no. 086/10.

Results

A total of 151 older adults were included in the study, 127 of whom (84.1%) reported the presence of chronic diseases and consequent continuous use of medication. Table 1 describes the distribution of the participants according to certain socio-demographic characteristics.

The average age of the sample was 69.04 years old (standard deviation, SD= 7.0), with a median of 67.81 years old. The average age did not exhibit a statistically significant difference as a function of gender.

Most of the participants (71, 47.0%) reported being married or having a stable union; most (121, 81.1%) reported being white.

The average school attendance was 4.11 years (SD = 3.1), with median of 4.0 years.

With respect to their consumer class, level C predominated (89, 58.9%), while no volunteer corresponded to class E.

With respect to the medical care-related characteristics (Table 2), the average number of drugs per volunteer was 4.29 (SD = 2.33), with a median of 4.0, and 65 participants (43.0%) used more than 5 drugs. The average number of drugs per volunteer did not exhibit a statistically significant difference as a function of gender, age range, or type of healthcare centre. Inappropriate drug prescription was found in 16.5% of the sample and exhibited a correlation with the adverse reactions reported ($p = 0.04$).

Most participants (91, 72.2%) stated that they had never discontinued treatment previously. Analysis of the association between economic class and drug discontinuation due to unavailability at the public network showed that discontinuation occurred in 68.6% (24) of the volunteers in class D versus 25.7% (9) in classes A and B, and 5.7% (2) in class C, although the difference was statistically non-significant ($p = 0.23$).

Analysis of the primary diseases found a predominance of afflictions of the circulatory system (65, 43.3%), followed by endocrine, metabolic, and nutritional disorders (36, 24.0%).

The prevalence of non-adherence among the volunteers using continuous medication (n = 127) was 35.4% (95% CI 27.2-44.4%). The results of univariate analysis of the correlation between the investigated variables clustered in groups, and the levels of non-adherence according to the Morisky scale are described in Table 2.

The only variables that exhibited association with non-adherence were "previous discontinuation due to lack of medication" and "inappropriate medication prescription". The variables "consumer class", "how do you feel relative to your treatment", and "adverse reactions reported" exhibited p-values < 0.20 and were included in the multivariate analysis.

The final logistic regression model is described in Table 3.

Discussion

The challenge posed by adherence to treatment is greater in older adults. That fraction of the population represents up to 50%[18] of multidrug users due to the higher prevalence of chronic degenerative illnesses.[13,15,18-20]

Among the population of older adults in Blumenau, there are more women (58.15%) than men.[21] In the present study, women represented 72.2% of the primary care users older than 60 years old. The reason might be that women seek healthcare more often than men,[22,23] resulting in greater use of medication,[3,4,18] and women also frequently assume responsibility for the family's well-being and thus go to pharmacies to pick up medications for other family members.[15] A second relevant socio-demographic characteristic of the present sample was the predominance of younger elderly (60-69 years old) and married individuals as well as of low levels of schooling. This profile agrees with previously reported profiles in studies conducted on older adults in the primary care setting.[18,24]

The prevalence of non-adherence to treatment might be rated low (35.4%) compared with rates found in other studies,

Table 1 – Socio-demographic characteristics and medical care-related features in older adults attending primary care, Blumenau, SC (n = 151).

Variable	n	Frequency (%)	95% CI
Gender			
Male	42	27.8	20.8-35.7
Female	109	72.2	64.3-79.2
Age range			
60-69 years old	95	62.9	54.7-70.6
70-79 years old	47	31.1	23.8-39.2
80 years old and older	9	6.0	2.8-11.0
Marital status			
Married or stable union	71	47.0	38.9-55.3
Single	9	6.0	2.8-11.0
Separated	14	9.3	5.2-15.1
Widowed	57	37.7	30.0-46.0
*Skin colour/ethnicity**			
White	121	81.2	74.0-87.1
Brown	24	16.1	10.6-23.0
Black	1	0.7	0.0-3.7
Asian	2	1.3	0.2-4.8
Other	1	0.7	0.0-3.7
Schooling			
0-2 years	32	21.2	15.0-28.6
3-4 years	69	45.7	37.6-54.0
5-8 years	30	19.9	13.8-27.1
More than 9 years	20	13.2	8.3-19.7
Consumer class			
A-B	21	13.9	8.8-20.5
C	89	58.9	59.7-66.9
D	41	27.2	20.2-35.0
Number of drugs			
0-1	13	8.6	4.7-14.3
2-4	73	48.3	40.1-56.6
5 or more	65	43.0	35.0-51.3
Prescription of inappropriate medication			
Yes	25	16.6	11.0-23.5
No	126	83.4	76.5-89.0
Continuous-use medication			
Yes	127	84.1	77.3-89.5
No	24	15.9	10.5-22.7
Homemade remedies			
Yes	47	31.1	23.8-39.2
No	104	68.9	60.8-76.2
*Treatment discontinuance**			
No	91	72.2	63.5-79.8
Once	5	4.0	1.3-9.0
2 or more times	30	23.8	16.7-32.2
*Primary disease**			
Neoplasms	6	4.0	1.5-8.5
Endocrine, nutritional and metabolic diseases	36	24.0	17.4-31.6
Mental and behavioural disorders	7	4.7	1.9-9.4
Circulatory system diseases	65	43.3	35.3-51.7
Respiratory system diseases	7	4.7	1.9-9.4
Digestive system diseases	10	6.7	3.2-11.9
Musculoskeletal and connective tissue diseases	10	6.7	3.2-11.9
Other	9	6.0	2.8-11.1
*Length of treatment of primary disease**			
Up to 2 years	32	21.9	15.5-29.5
2 years or more	114	78.1	70.5-84.5

95% CI, 95% confidence interval.
* Unknown items excluded.
Source: secondary data, 2010.

Table 2 – Univariate analysis of the correlation of non-adherence to treatment according to the Morisky scale with social and medical care-related factors.

	Non-adherence n (%)	OR	*p*
Gender (n = 127)			
Male	9 (26.5)		
Female	36 (38.7)	1.8 (0.7-4.2)	0.20
Age range (n = 127)			
60-69 years old	30 (38.0)		
70-79 years old	12 (29.3)	0.7 (0.3-1.5)	
80 years old or older	3 (42.9)	1.2 (0.3-5.9)	0.58
Marital status (n = 127)			
Married or stable union	21 (36.2)		
Single	5 (55.6)	2.2 (0.5-9.1)	
Separated or widowed	19 (31.7)	0.8 (0.4-1.8)	0.39
Skin colour/ethnicity (n = 127)			
Black, brown and other	8 (33.3)		
White	37 (35.9)	1.1 (0.4-2.9)	0.81
Schooling (n = 127)			
Secondary and higher education	5 (33.3)		
5-8 years	3 (20.0)	0.5 (0.1-2.6)	
1-4 years	31 (36.5)	1.1 (0.4-3.7)	
Illiterate	6 (50.0)	2.0 (0.4-9.5)	0.42
Consumer class (n = 127)			
A-B	4 (22.2)		
C	33 (42.3)	2.6 (0.8-8.5)	
D	8 (25.8)	1.2 (0.3-4.8)	0.11
Healthcare centre type (n = 127)			
General outpatient clinic	20 (30.8)		
FHS	25 (40.3)	1.5 (0.7-3.2)	0.26
Number of drugs (n = 127)			
1	1 (25.0)		
2 or more	44 (35.8)	1.7 (0.2-16.5)	0.66
Prescription of inappropriate medication (n = 127)			
No	33 (31.4)		
Yes	12 (54.6)	2.6 (1.0-6.7)	0.04
Adverse reactions (n = 127)			
No	38 (33.3)		
Yes	7 (53.8)	2.3 (0.7-7.4)	0.15
Previous discontinuance due to lack of medication (n = 126)			
No	26 (28.6)		
1 or more times	19 (54.3)	3.0 (1.3-6.6)	0.008
Previous discontinuance on own account (n = 127)			
No	39 (35.8)		
1 or more times	6 (33.3)	0.9 (0.3-2.6)	0.84
How do you feel about your treatment (n = 125)			
Better	28 (31.5)		
The same	12 (42.9)	1.6 (0.7-3.9)	
Worse	5 (62.5)	3.6 (0.8-16.3)	0.15

FHS, Family Health Strategy; OR, odds ratio.
Source: secondary data, 2010.

which vary from 40 to 75% as a function of the context and the methods of assessment used.[10,15,25] Such a low prevalence of non-adherence might be at least partially explained by the use of a questionnaire as the method for data collection because it might exhibit a desired answer bias.

Regarding the factors associated with non-adherence, only a previous discontinuance due to lack of access to medication and having been inappropriately prescribed a medication exhibited a statistically significant correlation on multivariate analysis. The variable "how do you feel since you started treatment" fit into the model but without statistical significance. The fact that these variables might be used as indicators of service quality and could play a role in the occurrence of non-adherence to treatment should be given particular attention.

In countries such as Brazil that exhibit wide income variation, access to medication exerts significant influence on the continuity of treatment.[8] In the present study,

Table 3 – Final logistic regression model of the correlation of non-adherence to treatment according to the Morisky scale with social and medical care-related factors (n = 124).

	Non-adjusted OR	Adjusted OR	p
	95% CI	95% CI	
Previous discontinuance due to lack of medication (n = 126)			
No	1		
1 or more times	3.0 (1.3-6.6)	2.9 (1.3-6.9)	0.01
Prescription of inappropriate medication (n = 127)			
No	1		
Yes	2.6 (1.0-6.7)	2.9 (1.1-7.9)	0.03
How do you feel about your treatment (n = 125)			
Better	1		
The same	1.6 (0.7-3.9)	2.1 (0.8-5.2)	0.13
Worse	3.6 (0.8-16.3)	3.9 (0.8-18.9)	0.09

95% CI, 95% confidence interval; OR, odds ratio.
Maximum likelihood ratio (LR) test = 15.1, p < 0.005.
Hosmer-Lemeshow goodness-of-fit test = 5.0, p = 0.29.

non-adherence proved to be lower when the drugs were not available from the public healthcare network. The availability of medications at public facilities is limited, and thus a drug needed to treat a definite chronic problem might not be available for about one quarter of the year.[26] Vasconcelos et al. found that a fraction of older adults use lower doses of their treatment than the prescribed amount to "store" medication in case it becomes unavailable at the public healthcare network.[27] Teixeira et al. observed that some older adults looked for alternatives to purchase the drugs they need despite their low income, while other older adults simply discontinued them as a function of their high cost.[28] Lack of access to medication might worsen the individual's clinical condition, resulting in increased expenses for secondary and tertiary healthcare.[29]

No studies were located assessing the association between inappropriately prescribed medication and poor adherence. The frequency of inappropriately used medication found in the present study was lower than the rates reported by international studies that applied the same criteria[30,31] (16% vs. 18-21%). These latter two studies, in turn, found associations between inappropriately used medication, polypharmacy and adverse reactions.[30,32]

The larger the number of prescribed medications, the greater the complexity of the therapeutic regimen,[3,33] and both factors increase together with age.[3] The participants in the present study used 4.3 drugs each on average, which is slightly higher than the findings of other studies conducted in Brazil, which varied from 2.7 to 4.2 drugs per elderly patient.[3,4,22] The larger the number of drugs, the higher the odds for adverse reactions to occur, which is one reason for intentional discontinuance.[3,34] The symptoms associated with adverse reactions and non-adherence predispose older adults to being prescribed additional drugs due to the difficulty in identifying the actual basic cause of non-responsiveness to treatment.[35,36] The results of the present study showed that higher rates of adherence corresponded to the volunteers who did not exhibit adverse reactions.

Therefore, it can be inferred that the association between polypharmacy and/or adverse reactions and non-adherence belongs in the same causal chain as inappropriate prescriptions. Thus, the doctors themselves might involuntarily contribute to the occurrence of non-adherence. This hypothesis should be more thoroughly investigated by means of longitudinal studies and larger samples.

The economic status of older adults might exert influence on their adherence to treatment because adults with low incomes cannot purchase the medication they need.[15,23,27,37] In addition, low educational levels are a risk factor for non-adherence as a function of the complexity of the therapeutic regimens[18,22,27,33] and as a function of their influence on the individual's understanding of his or her state of health, which is a relevant factor with respect to adherence to treatment.[10,15,22] The results of the present study show that socioeconomic variables such as low consumer class and low educational level exhibited a correlation with non-adherence, albeit in a statistically non-significant manner.

The present study had some limitations. First, the sample size was small because the eligible population was restricted to individuals within a given age range from a source study, resulting in reduced statistical power. The second limitation concerned the study setting. The volunteers were recruited at pharmacies in primary care centres, which might have caused selection bias because the individuals found at that setting might have a greater tendency to care for their health and thus to exhibit better adherence to treatment. One further limitation was related to the method used to measure adherence. The Morisky questionnaire is a qualitative instrument that seeks to identify non-adherence based on the behaviour of people relative to the intake of medication. Thus, the questions are not framed with time clauses and do not address clinical outcomes. Importantly, other studies in the literature have used different methods to assess adherence, thus hindering comparison of their results.

Nevertheless, the present study is relevant because it is one of the first studies on adherence to treatment in older

adults attending primary care conducted in Brazil. The fact that the study included 14 primary care centres (conventional outpatient clinics and FHS units) in a mid-sized city is also noteworthy because it allows for the application of its results to the SUS as a whole.

Conclusion

In the present study, correlations were found between non-adherence to treatment and lack of access to medication as well as inappropriate medication prescription. The results point strongly to the need to improve public policies and management processes to ensure population-wide access to essential medications and to evaluate the prescriptions made by healthcare providers.

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Conflicts of interest

The authors declare no conflicts of interest.

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