



Self-reported medication adherence and beliefs among elderly in multi-treatment: a cross-sectional study



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ABSTRACT

Aim: To evaluate the association between adherence to treatment and beliefs about medications in multi-treated elderly patients.

Background: A large body of evidence documented the importance of adherence to therapy in predicting clinical outcomes, and the association between adherence and medication beliefs in patients of various ages and with different health conditions. However, so far only a few studies have specifically investigated the associations between medication beliefs and adherence among elderly in polypharmacy.

Methods: In this multicenter cross-sectional study we used the MMAS-8 and BMQ Scales to assess medication adherence and beliefs about medications, respectively.

Results: The final sample consisted of 567 patients. Patients reporting higher levels of necessity or concerns about their medicines showed higher adherence (OR: 1.61, and 2.02, respectively; both $p < .001$). Accepting patients (high necessity and low concerns) were less likely (OR: 0.24; $p < .001$) to report adherence than ambivalent ones (high necessity and concerns).

Conclusions: Medication adherence is related to high necessity and concern about treatment. In nursing practice it is important to understand the specific barriers to adherence and to engage patients in the implementation of strategies to improve adherence.

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1. Introduction

With the progressive increase in life expectancy (United Nations, Departments of Economics, & Social Affairs, 2013), aging-related diseases are expected to grow by 10% every year (Wolff, Starfield, & Anderson, 2002). It is therefore unsurprising that elderly patients consume a mean of seven different drugs simultaneously (Garfinkel & Mangin, 2010). In such a context, adherence to therapy plays a pivotal role in predicting clinical outcomes and, in turn, health care costs

All authors participated in all phases of the study (design, data collection and interpretation of the results).

VS, DC and GC designed and wrote the study; MEF made the statistical analysis; VS, DC and GC wrote the article; CM contributed to data collection; LC critically revised the paper.

All authors had full access to data and are responsible for the integrity and the accuracy of the data.

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(Bondesson, Hellström, Eriksson, & Höglund, 2009; Cutrona et al., 2010; Lin, Yang, Yang, & Lin, 2011; Peterson, Takiya, & Finley, 2003; Sokol, McGuigan, Verbrugge, & Epstein, 2005; Van De Steeg, Sielk, Pentzek, Bakx, & Altiner, 2009; Wu et al., 2010). The rate of adherence to therapy may largely vary, ranging between 20% and 80% according to the type of population, disease, type of measure, and treatment (DiMatteo, 2004; Vik, Maxwell, & Hogan, 2004). Typically, however, the adherence of patients under chronic therapy is poor (Abughosh, Kogut, Andrade, Larrat, & Gurwitz, 2004; Blackburn, Dobson, Blackburn, & Wilson, 2005; Jackevicius, Mamdani, & Tu, 2002), with elderly subjects showing the lowest rates (MacLaughlin et al., 2005).

It has been suggested that several factors may affect the level of adherence to therapy, such as the complexity of a multiple-medication regimen (Goff, Mazor, Meterko, Dodd, & Sabin, 2007; Tsai et al., 2012; Vik et al., 2004), age, ethnicity, environmental factors (O'Brien, Petrie, & Raeburn, 1992; Phatak & Thomas, 2006), patients' beliefs, concerns and knowledge about the disease and the therapy and quality of the relationship between patients and health professionals (Hughes, 2004; MacLaughlin et al., 2005; Osterberg & Blaschke, 2005; Vik et al., 2004). Among these factors, patients' beliefs about medications seem to be a strong positive predictor of adherence (Brown et al., 2005; Gatti, Jacobson, Gazmararian, Schmotzer, & Kripalani, 2009; George, Munro,

McCraig, & Stewart, 2006; Horne & Weinman, 1999; Horne et al., 2004), while negative beliefs, such as patients' perception of necessity and concerns on the potential harmful effects of medications may be associated with intentional or unintentional non-adherence (Horne & Weinman, 1999; Phatak & Thomas, 2006).

Although a large body of evidence documented the importance of adherence to therapy in predicting clinical outcomes, and the association between adherence and medication beliefs in patients of various ages with different health conditions, so far very few studies have specifically investigated this association among patients with multiple chronic co-morbidities and on a complex regimen of medications (AlHewiti, 2014; Gatti et al., 2009; Phatak & Thomas, 2006). Moreover, such studies were carried out only on young adults in outpatient pharmacies (Gatti et al., 2009; Phatak & Thomas, 2006) or were designed as monocentric surveys (AlHewiti, 2014; Phatak & Thomas, 2006).

We thus carried out a multicentric cross-sectional survey in order to evaluate the association between adherence to multi-therapy and patients' beliefs and attitudes toward medications in elderly subjects in a primary care setting.

2. Methods

2.1. Study design, setting and population

This multicentric, cross-sectional study was carried out on a sample of patients from four Italian Regions (Abruzzo, Marche, Puglia, Campania). In each region, participants were randomly extracted from the electronic databases of primary care groups, and all patients who met the following criteria were included: age 65–80, under treatment with ≥ 4 drugs per day for ≥ 2 months, affected by more than one chronic condition among cardiovascular, neurological, respiratory, musculoskeletal, oncologic diseases, or diabetes mellitus. Exclusion criteria were: mental illness, nursing home institutionalization and inability to speak and read Italian language.

From June 2012 to April 2013, in each primary care group a specifically trained nurse asked participation to all the subjects admitted to the GP's office for routine visits and meeting the above mentioned inclusion criteria. After signing an informed consent, all the patients accepting to participate were administered a questionnaire, which was returned in an envelope inside an urn, to guarantee anonymity.

2.2. Questionnaire

The structured questionnaire included three parts:

2.2.1. General information

Demographic information included age, gender, marital status, level of education, and few clinical information, including diseases and disabilities, and the total number of medications per day.

2.2.2. Morisky Medication Adherence Scale (MMAS-8 Italian version)

The 8-item MMAS-8 (Morisky, Ang, Krousel-Wood, & Ward, 2008) consists of seven questions with a yes/no response, plus one question with a 5-score Likert-scale response. We strictly followed the coding instructions and classified adherence as "high" "medium" or "low" if patients scored 8, from 6 to 7, or less than 6, respectively (Morisky et al., 2008).

The Italian version of the MMAS-8 was provided to the researchers by Professor Donald Morisky, after formal requirement of use.

To test the face validity and reliability of the instrument, we distributed the translated questionnaire to twenty Italian elderly patients, which were not included in the study, and evaluated the clarity of the items.

The final Italian version of the MMAS-8 showed a Cronbach's alpha test of internal consistency of 0.725 for the total scale, with significant intra-class correlation coefficient ($p < .001$).

2.2.3. Beliefs about Medicines Questionnaire (BMQ-Italian version)

The BMQ has been described in detail elsewhere (Horne, Weinman, & Hankins, 1999). In brief, it is an 11-item questionnaire that measures subjective beliefs and attitudes toward "specific medications" that have been prescribed for a patient's chronic disease. The questionnaire comprises two sub-scales: the "Necessity" scale, which includes 5 items assessing the personal need of medications' prescription; and the "Concern" scale, which includes 6 items assessing the patients' beliefs about the long-term treatment dangerousness and about medications' toxicity and side effects. Items are structured on a 5-point Likert scale, with higher scores suggesting a stronger endorsement of the construct being measured. The total necessity and concern scores were computed summing all item scores, with overall maximum scores of 25 and 30, respectively. The two total scores were then divided by the number of items to obtain the overall mean score.

According to previous studies (Aikens, Nease, Nau, Klinkman, & Schwenk, 2005; Tibaldi et al., 2009), participants were classified into four attitudinal groups according to their responses to BMQ: after dichotomizing necessity and concern scores at their midpoint (12.5 and 15, respectively), participants were defined as skeptical (low necessity, high concerns), ambivalent (high necessity and concerns), indifferent (low necessity and concerns) or accepting (high necessity, low concerns).

We used the Italian version of the questionnaire, after requesting and obtaining permission by Argentero et al. (2010). The BMQ has been validated for use in forty Italian patients with four chronic conditions (ten patients for each illness group): asthma, diabetes, cardiac and depression. The instrument reliability showed a Cronbach's alpha of 0.78 and 0.72 for the BMQ Necessity and the BMQ Concern scales, respectively (Argentero et al., 2010).

2.3. Outcomes and sample size calculation

The primary outcome of the study was the difference in BMQ Concerns scale score according to adherence category. We expected a higher BMQ Concern score among subjects reporting low adherence, and hypothesized mean scores of 3.5 and 3.0 (SD 1.0) in low and medium adherence subjects, respectively (Tibaldi et al., 2009). Using an unpaired two-tailed t-test, assuming an alpha-error 0.05, and a proportion of low adherence subjects of 40% in the final sample, a minimum of 179 subjects were requested to achieve a 90% statistical power. Considering the potential misclassification bias of studies on self-reported adherence, we conservatively opted to enroll at least 358 subjects. Given that the results were opposed to those expected, we decided to further enroll at least 200 subjects, for a final sample of 567 individuals.

2.4. Data Analysis

Both multivariable logistic and linear regression analyses were used to evaluate potential independent predictors of adherence. In logistic analysis, which was the main analysis according to MMAS-8 (coding instructions), the dependent variable was medium versus low adherence. We could use binomial logistic since none of the participants scored "8" at the MMAS-8 and we only had two adherence categories. In the secondary linear regression analysis, the dependent variable was MMAS-8 adherence score. Because the number of success ($n = 304$) was sufficient to contain overfitting, we defined the regression models a priori including all recorded variables (age, gender, educational level, marital status, n. of prescribed drugs, diabetes and other diseases, BMQ concern and necessity scores and, separately, BMQ groups). Each covariate was tested in its original form or transformed if needed (Shapiro-Wilk). In addition, each variable included was tested for multicollinearity, for potential interaction and/or quadratic/cubic terms.

In logistic regression analysis, the outlier analysis was based upon the calculation of Pearson and standardized residuals, the change in Pearson chi-square and deviance chi-square, Dbeta influence statistic

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