RESEARCH

Medication Adherence in a Sample of Elderly Suffering from Hypertension: Evaluating the Influence of Illness Perceptions, Treatment Beliefs, and Illness Burden

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ABSTRACT

BACKGROUND: Although many advances in the management of hypertension have been made, success in hypertension control in real-life practice is limited. Control of hypertension is paramount in primary as well as secondary prevention of cardiovascular disease. Poor adherence to antihypertensive medication is one possible reason why success in clinical trials has not been translated into everyday practice. Despite many years of study, questions remain about why patients do or do not take medicines and what can be done to change their behavior. Although trends in adherence patterns across hypertensive patients is briefly documented in the literature, the role of perceived illness burden in addition to illness perceptions and medication beliefs in elderly people with hypertension is unclear.

OBJECTIVE: To assess the collective influence of illness perceptions, medications beliefs, and illness burden on medication adherence of a sample of elderly people suffering from hypertension.

METHODS: A cross-sectional questionnaire survey research design, utilizing convenience sampling strategies and a battery of self-administered health surveys, was adapted to address key study objectives. Previously validated instruments, such as the Brief Illness Perception Questionnaire, Pictorial Representation of Illness and Self Measure Revised II, Beliefs about Medicines Questionnaire, and Morisky Medication Adherence Scale, were utilized to assess illness perceptions, perceived illness burden, medication beliefs, and medication adherence, respectively. Conceptualized associations among the study variables were explored and tested to assess their individual, as well as collective, impact on medication adherence. In addition, combined predictive abilities of key variables in explaining the variations in medication adherence were determined using appropriate bivariate and multivariate statistics.

RESULTS: The majority of the sample was white (76.9%); 52.1% was over aged 65 years of which 47.9% attended some college, while 70.1% accessed adult day care centers. A usable sample of 117 respondents was retained for statistical analysis. From multiple linear regression analysis, it was observed that perceptions about illness, perceived illness burden, and beliefs about medication jointly played a significant role in the prediction of medication adherence (R-squared = 0.328). Significant bivariate correlations among study variables further indicated that threatening view of illness translated into higher levels of self-reported adherence with hypertensive medications ($r = 0.332$, $P < 0.001$), which in turn was associated with lower perceived illness burden ($r = 0.423$, -0.444, $P < 0.001$). The respondents reported illness-related "Stress" (49.1%) as a primary cause of hypertension in their opinion, followed by "Lifestyle" (43.8%) and "Heredity" (7.1%) factors. Perceived concerns about the benefits of medication played a more significant role in the prediction of adherence and perceived illness burden than the risks associated with their use.

CONCLUSIONS: This study provides insights into how perceptions of illness and burden relate to medication adherence in hypertension. More benign perceptions of illness and greater perceived illness burden translate to lower medication adherence. Positive beliefs regarding medications are also crucial for shaping adherence behavior of elderly hypertensive individuals. Threatening views of illness and stronger beliefs of the necessity of medications contribute substantially to positive medication adherence. Interventions and programs aimed at building adherence in elderly hypertension patients need to recognize the value and importance of patient perceptions of illness and medications in shaping adherence behavior.

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What is already known about this subject

- By 2030, the number of people suffering from hypertension is estimated to increase additionally by 27 million, a 9.9% increase from the 2010 estimate of 76 million.
- Rate of control of hypertension varies from 29% to 50%.
- Approximately 55% of the elderly do not follow the medication regimens prescribed by their physicians.

What this study adds

- Favorable perceptions of illness and lower perceived illness burden in addition to favorable beliefs about medication translate to high medication adherence.
- Pictorial representation of illness and self-measure are identified as tools in addition to paper-pencil tests that can be utilized for assessing burden in elderly people with hypertension.

Hypertension is the term used to describe high blood pressure. Hypertension exists when blood pressure is 140/90 millimeters of mercury (mmHg) or above, most of the time.[1] Data from the National Health and Nutrition Examination Survey report that 1 in every 3 American adults aged 20 years or older (30.6% of the U.S. population) suffer from hypertension.[2] Furthermore, a study by Heindenreich et al. (2011), forecasting the prevalence of cardiovascular disease in the United States by 2030, projects an estimated additional 27 million people suffering from hypertension, a 9.9% increase in prevalence from the 2010 estimate.[3] In addition to a high and increasing prevalence rate, hypertension is also reported to be the leading cause of cardiovascular disease worldwide.[4] Hypertension results in an economic burden of $47.5 billion

annually in direct medical expenses and $3.5 billion each year in lost productivity.[3] Therefore, control of hypertension is paramount in primary as well as secondary prevention of cardiovascular disease.[5]

Studies have documented the benefits of controlling hypertension, which result in reduced associated risk of stroke, coronary heart disease, congestive heart failure, and mortality.[6,7] However, studies evaluating data from those with hypertension—obtained from various sources such as national survey data, epidemiologic studies, ambulatory care practices, and high-risk patients—report a varying rate of hypertension control ranging from 29% to 50%.[4,8-17] Medication nonadherence is cited as the primary cause for lack of hypertension control.[5,18] Medication nonadherence is defined as the failure to adhere to medication instructions, either willfully or inadvertently. Instances of nonadherence can include failing to initially fill a prescription, taking more or fewer doses than instructed, and taking medications that have been prescribed for someone else.

Medication Adherence in the Elderly with Hypertension

The prevalence of hypertension increases with advancing age to the point where more than half of people aged 60-69 years and approximately three fourths of those aged 70 years and older are affected.[4] Lifetime risk of hypertension is estimated to be approximately 90% for men and women who were nonhypertensive at 55 or 65 years and survived to aged 80-85 years.[7] Furthermore, as compared with the nonelderly, elderly patients, aged 55 years and above, tend to suffer from multiple sociomedical conditions, which usually result in complex drug regimens.[19] In addition to complex drug regimens, elderly patients may also suffer from reduced physical and cognitive abilities that affect vision, hearing, strength, and proper cognitive functioning.[20] Decreased physical and cognitive abilities, coupled with complex drug regimens, can adversely affect the activities of daily living including self-care behaviors such as medication adherence.[21] Current research indicates that 55% of the elderly do not follow the medication regimens prescribed by their physicians.[22]

Factors Affecting Medication Adherence

Causes of medication nonadherence is often multifactorial but can be broadly broken down into 2 categories: intentional and nonintentional. Intentional nonadherence is an active process whereby the patient chooses to deviate from the treatment regimen, motivated by a rational decision-making process. Unintentional nonadherence is a passive process in which the patient may be careless or forgetful about adhering to the treatment regimen.[23,24] Specific to hypertension, fear of hypertensive complications, desire to control blood pressure, and faith in physician are the primary documented reasons for treatment adherence, while misunderstanding of the condition, perceived improvement in health, worsening of health, general disapproval of medications, and concern over side effects are primary documented reasons for treatment nonadherence.[18,25]

Implications

For elderly people with hypertension, nonadherence to medication regimens can result in the increased use of medical resources, such as nursing homes, hospitals, physician visits, and in unnecessary treatment. Furthermore, nonadherence to medication regimens may also result in therapeutic failure. Consequently, in elderly people suffering from hypertension, medication nonadherence is a growing concern to clinicians, health care systems, and other stakeholders because of mounting evidence that it is prevalent and associated with adverse outcomes and higher costs of care. This purpose of this study was to evaluate the role of illness perception, medication beliefs, and illness burden in medication adherence in a sample of elderly people suffering from hypertension.

Methods

Study Design and Selection

A cross-sectional survey research design, utilizing a convenience sample and a battery of self-administered surveys, was adopted to address the study objective. The survey questionnaire was administered to assess the relationship between perception of illness, perceived illness burden, beliefs about medications, and medication adherence in a sample of elderly suffering from hypertension. The study was approved by the Institutional Review Board, and all participants were required to sign an informed consent form prior to answering the questionnaire.

Study participants were required to be at least 55 years old, self-reported hypertensive, and prescribed at least 1 antihypertensive medication to be taken daily. Eligible participants for the study were recruited from an adult day care center in the New York City region and from an annual gathering of seniors attending a social activity on a New York City area university campus on the eve of Veterans Day. Figure 1 outlines the source of participants for the study and number of usable questionnaires received.

Study Instruments

The survey consisted of a collection of instruments that measured the dependent variable—medication adherence—and its association with the independent variables of illness perception, burden of illness, and beliefs about medications. A pilot testing was conducted to ensure readability of the questionnaire.

Morisky Medication Adherence Scale (MMAS). This 4-item dichotomous scale was used to assess the antihypertensive *medication adherence* in study participants. The scale is scored on the basis of numbers of questions answered as yes (1) or no (0), where "4" is the highest possible score and "0" is the

FIGURE 1 Responses Obtained from Different Study Sites

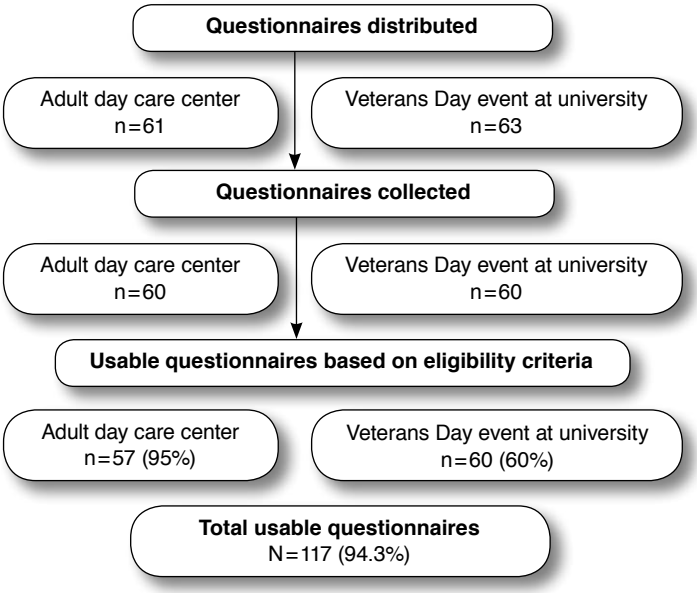
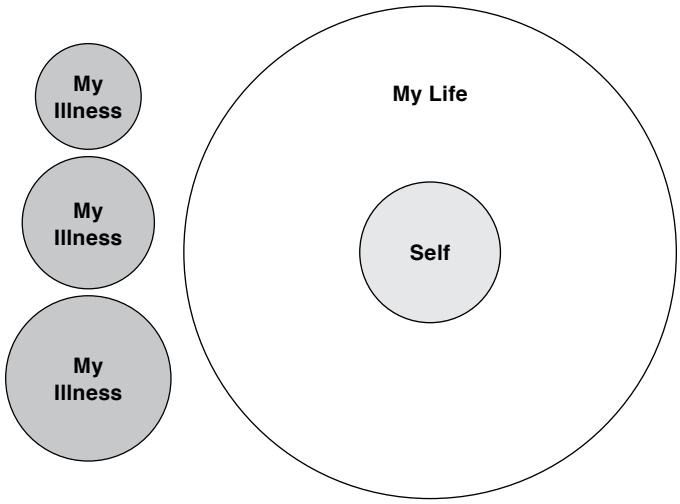


FIGURE 2 Pictorial Representation of Illness Self Measure-Revised II



lowest possible score. Higher scores translate to higher medication adherence as compared with lower scores.[26]

Brief Illness Perception Questionnaire-Revised (BIPQ-r). This instrument assessed *perceptions* of hypertension as an illness in study participants. BIPQ-r, a 9-item scale, is an abbreviated version of the Illness Perception Questionnaire-Revised (IPQ-r) that contains 1 question that best summarizes the items in each subscale of the IPQ-r.[27] Eight of 9 scale items in BIPQ-r are rated from 0-10, while the ninth item requires participants to rank in order from 1 to 3 "Lifestyle," "Stress," or "Heredity," as their perceived cause of illness. Lifestyle, stress, and heredity were identified to be most prevalent perceived causes of hypertension.[28] Higher composite scores on BIPQ-r translate to a more threatening view of the illness.

Beliefs about Medicines Questionnaire (BMQ). This questionnaire was used to assess *beliefs* about antihypertensive medications in study participants. The BMQ comprises 2 scales: Specific Beliefs (10 items) and General Beliefs (8 items). The Specific Beliefs scale is further divided into 2 subscales: Specific Necessity Beliefs (5 items) and Specific Concern Beliefs (5 items). General Beliefs is divided into General Harm Beliefs (4 items) and General Overuse Beliefs (4 items). Individual medication concerns were assessed by the Specific Concern Beliefs component. According to Horne (1997), individuals with strong specific concerns about their medications tend to be more distrustful of them and, thus, more nonadherent.[29] The Specific Necessity Beliefs subscale assesses the beliefs of individuals about the necessity of their medications, where having a strong necessity belief translates into higher medication adherence. The General Harm score signifies the degree of an individual's beliefs that his or her medications are harmful; therefore, a lower General Harm score means higher medication adherence. The General Overuse scores signifies the degree of an individual's belief that his or her physician overprescribes medication; therefore, a lower General Overuse score means higher medication adherence.[29] All 18 items on the scale utilize a 5-point Likert scale. The first 10 items evaluate attitudes about the necessity of, and the level of concern about, the medication the patient is currently taking. The next 8 questions are about general attitudes toward medicines. Scale scores are computed from the sum of answers to all the relevant questions.[29]

Beliefs about Medicines-Differential Score (BMQ-d). In addition to assessment of participants' beliefs about medication, we also evaluated the BMQ-d scores for all study participants. BMQ-d scores are obtained from the difference of specific necessity scores and specific concern scores. BMQ-d scores can be thought of as the cost-benefit analysis for each patient, for whom costs (concerns) are weighed against perceived benefits (necessity beliefs).

Pictorial Representation of Illness and Self Measure (PRISM). This tool is a generic measure of suffering.[30] PRISM-Revised II (PRISM-RII) was used in this study to assess *perceived burden* due to hypertension in the study participants. The PRISM-RII[31] consists of a large white circle, representing the participant's "life," with a yellow disk placed in the middle

TABLE 1 Study Participant Characteristics

Sample Characteristics	%[a]	Frequency[b] (N = 117)
Gender		
Male	64.1	75
Female	35.9	42
Ethnicity		
Whites/Caucasians	76.9	90
Blacks/African Americans	18.8	22
Age		
55-65 years	23.9	28
> 65 years	52.1	61
Education		
High school graduate	22.2	26
Some college	47.9	56
College graduate	25.6	30
Did not attend college	4.2	5
Marital status		
Single	28.2	33
Married	35.9	42
Divorced	22.2	26
Years since hypertension		
Seven years or more	96.6	113
Number of antihypertensive medications taken daily		
1 medication	11.1	13
2 medications	45.3	53
3 medications	39.3	46
Name of drug class		
Diuretics	39.3	46
Ace inhibitors	37.6	44
Alpha blockers	30.8	36
Number of other medical conditions		
1 illness condition	12.8	15
2 illness conditions	45.3	53
3 illness conditions	39.3	46
Name of medical condition		
Any type of arthritis	75.2	88
Heart-related disorder	94.0	110
Osteoporosis	31.6	37
Type of senior care institution attended		
Adult day care	70.1	82
Don't know	0	0

[a]*Cumulative percentage adds up to more than 100%, since participants were instructed to choose "all that applies."*

[b]*Only top 3 major findings per demographic variable are reported in the table. Missing values: age = 17, kind of senior care institution = 2, total comorbid disease conditions = 15, number of prescription medications taken = 1, number of other medical conditions = 1.*

TABLE 2 Descriptive Statistics for Morisky Medication Adherence Scale

Morisky's Composite Score[a]		%	Frequency
0	High	18.8	22
1	Medium	34.2	40
2		12.8	15
3	Low	21.4	25
4		12.8	15
Total		**100.0**	**117**

[a]*Interpretation: The lower the Morisky's composite score, the lower the medication adherence; the higher the composite score, the higher the medication adherence. According to Morisky et al.,[26] 0 = high medication adherence; 1, 2 = medium medication adherence; 3, 4 = low medication adherence.*

and in front of the white disk, representing the participant's "self" (Figure 2). Three differently sized red disk stickers were provided to the participants, representing the participant's "illness" (hypertension). The illness disks were, respectively, smaller than, equal to, and larger than the "self" disk. Patients were given the following oral instructions: "The white circle represents your current life and the yellow disk represents you. The three red disks represent your hypertension. Select from the three red disks the one which, in your view, represents your hypertension most accurately. Peel the sticker and place it into your 'life.' Place the disk at the place that the hypertension occupies in your life, as perceived by you. You can place the disk anywhere in your life, also entirely or partially on top of your 'self' (yellow disk)."[32] Two measures were extracted from the PRISM-RII: Self-Illness Separation (SIS), the distance from the center of "perceived illness," red disk, and "self," yellow disk (0 centimeters [cm]-10 cm), and the Illness Perception Measure (IPM), ranging from 1 to 3, with 1 representing the smallest disk and 3 the largest disk.

The distance from the center of the yellow disk (self) and the selected red disk (IPM, SIS) signifies a healthy adjustment to the illness. The greater the distance between the centers of the yellow and red disks, the stronger the hold participants have over their illness.[33] The size of the red disk (IPM) is hypothesized to measure the perceived severity of the illness—the smaller the disk, the lower perceived severity of illness.[32] Therefore, higher SIS and lower IPM together result in lower perceived illness burden.

Convergent validity of the responses obtained from PRISM-RII was established by calculating mutual Pearson's correlation between SIS and IPM scores with participants' cumulative scores on the World Health Organization's 5-item Well-Being Index (WHO-5) and their scores on the 1-Likert scaled item Suffering Questionnaire (SQ).[32] The WHO-5 is a short, self-administered questionnaire covering 5 positively worded items rated on a scale of 0 (at no time) to 5 (all the time), where patients select how they have been feeling over the last 2 weeks. The higher numbers mean better well-being. Suffering Questionnaire probed the degree of participants' suffering from hypertension on a scale anchored by not at all (0) to very much (4).

TABLE 3 Multiple Linear Regression Model to Assess the Collective Influence of Independent Variables on the Dependent Variables

Independent Variables	B	Standard Error	β	t	sig
Illness perceptions					
BIPQ-r composite score	0.023	0.010	0.236	2.364	0.020[a]
Beliefs about medication					
Specific concern	-0.053	0.024	-0.178	-2.155	0.033[a]
Specific necessity	0.020	0.026	0.067	0.750	0.455
General overuse	-0.025	0.035	-0.074	-0.721	0.473
General harm	-0.043	0.050	-0.071	-0.851	0.396
Illness burden					
SIS	0.028	0.106	0.040	0.261	0.795
IPM	-0.600	0.282	-0.330	-2.129	0.036

[a]*Model fit statistics: $R^2 = 0.328$; $r = 0.573$; $F = 7.390$. Correlation is significant at 0.01 level, 2 tailed.*

β = estimates resulting from analysis performed on variables that have been standardized so that they have variances of 1 to determine which of the independent variables have a greater effect on the dependent variable; B = values for the regression equation for predicting the dependent variable from the independent variable; BIPQ-r = Brief Illness Perception Questionnaire-Revised; F = F-statistic; IPM=Illness Perception Measure; r = correlation between the observed and predicted values of dependent variables; sig = significance; SIS=Self-Illness Separation; t = T-statistic.

Results

Of the 124 questionnaires that were distributed at 2 different study sites, 120 were collected. Following data collection, responses from the 120 questionnaires were coded, scored, and entered into the SPSS 17.0 database for further analyses (SPSS, Inc., Chicago, IL). Of these, 117 coded questionnaires were usable; 3 questionnaires were judged to be incomplete after data entry. Most of the sample comprised questionnaires from Caucasians (76.9%), and about 18.8% represented Blacks/African Americans (Table 1). More than half (52.1%, n = 61) of the study sample were over aged 65 years. Sixty-four percent of the sample participants were male, while 35.9% were female. Of all the participants, 47.9% (n = 56) attended some college; 25.6% (n = 30) were college graduates; and 4.27% (n = 5) did not attend college. Most of the study sample (n = 113, 96.6%) had hypertension since 7 years prior to being approached for this study (Table 1). Eighty-four percent (n = 99) of the study participants took at least 2 medications daily.

Cronbach's alpha coefficient for the MMAS was calculated to be 0.681, which is similar to Morisky et al. (1986)[26] The Cronbach's alpha for the WHO-5 was calculated to be 0.969, indicating a good measure of internal consistency. However, owing to the study design, test-retest reliability was not performed for the BIPQ-r.

A total of 18.8% of study participants responded "no" to all 4 items of the MMAS (Table 2), indicating high levels of medication-taking behavior. Patients answering "yes" to 1 or more items comprised 81.2% of study participants.

Model Fit

In order to assess the collective influence of illness perceptions, medication beliefs, and illness burden on the medication adherence of the study sample, independent variables were regressed on the dependent variable. BIPQ-r composite scores indicating illness perceptions of study participants; BMQ subscale composite scores (specific concern, specific necessity, general harm, general overuse) indicating beliefs about medication; and SIS and IPM scores indicating illness burden were regressed on the MMAS composite score, the dependent variable. Table 3 shows results from the multiple linear regression model. All the independent variables collectively explained about 32% variance in the adherence score (R^2 value = 0.328).

Illness Perception and Medication Adherence. In order to assess the influence of perceptions of illness on the medication adherence of the study sample, a correlation analysis was performed between the BIPQ-r composite scores and the MMAS composite scores. Table 4 depicts a positive and significant correlation (r = 0.332, $P < 0.001$) between medication adherence illness perceptions, suggesting that higher scores on the BIPQ-r scale (meaning more threatening view of illness) would translate into higher levels of medication adherence. Table 5 shows that the majority of the participants (n = 56, 49.1%) rank-ordered stress as the number 1 perceived cause of their hypertension, followed by lifestyle (n = 50, 43.8%), and heredity (n = 8, 7.1%).

Beliefs About Antihypertensive Medications. To assess the study participants' beliefs about their hypertensive medications and their influence on medication adherence, a correlation analysis was performed between BMQ subscale composite scores and MMAS composite scores. As shown in Table 6, a weak negative and significant association (r = -0.227, $P = 0.014$) was observed between specific concern scores and medication adherence, indicating that individuals with strong concerns about their medications tend to have lower medication adherence. A weak positive and significant correlation (r = 0.245,

TABLE 4 Correlation Between Medication Adherence and Illness Perceptions

Dependent Variable	N	BIPQ-r Composite Score[a]
Morisky's composite score	117	0.332[b]

[a]*Interpretation: Higher BIPQ-r score = more favorable illness perceptions.*
[b]*Correlation is significant at 0.001 level, 2 tailed.*
BIPQ-r = Brief Illness Perception Questionnaire-Revised; Morisky = Morisky Medication Adherence Scale.

TABLE 5 Cause of Illness as Perceived by the Participants, As Rank-Ordered by the Respondents

Rank Order	Frequency	%
Stress, heredity, lifestyle	3	2.6
Stress, lifestyle, heredity	53	45.3
Lifestyle, stress, heredity	44	37.6
Lifestyle, heredity, stress	6	5.1
Heredity, stress, lifestyle	2	1.7
Heredity, lifestyle, stress	6	5.1
Total	**114**	**97.4**

$P = 0.008$) was observed between specific necessity scores and medication adherence, indicating that individuals with strong beliefs that their medications are necessary for them tend to have higher medication adherence. A weak negative correlation ($r = -0.039$, $P = 0.676$) was observed between general harm scores and medication adherence, indicating that individuals with strong beliefs that medications are harmful to them tend to have lower medication adherence. A weak negative and significant correlation ($r = -0.0342$, $P < 0.001$) was observed between general overuse scores and medication adherence, indicating that individuals with strong beliefs that their physicians overprescribe their medications, and fear of medication overuse, tend to have lower medication adherence.

Perceived Illness Burden. Table 7 shows correlation analysis between illness burden (SIS and IPM scores) and medication adherence. A positive and significant association ($r = 0.423$, $P < 0.001$) was observed between self-illness separation scores and medication adherence, whereas a negative and significant association ($r = -0.444$, $P < 0.001$) was observed between illness perception measures and medication adherence. According to Table 6, the higher the SIS, and lower the IPM, the higher the medication adherence tends to be. Therefore, individuals with a greater self-illness separation (SIS) and a lower illness perception were observed to have higher scores on the MMAS. Higher scores on the MMAS translate to higher medication adherence.

Correlations between PRISM-RII (IPM and SIS) and other variables are presented in Table 8. The correlation between SIS and IPM was negative and significant ($r = -0.841$, $P < 0.001$). As expected, IPM scores correlated significantly and negatively

TABLE 6 Correlation Between Medication Adherence and Beliefs About Antihypertensive Medications

Dependent Variable	N	SPC	SPN	GO	GH
Morisky's composite score[a]	117	-0.227[b]	0.245[b]	-0.342[b]	-0.039

[a]*Interpretation: Lower SPC beliefs score imply weak beliefs or distrust towards medication; higher SPN beliefs scores imply strong necessity to take medication; lower GO beliefs scores imply diminished beliefs that physicians overprescribe medications; lower GH beliefs scores imply diminished beliefs about medications as harmful.*
[b]*Correlation is significant at 0.001 level, 2 tailed.*
GH = general harm score; GO = general overuse score; Morisky = Morisky Medication Adherence Scale; SPC = specific concern score; SPN = specific necessity score.

TABLE 7 Association Between Medication Adherence and Perceived Illness Burden

Dependent Variable	N	SIS	IPM
Morisky's composite score[a]	117	0.423[b]	-0.444[b]

[a]*Interpretation: Higher SIS scores and higher IPM scores imply lower perceived illness burden.*
[b]*Correlation is significant at 0.001 level, 2 tailed.*
IPM = Illness Perception Measure; Morisky = Medication Adherence Scale; SIS = Self-Illness Separation.

with WHO-5 scores ($r = -0.201$, $P < 0.031$). SIS scores showed no significant association with WHO-5 results ($r = 0.142$, $P > 0.126$). SIS and IPM scores both showed opposite, significant associations with SQ results (SIS: $r = 0.847$, $P < 0.001$; IPM: $r = -0.828$, $P < 0.001$).

Table 9 shows that BMQ differential scores correlate positively and significantly ($r = 0.301$, $P < 0.001$) with medication adherence, inferring that higher scores on the BMQ-d translate to higher medication adherence. Therefore, for the study participants, beliefs about the benefits of taking medications outweigh the costs or concerns of the medications.

Discussion

This study provided insights into how perceptions of illness and burden relate to medication adherence in hypertension. More benign illness perceptions, along with greater perceived burden of illness, lead to lower medication adherence. Positive beliefs regarding medications are also crucial for shaping adherence behavior of elderly hypertensive individuals. Threatening views of illness and stronger beliefs about the necessity of medications contribute substantially to positive medication adherence.

In assessing medication adherence using the MMAS, the majority of the study participants exhibited medium- to low-medication adherence patterns, while only a handful of participants exhibited high adherence rates. Low adherence rates

TABLE 8 Convergent Validity for PRISM-RII

Variables[a]	N	SIS	IPM	SQ	WHO-5
WHO-5 scores	117	0.142	-0.201[b]	-0.166	1
SQ scores	117	-0.847[c]	0.828[c]	1	-0.166
SIS	117	1	-0.841[c]	-0.847[c]	0.142
IPM	117	-0.841[c]	1	0.828[c]	-0.201[b]

[a]*Interpretation: Lower SIS scores and higher IPM scores imply lower perceived illness burden; higher WHO-5 scores imply better well-being; lower SQ scores imply lower suffering from illness.*

[b]*Correlation is significant at 0.01 level, 2 tailed.*

[c]*Correlation is significant at 0.001 level, 2 tailed.*

IPM = Illness Perception Measure; SIS = Self-Illness Separation; SQ = Suffering Questionnaire; WHO-5 = World Health Organization Well-Being Index.

TABLE 9 Association Between Medication Adherence and BMQ Differential Score

Dependent Variable	N	BMQ-d
Morisky's composite score[a]	117	0.301[b]

[a]*Interpretation: Lower BMQ differential scores imply that concerns about cost of medications outweigh the necessity of taking the medications.*

[b]*Correlation is significant at 0.001 level, 2 tailed.*

BMQ-d = Beliefs About Medicines Questionnaire-differential score.

within our study sample can be attributed to multiple factors, including the following: the majority of the participants were aged 65 years and older, taking more than 1 medication, and suffering from more than 1 medical condition.

Reviewed literature amply demonstrates that illness perceptions and beliefs about medication significantly affect medication compliance in chronic disease conditions in the general population. However, the impact of these variables on compliance particularly in the elderly is poorly documented, especially when burden of illness is factored into the equation. Patient cognitive models of their illnesses are, by their nature, private. Patients are often reluctant to discuss beliefs about their illnesses in medical consultations because they fear being seen as misinformed. Until recently, assessment of illness perceptions has been by open-ended interviews designed to encourage patients to elaborate their own ideas of their illnesses. The BIPQ-r scale used in our study assessed perceptions on each of the above mentioned dimensions by asking patients for their own perceptions about their illnesses. The BIPQ-r is a shorter version of the IPQ-r and is designed to be more suitable for patients who are frailer, as it is less taxing and much quicker to complete. It is also more acceptable to elderly participants, who can be limited in their ability to read and respond.[29] Analysis showed that study participants with favorable illness perceptions and lower perceived illness burden tend to be more adherent to their medications than study participants with unfavorable illness perceptions.

PRISM-RII was used in this study as a tool to assess perceived burden due to hypertension in the study participants. This study is a first to apply PRISM-RII to the assessment of illness burden in association with medication adherence in a sample of elderly with hypertension. Prior to this study, studies that employed PRISM-RII to assess illness burden utilized it in research on most chronic disease conditions except hypertension and, specifically, in the elderly. Although the concept of suffering is abstract, a vast majority of participants in our study were able to complete the PRISM-RII questionnaire, which required extensive use of graphic tools to gather subject response, with little difficulty, especially after having been provided with a demonstration of its use prior to its administration. Preliminary findings from our study indicate that PRISM-RII might, in fact, be a useful tool for measuring the burden of hypertension in the elderly. Specifically, we observed that, the stronger the elderly felt that hypertension played a major role in defining their self (higher SIS scores) and the more favorable were their impressions of the medical condition (lower IPM scores), the more likely they were to be adherent to antihypertensive medications. Moreover, validation statistics that were performed as part of the study showed the instrument to have adequate validity in patients with hypertension.

Limitations

Owing to the cross-sectional study design, test-retest reliability for evaluating internal consistency of the BIPQ-r could not be conducted. Additionally, study participants were recruited from a small geographic region within New York City; therefore, the generalizability of the study sample may be limited. Furthermore, a convenience sampling methodology was used to collect data. As a result, there may have been some volunteer bias in the results obtained. Because the respondents were not randomly sampled or selected, statistical results have to be viewed with caution, since representative normal distributions were not obtained.

Conclusions

Based on reviewed literature, the perspective of a patient towards medication adherence is gaining importance over a provider's insistence on a patient's adherence with written or oral instructions to take medications. Prior to this study, the influence of the perception of hypertension, in addition to beliefs about antihypertensive medications and perceived illness burden, was not clearly understood. While adherence to medication is necessary, an evaluation of the factors contributing to lack of adherence is important in identifying the reasons leading to low adherence and resulting therapeutic failure. An understanding of these factors can help shape future interventions and programs aimed at building increasing medication adherence in elderly hypertensive patients by incorporating perception of illness, beliefs about medications, and perceived illness burden in order to achieve desired patient outcomes.

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DISCLOSURES

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Both authors contributed equally to study concept and design. Rajpura was responsible for data collection, and Rajpura and Nayak interpreted the data. Both authors contributed equally to the writing of the manuscript, and Rajpura revised the manuscript.

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