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Self-Reported Barriers to Medication Use in Older Women: Findings from the Women’s Health Initiative

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Abstract

Objectives: To describe the prevalence of, types of, and characteristics associated with self-reporting multiple (2) barriers to medication use in older women using chronic cardiovascular and oral hypoglycemic medications.

Methods: Design: Cross-sectional. Setting: Women’s Health Initiative (WHI) (2005–2010). Participants: Women who were using any chronic medication from three target classes (i.e., antilipemics, antihypertensives, oral hypoglycemics) for at least a month and who had answered questions about barriers to medication use at year 4 (2009) of the study period (N=59,054).

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1. Conceptualization: ZM, SV, SG
2. Data curation: SV
3. Formal analysis: SV
4. Funding acquisition: AL
5. Investigation: ZM, SV, SG
6. Methodology: ZM, SV, ST, LH, YW, AS, AL, SG
7. Project administration: ZM, SV
8. Resources: SV
9. Software: SV
10. Supervision: ZM, SG
11. Validation: ZM, SV
12. Visualization: ZM, SV
13. Writing – original draft: ZM, SV, SG
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Conflicts of Interest: None of the authors has a conflict to report.

Measurements: Common self-reported barriers to medication use, as well as sociodemographic, health characteristic, medication use, and access to care variables were additionally evaluated. Multivariable logistic regression models were used to examine associations between participant characteristics and barriers to medication use.

Results: Among the participants, 47,846 (81%) reported no barriers, 7105 (12%) reported 1 barrier, and 4103 (6.9%) reported 2 barriers to medication use. The most common barriers reported were having concerns about side effects, not liking to take medications, and medications costing too much. Several characteristics were found to be associated with reporting 2 barriers in multivariable modeling, including demographic (e.g., lower age, Black race, Hispanic ethnicity) and health/medication (e.g., lower quality of life, lower physical function, higher number of concurrent medications) characteristics.

Conclusion: Among older women using chronic cardiovascular and oral hypoglycemic medications, approximately 20% reported at least one barrier to medication use, with 7% of women reporting multiple barriers. Pharmacists should prioritize identifying barriers to medication use in older women using chronic medications to improve patient care.

Keywords

medication adherence and persistence; medication safety; geriatrics

BACKGROUND

Medication use is common in older adults aged 65 years, with 36% of community-dwelling older adults reporting use of 5 or more medications on a regular basis, frequently resulting in medication non-adherence.¹⁻³ Medication non-adherence can be viewed as two underlying constructs – the extent of (how common) and reasons for (barriers to) medication non-adherence.⁴ Some of the most common barriers to medication use reported by older adults are regimen complexity, cost, and side effects.⁵ Clinically, it is important for pharmacists and other healthcare providers to identify the most common barriers to medication use in older adults in order to provide patient-centered care.

Chronic cardiovascular drugs (e.g., antilipemics, antihypertensives) and oral hypoglycemics are some of the most frequently used drugs among older adults.¹ As chronic cardiovascular disease and diabetes increase morbidity and mortality, optimal management with medications is important.⁶ Prior studies on medication use barriers in older adults have been limited by focusing on single disease states (e.g., CHD) and individual barriers (e.g., medication cost), as well as using small sample sizes.⁷⁻⁹ Older adults reporting multiple barriers to, or more concerns toward, medication use have been shown to be at highest risk for medication non-adherence¹⁰.

OBJECTIVE

Our objective was to describe the prevalence of, types of, and characteristics associated with self-reporting multiple (2) barriers to medication use by older women taking chronic cardiovascular and oral hypoglycemic medications in the Women's Health Initiative (WHI), a national, population-based study among postmenopausal women.

METHODS

Study Population

This cross-sectional study included community-dwelling postmenopausal women who were enrolled in an Extension Study from 2005–2010 of the WHI (N=115,407). The WHI observational study recruited women between October 1, 1993, and December 31, 1998, at 40 clinical centers in the USA. Women were eligible if they planned to remain in the area where they lived at the time of recruitment and had an estimated survival of at least 3 years. The study methods have been described in detail elsewhere.¹¹ At the closeout of the main WHI study in March 2005, women were invited to participate in an additional 5 years of follow-up in the Extension 1 Study. The consent rate for the Extension Study was 71.3%. Among these women, 97,448 completed the medication inventory at Year 4 (2009), which served as the index date for this analysis. Women were asked to assemble their prescription and over-the-counter medications taken in the past 2 weeks and to write them down on a mailed form. Women were instructed to record medication use information directly from the medication containers. Women were also asked how long they had used each medication. Women who needed assistance with the form could request a phone call to complete the form by interview. We included women who had answered questions about self-reported barriers to medication and who were using any chronic medication from three target classes (i.e., antilipemics, antihypertensives, oral hypoglycemics) for at least one month (N=59,054). Informed consent was obtained, and all protocols were approved by the respective institutional review board at the participating institutions.

Self-Reported Barriers to Medication Use

Self-reported barriers to medication use were collected once during Year 4 of Extension 1 of WHI. Participants were asked, “*Have any of the following barriers prevented you from obtaining or taking any medications that have been prescribed for you?*” The barriers represented a list of 10 of the most common self-reported barriers to medication use, developed by WHI investigators.⁵ These items are aligned with one component of Necessity-Concerns Framework – i.e., concerns about taking medication.¹² Participants also had the option to respond that they have not experienced any barriers to taking prescription medications.

Covariates

Sociodemographic information included self-reported race and ethnicity, education, and family income. Age was expressed as age at index date. For health characteristics, information closest to the index date was used. Women were asked to rate their quality of life on a scale from 0 (worst) and 10 (best). This self-reported score was then multiplied by 10. Quality of life was defined as low (0–50), moderate (50–69), and high (70).¹³ Activities of Daily Living (ADL) were measured using four activities: feeding, dressing, transferring, and bathing. Dependence in ADLs was operationalized as reporting needing “some help” in any of the four activities. Physical function was assessed using the 10-item Scale from the Rand 36-item Health Survey (SF-36) and operationalized as low, moderate, or high based on tertile.¹⁴

The total number of prescription and non-prescription medications that women reported taking was calculated. A dichotomous measure (user/non-user) was created for use of any of the three target classes – antihypertensive, antilipemic, and/or oral hypoglycemic medications – and a count variable (range=1–3) was generated.

Medicare coverage was determined using a Centers for Medicare and Medicaid Services (CMS) enrollment file that WHI receives from CMS. Women were defined having Medicare coverage if they were enrolled in Medicare Part A or B, with or without health maintenance organization (HMO) enrollment. Self-reported living assistance was measured as receiving any special service (such as help with transportation, meals, medicines, or bathing). Women who engage in preventive healthcare may be more likely to have better access to care and, in turn, fewer barriers to medication use. To assess preventive health behavior, we examined self-reported receipt of a mammogram, flexible sigmoidoscopy, or bone density scan in the four years prior to the index date.

Statistical Analysis

Descriptive characteristics were reported by number of barriers (no barriers, 1 barrier, and 2 barriers). The mean and standard deviation is presented for continuous variables, and the frequencies and percentages for categorical variables. For continuous variables, F-tests (ANOVA) were used to compare the three groups. For categorical variables, chi-squared tests were used to compare groups. We described the prevalence of individual barriers among those reporting only 1 barrier (for descriptive purposes) and among women reporting 2 barriers (for modeling). Because older adults reporting multiple barriers to, or concerns toward, medication use have been shown to be at highest risk for medication non-adherence, multivariable logistic regression models were used to assess the factors associated with reporting multiple (2) barriers compared to those reporting no barriers. A single model was used including all sociodemographic, health characteristic, medication use, and access to care variables.² The covariates were selected from the literature as those potentially associated with having barriers to medication use.² Adjusted odds ratios and 95% confidence intervals were produced for each characteristic. P-values were considered statistically significant at values <0.05. All statistical analyses were conducted using SAS software version 9.4 (SAS Institute Inc., Cary, NC). The financial sponsors played no role in the design, execution, analysis and interpretation of data, or writing of the current study.

RESULTS

The mean (SD) age of the study participants was 76.6 (6.5) years. Approximately 7% and 3% of women were Black or Hispanic, respectively. The majority of women had high self-reported quality of life and independence in activities of daily life (Table 1). The mean number of prescription and non-prescription medications used was 5.1 and 3.0, respectively. Of the three target medication classes in this analysis, antihypertensive use was most common (85%), followed by antilipemic (59%) and oral hypoglycemic use (13%).

Among the 59,054 women meeting eligibility criteria for this analysis, 47,846 (81%) reported no barriers, with a total of 11,208 (19.0%) women reporting one or more barriers to medication use. Among those reporting one or more barriers, 7105 (12%) reported 1 barrier

and 4103 (6.9%) reported 2 barriers. The most common barriers reported were having concerns about side effects, not liking to take medications, and medications costing too much (Table 2). Among women reporting 2 barriers, the most common combinations of barriers were: health insurance would not cover/medication costs too much (n=742); concerned about side effects/do not like taking medications (n=671); and taking too many medications/do not like taking medications (n=330).

Several participant characteristics were found to be associated with reporting 2 barriers in multivariable analyses, after adjusting for all sociodemographic, health characteristic, medication use, and access to care variables (Table 3). Lower age (OR 0.95, 95% CI 0.95–0.96), Black race (reference: White; OR 1.59, 95% CI 1.40–1.81), Hispanic ethnicity (reference: White; OR 1.93, 95% CI 1.60–2.33), lower family income (reference: <\$10,000; \$75,000 OR 0.42, 95% CI 0.34–0.52), lower quality of life (reference: high; low OR 2.46, 95% CI 2.10–2.88), lower physical function (reference: high; low OR 1.88, 95% CI 1.66–2.13), and higher number of concurrent medications (prescription: OR 1.14, 95% CI 1.12–1.16; non-prescription: OR 1.13, 95% CI 1.11–1.16) were significantly associated with increased odds of reporting 2 barriers. Women receiving a mammogram and those taking two or three of the target medication classes (compared to those taking one) had lower odds of reporting 2 barriers (p<0.05).

DISCUSSION

In a large, diverse, US cohort of older women, we found that approximately one in five participants reported at least one barrier to chronic disease medication use. Among the 7% of women reporting multiple barriers to medication use, the most common combination of barriers related to high medication cost and lack of prescription medication coverage (even in the post-Part D implementation period). Black race, Hispanic ethnicity, lower family income, lower quality of life, lower physical function, and higher number of medications were associated with higher odds of multiple barriers to medication use.

Many studies have reported on individual barriers to medication use in older adults, but few have described patients reporting multiple barriers.^{2,5,12,15} Consistent with prior research, we found that medication cost and concerns about side effects were two of the most common barriers reported.⁵ In addition, we found that women reported a global dislike for taking medications as an important and common barrier. Beliefs about medications have been shown to be significantly associated with medication adherence, and thus should be addressed by pharmacists managing medications for older adults.^{9,12,15} When examining common combinations among women reporting multiple barriers, we also found that women frequently reported a general sense of taking too many medications. On average, participants were taking 5 prescription and 3 non-prescription medications at the time of the Medication Inventory, indicating a significant medication burden. To translate this finding to clinical practice, a simple screening item could be employed by asking older adults taking multiple medications, “*Do you think the number of medications that you are currently taking is: too many or just right?*” Based on the response, conversations around discontinuation could follow for those expressing that they are taking too many medications.¹⁶ Future research should explore the validity of simple screening items to predict important process and

outcome measures related to medication use, such as subsequent medication non-adherence and healthcare utilization.

Several factors were found to be associated with reporting multiple barriers to medication use. Consistent with prior research, we observed differences in medication use by race/ethnicity.¹⁷⁻¹⁹ Compared to White women, Black and Hispanic women were significantly more likely to report multiple barriers, after adjusting for potential access difficulties that may disproportionately affect minorities (e.g., income, education). This supports existing evidence suggesting that increased efforts are needed to improve access to culturally appropriate healthcare and adequate drug benefits for older women.²⁰

Not surprisingly, we found that women taking more medications (prescription and non-prescription) overall were more likely to report multiple barriers. Specifically, for every additional prescription medication, there was a 14% increased odds of reporting multiple barriers. Polypharmacy has been consistently shown to be an important medication barrier in older adults.²¹ Conversely, among the three target medication classes used for inclusion criteria in this analysis (antihypertensives, antilipemics, and oral hypoglycemics), women taking more of these medication classes were less likely than those only taking a single class to report multiple barriers. We were unable to measure the duration of cardiovascular disease and diabetes, but it is possible that women taking multiple cardiovascular and/or diabetes medications had surmounted early barriers in their treatment plan.

We found that women with better self-reported quality of life and physical function were less likely to report multiple barriers. This aligns with previous findings that older adults with poor quality of life and physical function often suffer from greater comorbidity burden and face several logistical barriers (e.g., transportation) to successful medication management.²² Finally, we found that women reporting receipt of a mammogram in the previous four years were less likely to report multiple barriers to medication use. This may be evidence of greater healthcare access among those women receiving a mammogram and, in turn, fewer barriers to medication use.

Strengths of our study include the large and diverse cohort of postmenopausal women and the measurement of a wide array of potential barriers to medication use. We view the focus on women as a strength because women are disproportionately represented among older adults, and are a population heavily burdened by chronic conditions including cardiovascular disease and diabetes. There are important limitations worth mentioning. First, we measured medication barriers in general rather than related to individual classes of medications. This approach is similar to other studies determining overall medication use barriers.^{7,23,24} However, barriers to specific medications may vary from general barriers to medications so it is important to clearly report which construct is being measured. Second, this was a cross-sectional analysis and, thus, does not reflect patterns of barriers to medication use over time. Future studies should explore longitudinal patterns of medication barriers. Third, the ten barriers to medication use included in this analysis are not derived from a validated instrument. However, these barriers have face validity and potential utility in clinical practice. Future research is needed to validate simple, freely available, and clinically useful instruments for assessing medication barriers.

CONCLUSION

In conclusion, we found that approximately one in five older women reported at least one barrier to medication use, with 7% of women reporting multiple barriers to medication use. These findings highlight the need to screen for and initiate conversations about medication beliefs. This may prove fruitful for pharmacists caring for older women, allowing them to more easily identify opportunities for discussions about perceived and structural barriers and possible medication regimen simplification.

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Availability of data and materials: The datasets supporting the conclusions of this article are available at: <https://www.whi.org/SitePages/WHI%20Home.aspx>.

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The funding source had no role in the study design and conduct of the study; in the collection, analysis, and interpretation of the data; or in the preparation, review, or approval of the manuscript

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Table 1.

Characteristics of Participants Overall and by Self-Reported Barriers to Medication Use

Characteristics ^a , N (%)	Total N=59,054	No Barriers N=47,846	1 Barrier N=7,105	2 Barriers N=4,103	P-Value
Age ^b	76.6 (6.5)	76.7 (6.5)	76.54 (6.6)	75.88 (6.5)	<0.0001
Race/ethnicity	--	--	--	--	<0.0001
White	51054 (86.5)	41772 (87.3)	6018 (84.7)	3264 (79.6)	
Black	4339 (7.4)	3235 (6.8)	630 (8.9)	474 (11.6)	
Hispanic	1560 (2.6)	1140 (2.4)	213 (3.0)	207 (5.1)	
American Indian	193 (0.3)	135 (0.3)	34 (0.5)	24 (0.6)	
Asian/Pacific Islander	1225 (2.1)	1036 (2.2)	120 (1.7)	69 (1.7)	
Education	--	-	-	-	<0.0001
0–8 Years	387 (0.7)	277 (0.6)	55 (0.8)	55 (1.3)	
Some High School	1503 (2.6)	1106 (2.3)	242 (3.4)	155 (3.8)	
High School Diploma/GED	9791 (16.6)	8000 (16.7)	1163 (16.4)	628 (15.3)	
School after High School	22063 (37.4)	17591 (36.8)	2789 (39.3)	1683 (41.0)	
College degree or higher	24930 (42.2)	20557 (43.0)	2821 (39.7)	1552 (37.8)	
Family income, \$	--	--	--	--	<0.0001
<10,000	1434 (2.4)	1001 (2.1)	242 (3.4)	191 (4.7)	
10,000–19,999	5293 (9.0)	3838 (8.0)	879 (12.4)	576 (14.0)	
20,000–34,999	12914 (21.9)	10216 (21.4)	1687 (23.7)	1011 (24.6)	
35,000–49,999	12131 (20.5)	9894 (20.7)	1433 (20.2)	804 (19.6)	
50,000–74,999	12396 (21.0)	10354 (21.6)	1316 (18.5)	726 (17.7)	
75,000	11822 (20.0)	10114 (21.1)	1145 (16.1)	563 (13.7)	
US region	--	--	--	--	<0.0001
Northeast	14255 (24.1)	11641 (24.3)	1673 (23.6)	941 (22.9)	
Southeast	14542 (24.6)	11419 (23.9)	1898 (26.7)	1225 (29.9)	
Midwest	13763 (23.3)	11198 (23.4)	1629 (22.9)	936 (22.8)	
West	16494 (27.9)	13588 (28.4)	1905 (26.8)	1001 (24.4)	
Quality of life	--	--	--	--	<0.0001
Low	2093 (3.5)	1348 (2.8)	399 (5.6)	346 (8.4)	
Moderate	8323 (14.1)	5980 (12.5)	1419 (20.0)	924 (22.5)	
High	48086 (81.4)	40112 (83.8)	5196 (73.1)	2778 (67.7)	
Activities of daily living ^c	--	--	--	--	<0.0001
No Help	55773 (94.4)	45411 (94.9)	6620 (93.2)	3742 (91.2)	
Some Help	1981 (3.4)	1403 (2.9)	331 (4.7)	247 (6.0)	
Physical function	--	--	--	--	<0.0001
Low	21388 (36.2)	16181 (33.8)	3162 (44.5)	2045 (49.8)	
Moderate	21295 (36.1)	17738 (37.1)	2319 (32.6)	1238 (30.2)	

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Characteristics ^a , N (%)	Total N=59,054	No Barriers N=47,846	1 Barrier N=7,105	2 Barriers N=4,103	P-Value
High	12087 (20.5)	10594 (22.1)	1017 (14.3)	476 (11.6)	
No. of prescription drugs ^b	5.1 (2.6)	4.96 (2.6)	5.57 (2.68)	6.17 (2.8)	<0.0001
No. of non-prescription drugs ^b	3.0 (1.5)	3.02 (1.5)	3.14 (1.6)	3.26 (1.7)	<0.0001
Antihypertensive use	50137 (84.9)	40457 (84.6)	6126 (86.2)	3554 (86.6)	<0.0001
Antilipemic use	34712 (58.8)	28564 (59.7)	3885 (54.7)	2263 (55.2)	<0.0001
Oral hypoglycemic use	7614 (12.9)	5715 (11.9)	1100 (15.5)	799 (19.5)	<0.0001
No. of different classes of target medications ^d					<0.0001
1	30543 (51.7)	24753 (51.7)	3762 (53.0)	2028 (49.4)	
2	23613 (40.0)	19296 (40.3)	2680 (37.7)	1637 (39.9)	
3	4898 (8.3)	3797 (8.0)	663 (9.3)	438 (10.7)	
Had Medicare coverage	53029 (89.8)	43072 (90.0)	6340 (89.2)	3617 (88.2)	0.0002
Living assistance	2731 (4.9)	2072 (4.6)	394 (6.0)	265 (7.0)	<0.0001
Mammogram	55197 (93.5)	44847 (93.7)	6564 (92.4)	3786 (92.3)	<0.0001
Flexible sigmoidoscopy	28883 (48.9)	23183 (48.5)	3591 (50.6)	2109 (51.4)	<0.0001
Bone density scan	38282 (64.8)	30844 (64.5)	4696 (66.1)	2742 (66.9)	0.0005

Abbreviations: GED, General Equivalency Diploma, SD, standard deviation; US, United States

^aMissing/unknown variables: race/ethnicity, n=683 (1.2%); education, n=380 (0.6%); family income, n=3064 (5.2%); quality of life, n=552 (0.9%); activities of daily living, n=1300 (2.2%); physical function, n=4284 (7.3%)

^bMean (standard deviation)

^cActivities of daily living included feeding, dressing, transferring, and bathing.

^dTarget medication classes include antihypertensives, antilipemics, and/or oral hypoglycemics

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Table 2.

Self-Reported Barriers to Medication Use among Postmenopausal Women Using Chronic Cardiovascular and Oral Hypoglycemic Medications

Barriers to Medication Use	Any Barrier N = 11,208^a	1 Barrier N = 7,105 (%)	2 Barriers N = 4,103 (%)^a
Concerned about side effects	4,780 (42.7)	2455 (34.6)	2325 (56.7)
Do not like taking medications	3,560 (31.8)	1494 (19.5)	2066 (50.4)
Medication costs too much	3,390 (30.3)	1389 (19.5)	2001 (48.8)
Health insurance would not cover	2,859 (25.5)	1247 (17.6)	1612 (39.3)
Taking too many medications	1,583 (14.1)	302 (4.3)	1281 (31.2)
Problem getting to medical facility	311 (2.8)	100 (1.4)	211 (5.1)
Family discouraged me	228 (2.0)	27 (0.4)	201 (4.9)
Taking medication is inconvenient	207 (1.9)	55 (0.8)	152 (3.7)
Friends discouraged me	146 (1.3)	16 (0.2)	130 (3.2)
Concerned about missing work	88 (0.8)	20 (0.3)	68 (1.7)

^a Column adds up to >100% because participants could report multiple barriers

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Table 3.

Multivariable Association between Participant Characteristics and Self-Reported Multiple (2) Barriers to Medication Use Compared to those Reporting No Barriers^a

Characteristics	2 Barriers to Medication Use
--	Adjusted OR ^b (95% CI)
Age	0.95 (0.95, 0.96)
Race/ethnicity	--
White	<i>Reference</i>
Black	1.59 (1.40, 1.81)
Hispanic	1.93 (1.60,2.33)
American Indian	1.64 (0.95,2.82)
Asian/Pacific Islander	1.16 (0.87, 1.54)
Education	--
High School Diploma/GED	<i>Reference</i>
0–8 Years	1.20 (0.78–1.85)
Some High School	1.35 (1.07–1.70)
School after High School but no college degree	1.34 (1.20–1.50)
College degree or higher	1.28 (1.14–1.45)
Family income, \$	--
<10,000	<i>Reference</i>
10,000–19,999	1.05 (0.85, 1.30)
20,000–34,999	0.72 (0.59, 0.88)
35,000–49,999	0.57 (0.46, 0.70)
50,000–74,999	0.49 (0.40,0.61)
>75,000	0.42 (0.34, 0.52)
US region	--
Northeast	<i>Reference</i>
Southeast	1.07 (0.96, 1.19)
Midwest	0.95 (0.85, 1.06)
West	0.85 (0.76, 0.95)
Quality of life	--
High	<i>Reference</i>
Moderate	1.60 (1.45, 1.76)
Low	2.46 (2.10,2.88)
Physical function	--
High	<i>Reference</i>
Moderate	1.43 (1.27, 1.61)
Low	1.88 (1.66,2.13)
No. of prescription drugs	1.14 (1.12, 1.16)

Characteristics	2 Barriers to Medication Use
--	Adjusted OR ^b (95% CI)
No. of non-prescription drugs	1.13 (1.11, 1.16)
No. of different classes of target medications ^c	--
1	<i>Reference</i>
2	0.79 (0.73, 0.86)
3	0.73 (0.64, 0.83)
Mammogram	0.78 (0.67, 0.90)
Bone density scan	1.14 (1.05, 1.23)

Abbreviations: GED, General Equivalency Diploma; OR, odds ratio

^aOnly those variables reaching statistical significance (p<0.05) are included in the table for presentation. Variables for which results are not shown because they did not reach statistical significance are: Medicare coverage, living assistance, receipt of flexible sigmoidoscopy, and activities of daily living. Those reporting only 1 barrier not included in model.

^bAdjusted for all covariates in Table 1

^cTarget medication classes include antihypertensives, antilipemics, and/or oral hypoglycemics