

# Factors associated with medical orders' compliance among hyperlipidemic patients

Leila Mardanian Dehkordi

## ABSTRACT

**Background:** Coronary artery diseases are one of the most important issues in health and social problems. One of the amendable risk factors in development of these diseases is high cholesterol which can be modified through correction of lifestyle (diet change, playing sports, and usage of lipid-lowering drugs). Patients' compliance to therapeutic programs is the most important element to achieve this goal. This study aims to define the factors associated with compliance to medications among hyperlipidemic patients.

**Materials and Methods:** This is a descriptive analytical study conducted on 82 hyperlipidemic patients. The data were collected by a questionnaire including two sections: The first section was about demographic characteristics and the second section contained a questionnaire extracted from Foley questionnaire (2005) to inquire medication compliance. The data were analyzed by descriptive statistics (mean), Pearson Spearman correlation coefficients, and independent *t*-test.

**Results:** Based on the findings, it was evident that most of the hyperlipidemic individuals were compliant. There was a significant association between scores of medication compliance and age ( $P=0.035$ ), the number of family members ( $P=0.033$ ), the number of consumed drugs ( $P=0.022$ ), and education ( $P<0.001$ ).

**Conclusion:** The results obtained in the present study were consistent with those of other studies reporting high compliance to medication among hyperlipidemic patients and possibly are one of the reasons for the low number of consumed drugs.

Since compliance was lower among the individuals with increased age, lesser number of family members, and lesser education, these groups should be supported to promote their level of compliance to medication orders, and this important issue should be included in their educational programs.

**Key words:** Cardiovascular diseases, hyperlipidemia, Iran, medication compliance

## INTRODUCTION

One of the common health problems in developed societies is cardiovascular diseases<sup>[1]</sup> killing about 7.2 million people annually.<sup>[2]</sup> Elevated cholesterol is among the important amendable risk factors in prognosis and development of coronary artery diseases (CADs).<sup>[3]</sup> Amendment of elevated cholesterol plays a key role in the prevention of cardiovascular diseases as its reduction by 1% lowers the risk of CADs by 2%.<sup>[4-6]</sup> Recommended cholesterol lowering treatments include low-fat diet, regular sport, BP control, blood sugar control (in diabetic patients), weight control, and medicational treatments.<sup>[7]</sup>

Based on the statistics, almost 52 million adult people need lifestyle modifications including a diet change and sport

to lower their level of low density lipoprotein (LDL) and 13 million need lipid-lowering drugs. Meanwhile, just a lifestyle change is not enough to lower the LDL level, so in all cholesterol-lowering treatments, patient's participation is of great importance.<sup>[6]</sup> Earlier studies showed that patients' compliance to clinical care in chronic diseases led to lower mortality and financial burden.<sup>[8,9]</sup> Therefore, patients' compliance to medications, including their behavior in relation with drug consumption, based on health providers' recommendation,<sup>[10]</sup> has been emphasized in long-term care.<sup>[11,12]</sup>

Several studies concerning the level of compliance to medication orders have been already conducted in Iran, which have reported patients' low compliance.<sup>[13,14]</sup> With regard to low compliance to medication orders in different diseases and the importance of patients' lipids control in reduction of CVD, this study was conducted to determine the level of compliance to medication orders and its associated factors among hyperlipidemic patients as detection of these factors among hyperlipidemic patients can help nurses to prevent CADs through suggestion and administration of appropriate caring and educational programs.

Department of Adult Nursing, Nursing and Midwifery Faculty, Isfahan University of Medical Sciences, Isfahan, Iran

**Address for correspondence:** Mrs. Leila Mardanian Dehkordi, Department of Adult Nursing, Nursing and Midwifery Faculty, Isfahan University of Medical Sciences, Isfahan, Iran  
E-mail: mardanian@nm.mui.ac.ir

## MATERIALS AND METHODS

This descriptive and analytical study was conducted on 82 hyperlipidemic patients, selected through convenient sampling and referring to clinics and hospitals affiliated to Isfahan University of Medical Sciences with at least 6 months history of hyperlipidemia and on current treatment with cholesterol-lowering drugs. To collect the data, the researcher referred to the related hospital managers after getting written research permission and a letter of introduction from Isfahan Nursing and Midwifery school, and eventually was referred to the related wards. She referred to the related hospitals and clinics on specific days of the week, detected the eligible subjects with the inclusion criteria, introduced herself to them, and collected the data through questioning after explaining the research goal and getting their consent. The data collecting tool was a questionnaire used by Foley *et al.*<sup>[15]</sup> This questionnaire was translated by the research team after getting permission from MS Foley through an E-mail, and then content analysis was used for its scientific validity. It was carried out by distributing the questionnaire among 10 academic members of Isfahan Nursing and Midwifery School and some cardiologists to include their viewpoints in the questionnaire. Test retest was adopted to confirm its scientific reliability. This was achieved by giving the questionnaire to 10 hyperlipidemic patients with baseline characteristics identical to those of the subjects. Next, Pearson correlation coefficient was calculated twice between the obtained responses ( $r = 0.86$ ).

The questionnaire included two sections: The first section was about demographic characteristics and the second section contained 10 questions on possible problems in the regular use of medications, in the form of yes/no questions (score zero was assigned to "yes" and score 1 was assigned to "no"). The level of compliance to medications was determined based on the possible problems in subjects' regular use (between 1 and 10). It was such that fewer problems in medication use (higher score) showed more compliance to medications. Descriptive statistical tests (mean) were adopted to calculate the score of possible problems in the regular use of medications. Pearson and Spearman correlation coefficients and independent *t*-test were used to investigate the association between medication compliance and some of the subjects' demographic characteristics.

## RESULTS

Based on the results obtained, 51.3% of the studied subjects were in the age group 63-84 years and 61% were males. With regard to the level of education, most of the subjects (34.1%) were illiterate. With regard to their employment, most of the subjects (35.4%) were homemakers and used gemfibrozil and atorvastatin (29.63%) to

control their blood lipid level. Most of the subjects suffered from background diseases (93.9%), and a high percentage (80.5%) had no problem with compliance to medications. As seen in Table 1, the mean score of compliance to medication (mean = 6.06% and SD = 2.48) shows that there were few problems in patients' compliance.

Pearson correlation coefficient showed that there was a significant association between the mean score of compliance to medications and age ( $P = 0.035$ ), as well as between compliance and the number of family members ( $P = 0.033$ ), i.e., higher number of family members increased the compliance, while compliance decreased with increased age. In addition, there was a significant association between compliance mean score and the number of consumed drugs ( $P = 0.022$ ), i.e., more number of drugs lowered the compliance [Table 2].

Spearman correlation coefficient showed a significant association between compliance mean score and subjects' education ( $P = 0.000$ ), i.e., higher level of education increased the compliance. Independent *t*-test [Table 3] showed that there was no significant difference between compliance mean score in female and male subjects ( $P = 0.86$ ), as well as between the subjects who had received information and those who had not ( $P = 0.47$ ). There was also no

**Table 1: Medication compliance components**

| Medication compliance components      | Yes |      | No  |      | Total   |     |
|---------------------------------------|-----|------|-----|------|---------|-----|
|                                       | No. | %    | No. | %    | No.     | %   |
| Forgetting medications                | 57  | 69.5 | 25  | 30.5 | 82      | 100 |
| Forgetting preparation of medications | 31  | 37.8 | 51  | 62.2 | 82      | 100 |
| Carelessness in time of use           | 53  | 64.6 | 29  | 35.4 | 82      | 100 |
| Carelessness in correct dosage        | 35  | 42.7 | 47  | 57.3 | 82      | 100 |
| Medication stop at recovery           | 42  | 51.2 | 40  | 48.8 | 82      | 100 |
| Medication stop due to side effects   | 30  | 36.6 | 52  | 63.4 | 82      | 100 |
| High cost of drugs                    | 7   | 8.5  | 75  | 91.5 | 82      | 100 |
| Not being sure about drug effect      | 25  | 30.5 | 57  | 69.5 | 82      | 100 |
| Concerned about the side effect       | 26  | 31.7 | 56  | 68.3 | 82      | 100 |
| Stop medication due to other reasons  | 8   | 9.8  | 74  | 90.2 | 82      | 100 |
| Mean=6.06                             |     |      |     |      | SD=2.48 |     |

**Table 2: Correlation score of compliance to medications with age, number of family members, and length of hyperlipidemia**

| Variables                | Compliance score |        |
|--------------------------|------------------|--------|
|                          | P value          | r      |
| Age                      | 0.035            | -0.203 |
| Number of family members | 0.033            | 0.207  |
| Length of hyperlipidemia | 0.1              | -0.143 |
| Number of drugs          | 0.022            | -0.222 |
| Number of consumption    | 0.314            | -0.054 |

**Table 3: Compliance mean score based on sex, receiving information, and history of diseases**

| Variables             | Compliance mean score |      | Independent t test |       |
|-----------------------|-----------------------|------|--------------------|-------|
|                       | Mean                  | SD   | P value            | r     |
| Sex                   |                       |      |                    |       |
| Female                | 6                     | 2.36 | 0.86               | 0.18  |
| Male                  | 6.10                  | 2.56 |                    |       |
| Receiving information |                       |      |                    |       |
| Yes                   | 6.22                  | 2.64 | 0.47               | 0.72  |
| No                    | 5.82                  | 2.22 |                    |       |
| Disease history       |                       |      |                    |       |
| Yes                   | 6.08                  | 2.54 | 0.81               | 0.242 |
| No                    | 5.80                  | 1.09 |                    |       |

significant difference in the mean score of compliance between the individuals with history of the disease and those without ( $P = 0.81$ ).

## DISCUSSION

The results obtained show that most of hyperlipidemic individuals had no problems with their compliance to medications and followed their medication diet. Although some other studies report consistent findings on compliance to medication,<sup>[16]</sup> more studies report lack of compliance to medication among the subjects.<sup>[17-19]</sup> A study conducted in five European countries showed that only 50% of CAD patients followed changes in their lifestyle.<sup>[20]</sup> Medication compliance has been reported to be less among Chinese and Asian individuals.<sup>[21,22]</sup>

Controversial statistics reported concerning compliance to medications reveals the fact that various factors influence the compliance. The results of the present study show that there was a significant association between the number of family members and score of compliance, indicating that higher number of family members increases the compliance. It seems that patient's support in the family increases by the higher number of family members, which eventually positively influences the compliance.

Some other studies also show a significant association between social familial support and compliance to medications.<sup>[5,23,24]</sup> Meanwhile, since in some researches, the individuals living alone were reported to have followed diet therapy more,<sup>[25]</sup> the latter issue needs more investigation and further studies. The findings of the present study show a significant association between the number of consumed drugs and compliance mean score, i.e., compliance decreased with more number of drugs. Some studies are consistent with this finding,<sup>[5,26-28]</sup> while some other are not,<sup>[29,30]</sup> the reason can be explained as patients' relationship with health centers.<sup>[31]</sup>

The results obtained show that there was a significant association between compliance mean score and age, as increased age decreased the compliance. Some study results are consistent with this finding,<sup>[5,23]</sup> while some others are not.<sup>[16,32,33]</sup> Therefore, some other factors seem to influence compliance, which should be investigated.

The results obtained show that there was a significant association between compliance mean score and education, as higher level of education increased the compliance. Some study results are consistent with this finding,<sup>[5]</sup> while some are not.<sup>[34]</sup>

The results obtained show that compliance mean score in the individuals receiving information was not significantly different from those not receiving information. Meanwhile, other studies show that going over the information about patients' diet medication together with the patients and investigating their compliance are among the issues increasing the compliance to medication.<sup>[35,36]</sup> Whereas health care inability in patients' education and prevention leads to lower compliance to medication.<sup>[10]</sup> The results also show that there was no significant difference between compliance mean scores based on history of the disease. The researcher encountered no studies to confirm or reject this issue in her database search, so further studies are essential in this regard. Based on the results obtained, it is observed that the mean scores of compliance were not significantly different in male and female subjects. Some study results are in line with this finding and show no association between sex and the level of compliance,<sup>[30,34]</sup> while some other studies report more compliance among men compared to women,<sup>[17]</sup> possibly due to more involvement of women in taking care of the elderly and children and their lack of financial support compared to men. Some studies also reported financial and mental problems among the items influencing patients' ability in the management of their disease.<sup>[4]</sup>

## CONCLUSION

The results obtained show high compliance to medication among hyperlipidemic patients and the association between the level of compliance and some of the demographic characteristics of the subjects, revealing that some specific groups such as the elderly and those with lower number of family members need more support in the form of caring and educational programs to promote their compliance to medications.

## ACKNOWLEDGMENTS

The researcher greatly acknowledges Vice Chancellor for research in Isfahan University of Medical Sciences, who sponsored this research project, as well as all the subjects who cooperated with the researcher.

## REFERENCES

1. McKinley S, Dracup K, Moser DK, Riegel B, Doering LV, Meischke H, *et al.* The effect of a short one-on-one nursing intervention on knowledge, attitudes and beliefs related to response to acute coronary syndrome in people with coronary heart disease: A randomized controlled trial. *Int J Nurs Stud* 2009;46:1037-46.
2. Zhao Y, Wong FK. Effect of a post discharge transitional care program for patients with coronary heart disease in china: A randomized controlled trial. *J Clin Nurs* 2009;18:2444-55.
3. Daniels L. Diet and coronary heart disease. *Nurs Stand* 2002;16:47-52,54-5.
4. Cook S, Drum ML, Kirchhoff AC, Jin L, Levie J, Harrison JF, *et al.* Providers' assessment of barriers to effective management of hypertension and hyperlipidemia in community health centers. *J Health Care Poor Underserved* 2006;17:70-85.
5. Cheng CW, Woo KS, Chan JC, Tomlinson B, You JH. Association between adherence to statin therapy and lipid control in Hong Kong Chinese patients at high risk of coronary heart disease. *Br J Clin Pharmacol* 2004;58:528-35.
6. Lin JS. An alternative treatment of hyperlipidemia with red yeast rice: A case report. *J Med Case Rep* 2010;4:4.
7. Woods SL, Froelicher ES, Motzer SU and Bridges EJ. *Cardiac Nursing*. 5<sup>th</sup> ed. Philadelphia: Lippincott Williams and Wilkins Company; 2005.
8. Garg R, Yusuf S. Overview of randomized trials of angiotensin-converting enzyme inhibitors on mortality and morbidity in patients with heart failure. *JAMA* 1995;273:1450-6.
9. Follin SL, Hansen LB. Current approaches to the prevention and treatment of postmenopausal osteoporosis. *Am J Health Syst Pharm* 2003;60:883-904.
10. Sabate E. World Health Organization. Adherence to long term therapies. Evidence for action. 2003. p. 211.
11. Resnick B, Quinn C, Baxter S. Testing the feasibility of implementation of clinical practice guidelines in long-term care facilities. *J Am Med Dir Assoc* 2004;5:1-8.
12. Hansen R, Seifeldin R, Noe L. Medication adherence in chronic disease: Issues in posttransplant immunosuppression. *Transplant Proc* 2007;39:1287-300.
13. Jahani S, Elahi N, Shahinzade A, Hakim A, Latifi SM. Relation of knowledge and attitude with control of medication in tuberculosis patients in Ahvaz-Iran. *J Gorgan Univ Med Sci* 2011;12:80-4.
14. Hadi N, Rostami-Goran N, Jaffari P. Determining of medication adherence in patients with hypertension. *Jundishapur J Med* 2006;4:223-9.
15. Foley KA, Vasey J, Berra K, Alexander CM, Markson, LE. The hyperlipidemia: Attitudes and beliefs in treatment (HABIT) survey for patients: Result of a validation study. *J Cardiovasc Nurs* 2005;20:35-42.
16. Larsen J, Andersen M, Kragstrup J, Lars F. High persistence of statin use in a Danish population: Compliance study 1993-1998. *Br J Clin Pharmacol* 2002;53:375-8.
17. Nilsson JL, Andersson K, Bergkvist A, Björkman I, Brismar A, Moen J. Refill adherence to repeat prescriptions of cancer drugs to ambulatory patients. *Eur J Cancer Care* 2006;15:235-7.
18. Hamilton GA. Measuring adherence in a hypertension clinical trial. *Eur J Cardiovasc Nurs* 2003;2:219-28.
19. Cramer JA. A systematic review of adherence with medications for diabetes. *Diabetes Care* 2004;27:1218-24.
20. Shepherd J, Alcalde V, Befort PA, Boucher B, Erdmann E, Gutzwiller F, *et al.* International comparison of awareness and attitudes towards coronary risk factor reduction: The HELP study. *J Cardiovasc Risk* 1997;4:373-84.
21. Molassiotis A, Nahas-Lopez V, Chung WY, Lam SW, Li CK, Lau TF. Factors associated with adherence to antiretroviral medication in HIV infected patients. *Int J STD AIDS* 2002;13:301-10.
22. Fong OW, Ho CF, Fung LY, Lee FK, Tse WH, Yuen CY, *et al.* Determinants of adherence to highly active antiretroviral therapy (HAART) in Chinese HIV/AIDS patients. *HIV Med* 2003;4:133-8.
23. De Geest S, Dobbels F, Martin S, Willems K, Vanhaecke J. Clinical risk associated with appointment noncompliance in heart transplant recipients. *Prog Transplant* 2000;10:162-8.
24. Catz SL, Kelly JA, Bogart LM, Benotsch EG, McAuliffe TL. Patterns correlates and barriers to medication adherence among persons prescribed new treatments for HIV disease. *Health Psych* 2000;19:124-33.
25. McLane CG, Zyzanski SJ, Flocke SA. Factors associated with medication noncompliance in rural elderly hypertensive patients. *Am J Hypertension* 1995;8:206-9.
26. Cramer JA. A systematic review of adherence with medications for diabetes. *Diabetes Care* 2004;27:1218-24.
27. Fung V, Huang J, Brand R, Newhouse JP, Hsu J. Hypertension treatment in a medicare population: Adherence and systolic blood pressure control. *Clin Ther* 2007;29:972-84.
28. Turner BJ, Hollenbeck C, Weiner MG, Ten Have T, Roberts C. Barriers to adherence and hypertension control in a racially diverse representative sample of elderly primary care patients. *Pharmacoepidemiol Drug Saf* 2009;18:672-81.
29. Arnsten JH, Demas PA, Farzadegan H, Grant RW, Gourevitch MN, Chang CJ, *et al.* Antiretroviral therapy adherence and viral suppression in HIV-infected drug users: Comparison of self-report and electronic monitoring. *Clin Infect Dis* 2001;33:1417-23.
30. Paterson DL, Swindells S, Mohr J, Brester M, Vergis EN, Squier C, *et al.* Adherence to protease inhibitor therapy and outcomes in patients with HIV infection. *Ann Intern Med* 2000;133:21-30.
31. Van Bruggen R, Gorter K, Stolk RP, Zuithoff P, Klungel OH, Rutten GE. Refill adherence and polypharmacy among patients with type 2 diabetes in general practice. *Pharmacoepidemiol Drug Saf* 2009;18:983-91.
32. Benner JS, Glynn RJ, Mogun H, Neumann PJ, Weinstein MC, Avorn J. Long-term persistence in use of statin therapy in elderly patients. *JAMA* 2002;288:455-61.
33. Kiortsis DN, Giral P, Bruckert E, Turpin G. Factors associated with low compliance with lipid-lowering drugs in hyperlipidemic patients. *J Clin Pharm Ther* 2000;25:445-51.
34. Botelho RJ, Dudrak R. Home assessment of adherence to long-term medication in the elderly. *J Fam Pract* 1992;35:61-5.
35. Bangsberg DR, Hecht FM, Clague H, Charlebois ED, Ciccarone D, Chesney M, *et al.* Provider assessment of adherence to HIV antiretroviral therapy. *J Acquir Immune Defic Syndr* 2001;26:435-42.
36. Aree P, Tanphaichitr V, Suttharangsri W, Kavanagh K. Eating behaviors of elderly persons with hyperlipidemia in urban Chiang Mai. *Nurs Health Sci* 2004;6:51-7.

**How to site:** Dehkordi LM. Factors associated with medical orders' compliance among hyperlipidemic patients. *Iranian J Nursing Midwifery Res* 2013;18:198-201.

**Source of Support:** Nil, **Conflict of Interest:** Nil.