

Determinants of treatment adherence among women with osteoporosis: a qualitative study in Iran

Iraj Zareban¹, Arezoo Fallahi², , Babak Nemat Shahrabaki³, Piraveen Pirakalathanan⁴.

1. Assistant professor, department of public health, Iranshahr university of medical sciences, Iranshahr, Iran. zareban@gmail.com. Assistant professor, Iranshahr university of medical sciences, Health Promotion Research Center, Zahedan University of Medical Sciences, Zahedan, Iran. zareban@gmail.com.
2. Assistant professor, School of Health, Kurdistan University of Medical Sciences, Sanandaj, Iran- Corresponding author: arezofalahi91@gmail.com
3. Ms in health service management, Health Center of Sanandaj, Kurdistan University of medical sciences Sanandaj, Iran. neamatbabak@gmail.com.
4. Chief Medical Officer, Sonoa Health, Melbourne, Australia. Piraveen.Pirakalathanan@healthand.com

Corresponding author: Arezoo Fallahi, School of Health, Kurdistan University of Medical Sciences, Pasdaran Boulevard, P.O.Box: 66177-13446

Sanandaj Iran

Tel: +98-87-33621803

Mobile: +98-918-373-75-91

E-mail: arezofalahi91@gmail.com

Abstract

Background: Despite the importance of adherence in increasing efficacy of treatment, controlling osteoporosis, and reducing costs of treatment, compliance to osteoporosis medications is less than expected.

Objectives: This study aimed to explore determinants of treatment adherence among Iranian women with osteoporosis.

Materials and Methods: The qualitative research was conducted in Sanandaj, Iran in 2016. A purposeful sample of 15 women aged 50 and more years, diagnosed with osteoporosis for at least 6 months, T-score below -2.5, and previously prescribed osteoporosis medication, was recruited to the study. To understand the women's views, semi-structured interviews were recorded, typed, and analyzed using content analysis. Criteria of credibility, confirmability, dependability and transformability were used in order to verify the accuracy and consistency of the data.

Results: From data analysis, two main themes (factors related to adherence and factors related to non-adherence) and 10 sub-themes (social supports, motivational factors, symptomatology, medication side effects, psychological characteristics, economic status, cultural beliefs about illness and treatment, patient's dissatisfaction, lack of knowledge, and medication factors) were identified.

Conclusions: The results of the study showed that treatment adherence is multi-factorial including individual, psychological, social, economical, and cultural factors. Improving health literacy and increasing awareness about the benefits of medications may promote greater medication adherence and improve clinical outcomes for patients with osteoporosis.

Key words: adherence, women, osteoporosis, qualitative research.

Background

Osteoporosis disease with low bone mass density and increased bone fragility(1), is a major public health challenge(2). It involves the aging population and has become a worldwide silent epidemic(3). In the Asian population, the prevalence of osteoporosis is greater than other countries(4). In Iran, 22% women and 11% men suffer from osteoporosis(2).

Medication non-adherence is a major barrier in treatment of chronic diseases and delivering effective healthcare(5). It can cause life-threatening complications(6). Rates of non-adherence in patients with chronic disease and in children and adolescents are 50% and 50%–70%, respectively(7-8). Studies have shown that if osteoporosis medications are not taken consistently for at least 6 months, it can lead to not only inefficient therapy but also can increase fragility fractures and chronic disability in women with osteoporosis(9). Siris et al reported a significant relationship between adherence to osteoporosis medications and risk of fractures(10). Lehane and McCarthy stated that 35-50 percent of patients did not take medications according to physicians' prescriptions(11). Rossini et al showed that poor compliance to prescribed therapy is common in clinical practices(6) and Weycker et al found half of women with osteoporosis stop taking medications(12).

Despite the importance of adherence in increasing efficacy of treatment, controlling disease, and reducing costs of treatment(13), compliance to osteoporosis medications is much lower than expected (14). Studies have showed that numerous factors related to medication adherence are including social, cultural, economical and individual factors (13, 15-16). For example, researchers have reported that cost of treatment, beliefs about effectiveness of treatment, experience of side effects, pain of a fracture and strict administration requirements were critical to adherence to therapy(5). In Iran, researches have focused mainly on evaluation of compliance in diabetic and heart failure patients, but adherence in women with osteoporosis has yet to be fully qualified(13, 15). A question that yet hasn't been respond by researchers based on qualitative methods is "Which are factors of treatment adherence among Iranian women with osteoporosis?" Qualitative research can extract the compliance and the non-compliance factors from patients' perspectives(13). There is an important requirement to help improve treatment

adherence, reduce the risk of fractures and healthcare costs. Also to modify and design educational interventions, different aspects of non-adherence should be considered(5).

The aim of this qualitative study was to improve our understanding of the factors that affect medication adherence from the perspective of women with osteoporosis. The findings of this study will assist in implementing the findings of previous studies, make educational programs, improve treatments, and help women, especially Iranian women with special cultural issues, to control their disease.

Materials and Method

This qualitative study was done based on content analysis approach in Sanandaj city, located in the west of Iran, in 2016. This method enhance understanding of the data, and addressed perception and sense of describing phenomena(17). Women were selected from this study because osteoporosis is more prevalent in women than men. Participants were chosen through purposeful sampling. Women recruited to the study attended osteoporosis screening through 3 private and governmental centers in 3 different regions in Sanandaj city. The inclusion criteria included diagnosed of osteoporosis for at least six months, T-score below -2.5, age 50 and over, and ability to speak the local language (Kurdish language). Participants were excluded if they did not use osteoporosis therapy (types of osteoporosis medications were calcium, vitamin D and bisphosphonates), did not speak fluently, and did not wish to participant in the study. Fifteen women (mean age 64 years, range 50-75, mean of duration of illness 28.16 months) with osteoporosis were interviewed. All participants with different sex, age, socio-economic status, and T-score signed and returned the consent form. The corresponding author, the interviewer, who had passed interview training courses, had done qualitative studies based on different methods, published the articles in journals, arranged interview times and conducted the interviews in a private room in the osteoporosis screening units and/or at the participants' homes.

Data were collected by focus group and individual semi-structured interviews. To confirm and understand participants' responses in individual interviews, we also used focus group interviews(18). Thematizing, designing, interviewing, transcribing, analyzing, verifying and reporting were the stages of the investigation(19). Interviews covered questions such as "please describe your experience of taking medications used to treat osteoporosis?" Further probing questions such as "what factors might cause you to take these drugs or stop osteoporosis therapy?" were also asked in both focus group and individual interviews.

Data collection stopped when no new code emerged and the study had reached saturation point (this point of closure is arrived at when the information that is being shared with the researcher becomes repetitive and contains no new ideas)(20). Fifteen women with osteoporosis, each with a different level of literacy and socio-economic status, were interviewed. Mean duration of individual and focus group interviews was 25 and 48 minutes respectively.

To clarify the perspectives of participants, they were encouraged to state openly reasons for lack of compliance to osteoporosis treatments.

Two focus groups (four participants per group) and seven individual interviews were conducted. All tape-recorded interviews were analyzed using the content analysis approach by 3 coders (17). Voice recorder was used for the interviews recording. The steps of data analysis were as follows: transcribing and reading interviews (we transcribed the data and read each interview through several times to acquire a sense of content), making brief relevant notes and codes in the margin (we abstracted meaning units with codes), and comparing codes based on their similarities and differences (we compared the various codes based on differences and similarities), providing sub categories and sub-themes (we classified codes into sub-categories and categories), and finally describing the participants' views in each theme (we read all categories and regarded to whether they appeared to form a consistent model)(17). NVivo version 9 was used to manage the data. To support rigor of the study data, the following criteria were used: credibility - sense of accuracy in a source or message (such as member checking), confirmability - the degree to which results could be confirmed (peer checking), dependability - the stability (or reliability) of data over time and over conditions (prolonged engagement, constant comparative analysis) and transferability - generalizing results to other contexts or settings (such as maximum variance sampling)(21).

This study was performed in Sanandaj, Iran and approved by the research council of the Iranshahr University of Medical Science under code of ethical IR.IRSHUMS.REC.1395.5 Participants were informed about the study design and information security. They signed a written consent form and could withdraw from the study at any time.

Results

The demographic characteristics of the 15 women with osteoporosis are shown in table (1). From data analysis, two main themes (factors related to adherence and factors related to non-adherence) and 10 sub-themes (social supports, motivational factors, symptomatology,

medication side-effects, psychological characteristics, economic status, cultural beliefs about illness and treatment, patient's dissatisfaction, lack of knowledge, and medication factors) were identified. An overview of the themes and sub-themes with representation quotes for each is shown in table (2).

Factors related to adherence

Factors related to adherence included the sub-themes of “social supports” and “motivational factors”.

Social supports

Participants referred to helpful social support. They expressed that their family, especially their spouse made a difference in their health and overall well-being. Some patients tended to take osteoporosis medications because they had a high regard and trust for their physician. They attributed adherence to treatment to appropriate interactions between patient and doctor, sufficient consultation time, physician's experience, good communication and follow-up treatment by a physician. Patients adhered to their medications and went for osteoporosis screening because of support and advice from their family and/or doctor. The participants highlighted that support from friends, family and physician promotes adherence by encouraging optimism, self-esteem, and self-efficacy which can buffer the stress of being ill and reduce patient depression.

Motivational factors

Satisfaction with treatment, improvement in bone mass density, hope for return to good health, pain control, and avoiding complications of osteoporosis were the most important motivational factors to persist with treatment. During the interviews, participants usually said that they continued taking their osteoporosis medications according to physician's prescription to control and prevent complications of the disease. The participant stated that motivation is important because it provides the drive for patients to accomplish their goals, maintain their responsibilities, solve problems, and change behaviors. In the study women mentioned that pain reduction and returning to activity after an episode of pain are two elements critical in optimizing adherence.

Factors related to non-adherence

Factors related to non-adherence included the sub-themes of “symptomatology”, “medication side effects”, “psychological characteristics”, “cultural beliefs about illness and treatment”, “patient’s dissatisfaction”, “lack of knowledge”, and “medication factors”.

Symptomatology

Women stated that osteoporosis disease is different from other disease because it didn't have any symptoms. Participants had not sufficient knowledge about osteoporosis, they assumed if they don't have pain then they were healthy and they didn't need to take their medications. It was important that patients be educated to understand the importance of adherence to medications even when they do not have any pain. The participants stated that no adherence can be unintentional, where treatment advice is misunderstood, carried out incorrectly, or ignored, and knowledge about disease is low.

Medication side effects

One of the patient's subjective reasons for non-adherence to medication was linked to fear of medication side effects, such as addiction and dependence to them and fear of getting other diseases by taking medications. Also, patients stated that they did not take their medication because they experienced medication-related side effects. Fear of side effects prompted many patients to stop taking their medicines and led to an elevated level of anxiety. According to the participants' experiences, this fear caused concern and removal of this was a basic requirement to improve their compliance. Patients stated that they need to skills to control their fear of medication side effects.

Psychological characteristics

Perceived lack of risk, susceptibility, and severity to disease, psychotic disorder, forgetfulness, tiredness, impatience, self-efficacy, low self-esteem, feeling of inadequacy, indifference to healthcare needs, and lack of willingness to take medication were codes that were placed in this sub-theme. Many patients suffered from depression, hopelessness and severe anxiety. Depression in women with osteoporosis was not only prevalent, but was also one of the main reasons for non-adherence.

Cultural beliefs about illness and treatment

Cultural beliefs hindered adherence to medications in some participants, because they did not believe in the treatment and/or therapist. Participants did not appreciate the benefits of medication and thus did not feel the need to them. Also, some patients said that they could be

treated without medications and/or doctors, as they saw the condition as a result of natural phenomena. Although some women in the study knew that cultural beliefs affect their attitudes about medical care and their ability to understand, manage, and cope with the course of an illness, the meaning of a diagnosis, and the consequences of medical treatment, they don't tended to change their cultural beliefs or they were unable to modify these.

Patient's dissatisfaction

Complexity of medication prescription, duration of therapy, change in time of medications, lack of immediate benefits of therapy, lack of healthcare insurance, medical costs, long wait times, poor access to physicians, poor communication between doctor and patients, inadequate follow-up, and lack of social support were factors that caused dissatisfaction and poor adherence. It was important for patients to have insurance coverage and be provided with medications without difficulty. The participants stated that their treatment satisfaction lead to adherence to treatment and follow their doctors' advices.

Lack of knowledge

Lack of understanding of medical instructions, the benefits of medication, medication side effects and osteoporosis pathophysiology, contributed to non-adherence. Women participating in the study expressed that sources of information and knowledge of osteoporosis were quite limited. Ideally, they would like to receive information about osteoporosis from different sources as TV, radio, clinics, and healthcare centers. The participants stated that information about medications and their benefits must be available, low costs and perceptible.

Medication factors

Medication factors were reasons that patients did not take your medicine according to the schedule prescribed by their physician. These factors included dosing frequency, taking medicines on an empty stomach, exercising after taking medicine, and drinking water after taking medication. Patients tended to prefer medications with less administration requirements. The participants stated that medication factors cause disappointment in treatment and unwanted side-effects.

Discussion

For the first time we employed a qualitative research method to illustrate cultural, social and psychological factors on treatment adherence in Iranian women with osteoporosis. The finding of this study provides an understanding of women's viewpoints and experiences about

adherence to osteoporosis medications. Also, the results can help direct preventive interventions to improve factors related to treatment adherence. Factors related to adherence included sub-themes “social supports” and “motivational factors”. Social support such as patients’ relationships with their physician and family affected how they saw the importance of medication compliance. Good communication with patients was an essential part of the five interacting dimensions of medication adherence as shown by the World Health Organization (WHO)(22). Positive relationships between a healthcare team and a patient could improve adherence(23-24). Also, a study showed the positive effect of family support, especially on the part of husbands and their concern with women’s health, on the maintenance of behavioral changes(25). Family, friends and physicians can provide practical, emotional, instrumental, and informational supports, reduce stress and anxiety, and bring calm into patient's life.

Motivational factors, such maintaining health, were another key to facilitating adherence. According to other studies, regular follow-up, increasing patient’s awareness, positive feedback received from medicines, review of BMD results, control of the condition, and easy medical instructions were considered as motivational factors among women with osteoporosis(26-27).

Designing strategies for increasing medication adherence are the responsibility of healthcare providers, policy makers and planners. Unfortunately, strategies such as reminders to take medications and health promotion programs about chronic diseases such as osteoporosis do not exist in Iran. Lack of these programs can cause unsuccessful treatment outcomes among patients with osteoporosis.

Factors related to non-adherence included sub-themes “symptomatology”, “medication side effects”, “psychological characteristics”, “cultural beliefs about illness and treatment”, “patient’s dissatisfaction”, “lack of knowledge”, and “medication factors”. These our findings are in line with other studies(26, 28).

An important finding in this study was that patients did not seek information on medications and even in some cases; they took medications without doctor’s prescription. Another important finding of the study was participant’s persistence on cultural beliefs about illness and treatment. Lack of knowledge about benefits of medications, need for support, and patients’ incorrect beliefs and expectations about medical care impact upon adherence. Counseling patients about medication and their effects not only can decrease concerns, but also can modify inappropriate beliefs about medications(29).

The Medication Adherence Model depicts that medication adherence is a dynamic process. Predictive factors of adherence in this model are benefits and risks of medications, patient's needs to take medications and decision-making about them, and medical positive feedback(30). According to model, patient's need to take medications is an integral part of the adherence process. Probably, the participants in this study did not only misunderstand this need but also they did not understand disease severity in themselves. Increasing the perceived severity and susceptibility of osteoporosis in these patients should be considered. In the present study, lack of awareness was one of reasons for non-adherence. A study showed that low awareness levels increase barriers to adherence(31). This low level of awareness associated with osteoporosis may largely be attributed to the level of education during childhood and adolescent periods. Maybe training on prevention of osteoporosis, medication side effects, and medication factors has been low or these programs have not been designed according to the target group and their need. Alternatively, these women may not have had a desire to acquire this knowledge. If training is not adequate or appropriate to prevent the disease, not only outcomes of treatment may decrease but also may cause patient's dissatisfaction. Studies showed that patient's dissatisfaction affects patient's adherence to treatment(26, 28).

The results of the study show that treatment adherence is a multi-factorial process including individual, psychological, social, economical, and environmental factors. Improving health literacy, increasing awareness about the benefits of medications and value of health, enhancing social support, decreasing environmental and cultural barriers, identifying patients' perceptions and attitude, strengthening self-confidence to reducing fear and maintaining treatment process may promote greater medication adherence and improve clinical outcomes for patients with osteoporosis.

Inability to generalize findings to the target population is a one of the limitations of this study. Further limitations of this study included exclusion of men and rural communities, and also women who did not wish to participate in the study. There's a possibility that these people's views about treatment adherence differ from the participants in the study. Although this does not discredit our findings, it means we should apply caution in extrapolating conclusions to the wider population. Further research to investigate patients' perspectives with osteoporosis in different groups would be suggested.

Acknowledgments

This article was taken from a research proposal with number 9513-5 approved by Iranshahr University of Medical Sciences, Iranshahr, Iran. The authors would like to extend their gratitude to all women who participated in the study and provided the authors with their precious experiences and viewpoints.

Financial Disclosure: None

Authors haven't any conflict of interest about this work.

References

1. Nielsen D, Huniche L, Brixen K, Sahota O, Masud T. Handling knowledge on osteoporosis :A qualitative study. *Scandinavian Journal of Caring*. 2013;27(3):516-24.
2. Fallahi A, Derakhshan S, Pashae T, Taymoori P. Factors affecting self-care in women with osteoporosis: a qualitative study with the content analysis approach. *Scientific Journal of School of Public Health and Institute of Public Health Research*. 2015;13(2):17-32.
3. Ridout C. Old bones in young bodies. *Am Fit*. 1999;17:28-31.
4. Soleymanian A, Niknami S, Hajizadeh E, Shojaeizadeh D, Montazeri A. Development and validation of a health belief model based instrument for measuring factors influencing exercise behaviors to prevent osteoporosis in pre-menopausal women (HOPE). *Musculoskeletal Disorders*. 2014;15:61.
5. Besser S, Anderson J, Weinman J. How do osteoporosis patients perceive their illness and treatment? Implications for clinical practice. *Arch Osteoporos*. 2012;7(1-2):115-24.
6. Rossini M, Bianchi G, Di Munno O, Giannini S, Minisola S, Sinigaglia L, et al. Determinants of adherence to osteoporosis treatment in clinical practice. *Osteoporos Int*. 2006;17:914–21.
7. DiMatteo M. Variations in patients' adherence to medical recommendations: a quantitative review of 50 years of research. *Med Care*. 2004;42:200–9.
8. Chappuy H, Treluyer J, Faesch S, Giraud C, Cheron C. Length of the treatment and number of doses per day as major determinants of child adherence to acute treatment. *Acta Paediatr*. 2009;99:433–7.
9. Huybrechts K, Ishak K, Caro J. Assessment of compliance with osteoporosis treatment and its consequences in a managed care population. *Bone*. 2006;38:922-8.
10. Siris E, Harris S, Rosen C, Barr C, Arvesen J, Abbott T, et al. Adherence to bisphosphonate therapy and fracture rates in osteoporotic women: relationship to vertebral and non-vertebral fractures from 2 US claims databases. *Mayo Clin Proc*. 2006;81:1013-22.
11. Lehane E, McCarthy G. An examination of the intentional and unintentional aspects of medication non-adherence in patients diagnosed with hypertension. *J Clin Nurs*. 2007;4(16):698-706.
12. Weycker D, Macarios D, Edelsberg J, Oster G. Compliance with drug therapy for postmenopausal osteoporosis. *Osteoporos Int*. 2006;17:1645-52.

13. Hekmatpou D, Mohammadi E, Ahmadi F, Arefi S. Non-compliance factors of congestive heart failure patients readmitted in cardiac care units. *Iranian Journal of Critical Care Nursing*. 2009;2(3):91-7.
14. McCombs J, Thiebaud P, McLaughlin-Miley C, Shi J. Compliance with drug therapies for the treatment and prevention of osteoporosis. *Maturitas*. 2004;48:271-87.
15. Mashrouteh M, Khanjani N, Gozashti M. Evaluation of Compliance with Drug Regimens in Diabetic Patients Referred to the Endocrinology Clinic of Afzalipour Hospital, Kerman, Iran. *Journal of Health & Development*. 2012;1(3).
16. Unson C, Siccion E, Gaztambide J, Gaztambide S, Mahoney Trella P, Prestwood K. Nonadherence and osteoporosis treatment preferences of older women: a qualitative study. *J Womens Health*. 2003;13(1037-1045).
17. Graneheim U, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse education today*. 2004;24(2):105-12.
18. Morgan D, Kreuger R. When to use focus groups and why' in Morgan D.L. (Ed.) *Successful Focus Groups*. London: Sage; 1993.
19. Kvale S. *Interviews: An Introduction to Qualitative Research Interviewing*. Thousand Oaks: Sage.; 1996.
20. Morse J. Designing funded qualitative research. In: Denzin NK, Lincoln YS, editors. *Handbook of qualitative research*. London: Sage. ; 1994. p 220-235.
21. Guba E, Lincoln Y. *Improving the usefulness of evaluation results through responsive and naturalistic approaches*. San Francisco: Jossey-Bass; 1981.
22. Sabate E. *Adherence to long-term therapies. Evidence for action*. 2003. Geneva, Switzerland: World Health Organization. http://www.who.int/chp/knowledge/publications/adherence_report/en/index.html.
23. Zolnierek K, Dimatteo M. Physician communication and patient adherence to treatment: a meta-analysis. *Med Care*. 2009;47(8):826-34.
24. Cooper L, Roter D, Bone L, Larson S, Miller E, Barr, et al. A randomized controlled trial of interventions to enhance patient-physician partnership, patient adherence and high blood pressure control among ethnic minorities and poor persons: study protocol NCT00123045. *Implement Sci*. 2009;4:7.
25. Saadoon O, Amin R. Factors influencing pap smear practice among primary school teachers in diyala city, Iraq. *Journal of Public Health Medicine*. 2014;14:19-28.
26. Lau E, Papaioannou A, Dolovich L, Adachi J, Sawka A, Burns S, et al. Patients' adherence to osteoporosis therapy: exploring the perceptions of postmenopausal women. *Can Fam Physician*. 2008;54(3):394-402.
27. Clowes J, Peel N, Eastell R. The impact of monitoring on adherence and persistence with antiresorptive treatment for postmenopausal osteoporosis: a randomized controlled trial. *J Clin Endocrinol Metab*. 2004;89:1117-23.
28. Baheiraei A, Ritchie J, Eisman J, Nguyen T. Exploring factors influencing osteoporosis prevention and control: A qualitative study of Iranian men and women in Australia. *Maturitas*. 2006;54:127-34.
29. Johnson M. The Medication Adherence Model: a guide for assessing medication taking. *Res Theory Nurs Pract*. 2002;16:179-92.

30. Woods N, Falk S, Saver B, Taylor T, Stevens N, MacLaren A. Deciding about hormone therapy: validation of a model. *Menopause*. 1998;5:52-9.

31. Van Der Wal M, Jaarsma T, Moser DK, Van Gilst W, Van Veldhuisen D. Unraveling the mechanisms for heart failure patients, beliefs about compliance. *Heart lung*. 2007;34(4):253-61.

Table (1): Demographic characteristics fifteen women with osteoporosis

Participants	Age	T-Score	Duration of illness (month)	Number of children	Frequency of bone density testing	Participant's job	Participant's literacy	Husband's job	Husband's literacy	Family's income
P1	66	2.5	16	5	2	Housekeeper	Diploma	Retired	Diploma	Good
P2	56	2.7	23	3	3	Employee	Diploma	Retired	Guidance	Average
P3	75	2.5	19	6	2	Housekeeper	Primary	Retired	Diploma	Average
P4	71	2.5	28	8	2	Housekeeper	Illiterate	Farmer	Illiterate	Bad
P5	56	2.7	9	2	2	Employee	Primary	Employee	Primary	Average
P6	59	2.5	24	4	2	Housekeeper	Primary	Employee	Primary	Good
P7	63	3	12	2	2	Housekeeper	Diploma	Employee	Diploma	Bad
P8	63	2.5	36	1	3	Housekeeper	Primary	Driver	Diploma	Average
P9	64	2.6	18	2	2	Housekeeper	Illiterate	Driver	Primary	Average
P10	75	2.6	19	4	2	Employee	Illiterate	Employee	Academy	Average
P11	50	2.5	21	2	2	Housekeeper	Primary	Employee	Primary	Average
P12	60	2.7	33	2	2	Housekeeper	Primary	Employee	Diploma	Average
P13	75	2.6	24	9	3	Housekeeper	Illiterate	Farmer	Illiterate	Average
P14	71	3	34	3	2	Employee	Diploma	Employee	Primary	Bad
P15	56	2.5	22	1	2	Housekeeper	Diploma	Employee	Diploma	Average

Table (2): Overview of themes, sub-themes, and quotes.

	Sub-theme	Quotes
Factors Related To Adherence	Social supports	P 9: “My doctor talks about me and my medical information, She's curious about me and behaves kindly and listens to me... I have a high regard for my doctor, I am willing to comply his prescriptions .” P 13: “my husband knows about my medications, he asks me to take them” .
	Motivational factors	P 15: “Avoiding from consequences is my strong motivator for taking medications .” P 2: “Medications should be taken for preventing and controlling of disease ... Disability and fracture is serious condition, I think take medication remove this conditions”.
Factors related to non-adherence	Symptomatology	P 14: “when pain stop in my leg or don’t feel pain in my body I don’t take my drug.” P 7: “if I haven't pain, I can ignore any drug”.
	Medication side effects	P 11: “If I take medication, I’ve got another disease, so I won’t go and do it”. P 3: “I haven't been lucky, many side effects of medications may be made to me”.
	Psychological characteristics	P 4: “I forget to take my medications; I do believe I don’t suffer from any illness, I have not any motivation for taking any medications.” P 8: “I am so bored with my life and my life is passing, I don’t like to do nothings.”
	Cultural beliefs about illness and treatment	P 5: “I never trust medication and doctor; they cause the worst symptoms of my illnesses”. P 11: “disease prompts my soul... folk healer are better than current physician”.
	Patient’s dissatisfaction	P 13: “I’m tired of the long-term drugs; there should be a monitoring system that monitors taking medications in patients...”. P 3: “Cost is an imitating factor to have medication If a patient hasn't insurance coverage for medication.”
	Lack of knowledge	P 15: “I do not know why I have to take some of my medications .” P 2: “I did not know anything about benefits of my medications and problems of the disease in the future”.
	Medication factors	P 10: “I should take osteoporosis medications on an empty stomach, I should stay upright after taking them, I did not like it at all” P 9: “I feel a problem with the digestive tract because osteoporosis medications hard on my stomach .”

