



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

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ABSTRACT

Aims Despite the importance of adherence in increasing efficacy of treatment, controlling osteoporosis, and reducing costs of treatment, compliance with osteoporosis medications is less than expected. The aim of this study was to determine treatment adherence among women with osteoporosis.

Participants & Methods This qualitative research was conducted in Sanandaj, Iran in 2016. Participants were chosen through purposeful sampling method. Fifteen women with age 50 years and over, diagnosed with osteoporosis for at least 6 months, T-score below -2.5, and previously prescribed osteoporosis medication were selected. 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.

Findings 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.

Conclusion Treatment adherence is multi-factorial including individual, psychological, social, economic, 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.

Keywords Medication Adherence; Women; Osteoporosis; Qualitative Research

CITATION LINKS

[1] Handling knowledge on osteoporosis -- a qualitative ... [2] Factors affecting self-care in women with osteoporosis: A qualitative study with the ... [3] An overview and ... [4] Development and validation of a health belief model based instrument for measuring factors influencing exercise behaviors to prevent osteoporosis in pre-menopausal ... [5] How do osteoporosis patients perceive their illness and treatment? implications for ... [6] Determinants of adherence to osteoporosis treatment in ... [7] Variations in patients' adherence to medical recommendations: A quantitative review of ... [8] Length of the treatment and number of doses per day as major determinants of child adherence to ... [9] Assessment of compliance with osteoporosis treatment and its consequences in a managed care ... [10] Adherence to bisphosphonate therapy and fracture rates in osteoporotic women: Relationship to vertebral and nonvertebral fractures from 2 US claims ... [11] An examination of the intentional and unintentional aspects of medication non-adherence in ... [12] Compliance with drug therapy for ... [13] Non-compliance factors of congestive ... [14] Compliance with drug therapies for the treatment ... [15] Evaluation of compliance with drug regimens in diabetic patients ... [16] Nonadherence and osteoporosis treatment preferences ... [17] Qualitative content analysis in nursing research ... [18] When to use focus groups and ... [19] Interviews: An introduction to qualitative ... [20] Effective evaluation: Improving the usefulness ... [21] Adherence to long-term therapies: Evidence for ... [22] Physician communication and patient adherence to ... [23] A randomized controlled trial of interventions to enhance ... [24] Factors influencing pap smear practice among primary ... [25] Patients' adherence to osteoporosis therapy: Exploring the perceptions of postmenopausal ... [26] The impact of monitoring on adherence and persistence with antiresorptive treatment for postmenopausal osteoporosis ... [27] Exploring factors influencing osteoporosis prevention and ... [28] The medication adherence model: A guide for ... [29] Deciding about hormone therapy: Validation ... [30] Unraveling the mechanisms for heart failure patients' beliefs ...

Introduction

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 in other countries [4]. In Iran, 22% of women and 11% of men suffer from osteoporosis [2]. Medication non-adherence is a major barrier for the 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% 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 the efficacy of treatment, controlling disease, and reducing costs of treatment [13], compliance with osteoporosis medications is much lower than expected [14]. Studies have shown that numerous factors related to medication adherence are including social, cultural, economical and individual factors [13, 15, 16]. For example, researchers have reported that the cost of treatment, beliefs about the effectiveness of treatment, experience of side effects, pain of a fracture and strict administration requirements were critical to adhere to therapy [5]. In Iran, researchers have focused mainly on the evaluation of compliance in patients with heart failure and diabetes, but adherence in women with osteoporosis has yet to be fully qualified [13, 15]. A question that yet hasn't been responding by researchers based on qualitative methods is "Which factors of treatment adherence are among Iranian women with osteoporosis?" Qualitative research can extract the compliance and the non-compliance factors from the patient's perspectives [13]. There is an important requirement to help improve treatment adherence, reduce the risk of fractures and health care costs. Also to modify and design educational interventions, different aspects of non-adherence should be considered [5]. The aim of this study was to determine treatment adherence among women with osteoporosis.

Participants and Method

This qualitative study was performed based on the

conventional content analysis approach in Sanandaj, located in the west of Iran, in 2016. This method enhances understanding of the data and addressed perception and sense of describing phenomena [17]. Since women have more osteoporosis than men, women were selected for this study. Participants were chosen through purposeful sampling method. Women recruited to the study attended osteoporosis screening through 3 private and governmental centers in 3 different regions in Sanandaj. The inclusion criteria included diagnosis with osteoporosis for at least 6 months, T-score below -2.5, age 50 years 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 participate in the study. Fifteen women (Mean age 64 years, range 50-75 years, mean of the 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 interviewer arranged interview times and conducted the interviews in a private room in the osteoporosis screening units and/or at the participant's homes.

Data were collected by individual semi-structured interviews. To confirm and understand participant's responses in individual interviews, also focus group interviews were used [18]. Thematizing, designing, interviewing, transcribing, analyzing, verifying and reporting were the stages of the investigation [19]. Interview guide included questions such as "Please describe your experience of taking medications used to treat osteoporosis?" and "What factors might cause you to take these drugs or stop osteoporosis therapy?" To explore concepts deeply, further probing questions 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. 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.

Two focus groups (Four participants in each group) and seven individual interviews were conducted. All tape-recorded interviews were analyzed using the content analysis approach [17]. Voice recorder was used for recording the interview. The steps of data analysis were as follows: Transcribing and reading interviews (The data were transcribed and each interview was read 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 (The various codes were compared based on differences and similarities.), providing subcategories and sub-themes (Codes were classified into subcategories and categories), and finally describing the participant's views in each theme (We read all categories and regarded to whether they appeared to form a consistent model) [17].

NVivo 9 was used to manage the data. To support rigor of the study data, the following criteria were used: To obtain confirmability of data, the research team conducted the analysis independently (3 coders), compared their findings and in cases of disagreement they held discussions until they reached an agreement. For peer checking, three faculty members (Research Methodologist, Health Education Specialist, and Educational Expert) reviewed the analysis report and confirmed the findings. The dependability of the findings was insured by early transcribing, precise recording of the work procedures and using mixed method of

data collection in different times and places. Variance according to age, gender, major, education, years of service and health education history, and family's income indicated that the findings were applicable in other contexts (Transferability sampling) [20].

Findings

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 are shown in table 2.

Table 1) Demographic characteristics of fifteen women with osteoporosis

Participants	Age (years)	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 high regard for my doctor, I am willing to comply with 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 these conditions".
Factors Related to Non-adherence	
Symptomatology	P 14: "When pain stops in my leg or don't feel pain in my body, I don't take my drug"; P 7: "If I haven't pained, 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 nothing".
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, and I did not like it at all"; P 9: "I feel a problem with the digestive tract because of osteoporosis medications hard on my stomach".

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 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 promote adherence by encouraging optimism, self-esteem, and self-efficacy can buffer the stress of being ill and reduce patient depression.

Motivational factors: Satisfaction with treatment, improvement in bone mass density, hope to 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 another 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 the 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 participant’s experiences, this fear caused concern and removal of this was a basic requirement to improve their compliance. Patients stated that they need 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, the 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 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 tend 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 leads to adherence to treatment and follow their doctor’s 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 such 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 fewer administration requirements. The participants stated that medication factors cause disappointment in treatment and unwanted side-effects (Table 1 and 2).

Discussion

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.

In the present study, for the first time, a qualitative research method was employed 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 patient's 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) [21]. Positive relationships between a healthcare team and a patient could improve adherence [22, 23]. 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 [24]. 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 bone mass density (BMD)

results, control of the condition, and easy medical instructions were considered as motivational factors among women with osteoporosis [25, 26].

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 [25, 27].

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 needs 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 it can modify inappropriate beliefs about medications [28].

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 [29].

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 [30]. 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 [25, 27].

Inability to generalize findings to the target population is one of the limitations of this study. Further limitations of this study included the 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 the findings, it means it should apply caution in extrapolating conclusions to the wider population. Further research to investigate patients' perspectives with osteoporosis in different groups would be suggested.

Conclusions

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 patient's perceptions and attitude, developing a instrument for measuring treatment adherence, strengthening self-confidence to reducing fear and maintaining treatment process may promote greater medication adherence and improve clinical outcomes for patients with osteoporosis.

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References

- 1- Nielsen D, Huniche L, Brixen K, Sahota O, Masud T. Handling knowledge on osteoporosis -- a qualitative study. *Scand J Caring Sci.* 2013;27(3):516-24.
- 2- Fallahi A, Derakhshan S, Pashae T, Teymoori P. Factors affecting self-care in women with osteoporosis: A qualitative study with the content analysis approach. *Sci J Sch Public Health Inst Public Health Res.* 2015;13(2):17-32. [Persian]
- 3- Sözen T, Özişik L, Başaran N. An overview and management of osteoporosis. *Eur J Rheumatol.* 2017;4(1):46-56.
- 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 premenopausal women (HOPE). *BMC Musculoskelet Disord.* 2014;15:61.
- 5- Besser SJ, Anderson JE, Weinman J. How do osteoporosis patients perceive their illness and treatment? implications for clinical practice. *Arch Osteoporos.* 2012;7:115-24.
- 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(6):914-21.
- 7- Di Matteo MR. Variations in patients' adherence to medical recommendations: A quantitative review of 50 years of research. *Med Care.* 2004;42(3):200-9.
- 8- Chappuy H, Tréluyer JM, Faesch S, Giraud C, Chéron G. Length of the treatment and number of doses per day as major determinants of child adherence to acute treatment. *Acta Paediatr.* 2010;99(3):433-7.
- 9- Huybrechts KF, Ishak KJ, Caro JJ. Assessment of compliance with osteoporosis treatment and its consequences in a managed care population. *Bone.* 2006;38(6):922-8.
- 10- Siris ES, Harris ST, Rosen CJ, Barr CE, Arvesen JN, Abbott TA, et al. Adherence to bisphosphonate therapy and fracture rates in osteoporotic women: Relationship to vertebral and nonvertebral fractures from 2 US claims databases. *Mayo Clin Proc.* 2006;81(8):1013-22.
- 11- Lehane E, Mc Carthy G. An examination of the intentional and unintentional aspects of medication non-adherence in patients diagnosed with hypertension. *J Clin Nurs.* 2007;16(4):698-706.
- 12- Weycker D, Macarios D, Edelsberg J, Oster G. Compliance with drug therapy for postmenopausal osteoporosis. *Osteoporos Int.* 2006;17(11):1645-52.
- 13- Hekmatpou D, Mohammadi E, Ahmadi F, Arefi SH. Non-compliance factors of congestive heart failure patients readmitted in cardiac care units. *Iran J Crit Care Nurs.* 2009;2(3):91-7. [Persian]
- 14- Mc Combs JS, Thiebaud P, Mc Laughlin-Miley C, Shi J. Compliance with drug therapies for the treatment and prevention of osteoporosis. *Maturitas.* 2004;48(3):271-87.
- 15- Mashrouteh M, Khanjani N, Gozashti MH. Evaluation of compliance with drug regimens in diabetic patients referred to the Endocrinology Clinic of Afzalipour Hospital, Kerman, Iran. *J Health Dev.* 2012;1(3):182-92. [Persian]
- 16- Unson CG, Siccione E, Gaztambide J, Gaztambide S, Mahoney Trella P, Prestwood K. Nonadherence and osteoporosis treatment preferences of older women: A qualitative study. *J Womens Health (Larchmt).* 2003;12(10):1037-45.

- 17- Graneheim UH, Lundman B. Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today*. 2004;24(2):105-12.
- 18- Morgan DL, Krueger RA. When to use focus groups and why. In: Morgan DL. *Successful focus groups: Advancing the state of the art*. Morgan DL, editor. Newbury Park: SAGE; 1993. pp. 3-20.
- 19- Kvale S. *Interviews: An introduction to qualitative research interviewing*. Thousand Oaks: SAGE; 1996.
- 20- Guba EG, Lincoln YS. *Effective evaluation: Improving the usefulness of evaluation results through responsive and naturalistic approaches*. San Francisco: Jossey-Bass; 1981.
- 21- Sabate E, Organisation mondiale de la santé, World Health Organization, Who, UNAIDS. *Adherence to long-term therapies: Evidence for action*. Sabate E, Sabaté E, editors. Geneva: World Health Organization; 2003.
- 22- Zolnierok KB, Dimatteo MR. Physician communication and patient adherence to treatment: A meta-analysis. *Med Care*. 2009;47(8):826-34.
- 23- Cooper LA, Roter DL, Bone LR, Larson SM, Miller ER, Barr MS, 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.
- 24- Saadoon OZ, Amin RM, Jadoo SAA. Factors influencing pap smear practice among primary school teachers in Diyala city, Iraq. *Malays J Public Health Med*. 2014;14(1):19-28.
- 25- Lau E, Papaioannou A, Dolovich L, Adachi J, Sawka AM, Burns S, et al. Patients' adherence to osteoporosis therapy: Exploring the perceptions of postmenopausal women. *Can Fam Physician*. 2008;54(3):394-402.
- 26- Clowes JA, Peel NF, 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(3):1117-23.
- 27- Baheiraei A, Ritchie JE, Eisman JA, Nguyen TV. Exploring factors influencing osteoporosis prevention and control: A qualitative study of Iranian men and women in Australia. *Maturitas*. 2006;54(2):127-34.
- 28- Johnson MJ. The medication adherence model: A guide for assessing medication taking. *Res Theory Nurs Pract*. 2002;16(3):179-92.
- 29- Woods NF, Falk S, Saver B, Taylor TR, Stevens N, MacLaren A. Deciding about hormone therapy: Validation of a model. *Menopause*. 1998;5(1):52-9.
- 30- Van Der Wal MH, Jaarsma T, Moser DK, Van Gilst WH, Van Veldhuisen DJ. Unraveling the mechanisms for heart failure patients' beliefs about compliance. *Heart Lung*. 2007;36(4):253-61.