

MEDICATION ADHERENCE IN PERSONS WITH CORONARY ARTERY DISEASE: A DELPHI STUDY

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ABSTRACT:

Background: Medication adherence is an essential behavior for persons with coronary artery disease (CAD). There are numerous definitions of medication adherence used in the literature. However, the existing definitions do not reflect a holistic approach. From a nursing perspective, characteristics or attributes of medication adherence specific to persons with CAD remain unclear. Exploration of the medication adherence concept is important for nurses to provide quality care. The purpose of this study was to operationalize a definition of medication adherence for persons with CAD from a nursing perspective.

Methods: Seventeen nurse experts in medication adherence in persons with CAD participated in this study. The Delphi method was used to classify, cluster, and verify the characteristics of medication adherence. Data were analyzed using descriptive statistics and content analysis.

Results: The results showed that from a nursing perspective, medication adherence refers to the actions of the person with CAD related to taking medication as prescribed. These actions consist of proper knowledge of prescribed medication, storing medication appropriately, self-regulating medication administration correctly and continuously, and participating in the medication treatment plan.

Conclusions: The findings of this study contribute to the concept of medication adherence in persons with CAD. It is clear that medication adherence includes not only taking medication as prescribed, but also practicing the four main concepts related to medication administration. When assessing medication adherence, nurses should review these aspects.

Keywords: Medication adherence, Coronary artery disease, Delphi

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INTRODUCTION

The rate of coronary artery disease (CAD) is increasing in low-middle income countries, including Thailand [1]. Persons with CAD experience a variety of symptoms, such as chest pain, fatigue, and dyspnea [2]. The goals for the management of CAD are to control angina symptoms, treat the underlying cause, and prevent myocardial infarction [2]. Persons with CAD require long-term medication therapy to prevent disease progression and recurrent cardiovascular events [3]. Therefore, medication adherence is important to improve quality of life and well-being, and reduce morbidity, mortality, re-hospitalization, and costs [4].

Medication adherence was first defined by the World Health Organization [5] as the extent to

which people take medication as recommended by their health care providers. This definition was used to guide medication adherence research. However, from the health care provider perspective, the characteristics of medication adherence are different. In the area of general medicine, medication adherence focuses on taking medication as prescribed in relation to dose and frequency [6, 7]. In the pharmacy discipline, medication adherence refers to taking medication at the appropriate time and in the required number of doses per day [8], taking a medication or performing a therapy as directed, following both proper schedule and proper technique [9], the extent to which patients take medication as prescribed by their health care providers reflecting broad influences on patient behaviors [10], whether patients take medication as prescribed (e.g., twice daily), and whether they continue to take prescribed medication [11]. In the psychology field, medication

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adherence focuses on taking medication and feelings of embarrassment about having to take medication for a mental health-related illness [12, 13]. These different perspectives cause medication adherence to be measured in different ways.

Nurses are present in virtually every healthcare setting, giving them the opportunity to help persons with CAD improve medication adherence. Nurses recognize the complexity and uniqueness of each person; therefore, they can improve medication adherence by increasing patients' knowledge and ability to adhere to the medication treatment plan [14]. Nurses must have accurate information and be knowledgeable about existing conditions and patient circumstances, encouraging patients to change their behaviors [15]. Defining medication adherence is crucial for nurses to be able to assess and develop such interventions. Although there are numerous medication adherence definitions, the existing definitions do not reflect a holistic approach. From a nursing perspective, characteristics or attributes of medication adherence specific to persons with CAD remain unclear. Medication adherence education has been limited by the inability to capture this concept in a way that is easily communicated or documented. Therefore, the aim of this study was to operationalize a definition of medication adherence for persons with CAD from a nursing perspective.

MATERIALS AND METHODS

This paper was part of a main research study entitled "The development of medication adherence scale for persons with coronary artery disease." This study used the Delphi method to classify, cluster, and verify the characteristics of medication adherence.

Sample selection

The first stage of the study involved setting up a panel of experts who were knowledgeable about medication adherence for persons with CAD. The expert panel consisted of nurses who met the following inclusion criteria: 1) advanced practice nurse (APN) certification, or publications on medication adherence for persons with cardiovascular disease, or teaching about medication adherence in persons with cardiovascular disease; 2) more than 3 years' clinical practice experience with persons with CAD; 3) currently employed in a clinical area; and 4) willing to participate in this study with sufficient time to participate in the Delphi process.

Regarding the appropriate number of subjects to involve in the Delphi process, Macmillan's guideline [16] was used to set the sample size.

Seventeen expert nurses participated in this study, including 15 APNs in cardiovascular nursing and two nurse educators.

Instrument

Three instruments were used in this study: 1) the Round 1 Interview Guideline, 2) the Round 2 Questionnaire, and 3) the Round 3 Questionnaire. The Round 1 Interview Guideline comprised two questions: "Could you please tell me the meaning of medication adherence?" and "Please tell me about behaviors that reflect medication adherence for persons with CAD." The Round 2 Questionnaire was established from analyzed statements in Round 1. The scale consisted of 47 items covering four domains (proper knowledge of prescribed medication, storing medication appropriately, self-regulating medication administration correctly and continuously, and participating in the medication treatment plan) with a five-point Likert scale from 1 to 5 (strongly disagree to strongly agree). Lastly, the Round 3 Questionnaire included the original 47 items from the Round 2 Questionnaire and added an indication of the overall group response to the items and the individual's response.

The questionnaire stemming from group opinion is more valid than a decision made by a single person. The process is based on expert clinical opinion, providing confirmative judgments. In addition, combining an open first qualitative round through the Delphi process allows experts to generate scale items, and the continual succession of rounds provides the opportunity to review and judge appropriateness. Based on these assumptions, numerous writers claim that the Delphi method provides evidence of content and face validity [17-19].

Ethical considerations

The main study was approved by the Ethical Review Committee of the Faculty of Medicine, Ramathibodi Hospital, Mahidol University (ID 11-57-92), Police Hospital (๖๖ 75/57), Chonburi Hospital (54/2557), Thammasat University (153/2557), Faculty of Medicine, Songkhla Nakarin University (57-344-19-9), Sappasithiprasong Hospital (005/2558), and Buddhachinaraj Phitsanulok Hospital (111/57).

Data were collected after permission was obtained from the director of each hospital, the dean of each faculty, and expert nurses. If the participants did not want to answer the questionnaires or did not have sufficient time to participate in the Delphi process, they had the right to withdraw themselves from the study at any time without penalty.

Data collection

Delphi round 1: Face-to-face interviews

The aim of the first round was to identify and classify the characteristics of medication adherence from a nursing perspective. Experts were interviewed one-on-one with specific questions about the definition and characteristics of medication adherence for persons with CAD from a nursing perspective using the Round 1 Interview Guideline. The data were recorded verbatim and then analyzed using content analysis. Statements that reflected characteristics of medication adherence were identified. Then, statements that either were the same or had similar meaning were classified. These statements were combined if they related closely or overlapped. Lastly, a name was chosen for the cluster that accurately represented characteristics of medication adherence.

Delphi round 2: Postal round

The aim of this round was to cluster the characteristics of medication adherence. The same expert panel who participated in the first round was asked to complete Round 2. The Round 2 Questionnaire was sent to the experts and included an addressed, stamped envelope for ease of return. The experts were asked to rate each statement on a five-point scale from strongly disagree to strongly agree, optionally comment on each statement, and return the completed questionnaire within 2 weeks using the enclosed addressed, stamped envelope or e-mail.

Delphi round 3: Postal round

The purpose of the third round was to verify the medication adherence concept. The experts were asked to re-rate the items in light of the overall group response using the Round 3 Questionnaire and return the completed questionnaire within 2 weeks using the enclosed addressed, stamped envelope or e-mail. The researcher analyzed the data from the third round to reach a consensus on the selection statement that represented characteristics of medication adherence by using descriptive statistics.

Data analysis

The data were analyzed using content analysis and descriptive statistics, including percentage, median (Mdn), interquartile range (IR), and consensus level of agreement. Criteria for gaining consensus on the selection statement that represented characteristics of medication adherence was a Mdn equal to or greater than 3.50, an IR equal to or less than 1.50, and a consensus level of agreement of more than 70% [18].

RESULTS

After the first round, there were 44 statements that reflected characteristics of medication adherence for persons with CAD. These statements were clustered into four domains, including proper knowledge of prescribed medication (eight statements), storing medications appropriately (six statements), self-regulating medication administration correctly and continuously (22 statements), and participating in the medication treatment plan (six statements).

A total of 17 questionnaires were returned in Round 2 and Round 3, representing a response rate of 100%. After the third round, the results showed that consensus was gained for 42 statements related to characteristics of medication adherence for persons with CAD covering four domains, including proper knowledge of prescribed medication, storing medication appropriately, self-regulating medication administration correctly and continuously, and participating in the medication treatment plan.

As shown in Table 1, proper knowledge of prescribed medication consisted of eight statements (Mdn = 4.52-4.64, IR = 0.80-1.06, and consensus level of agreement = 94.1%-100%). Storing medications appropriately consisted of six statements (Mdn = 4.69-4.75, IR = 0.50-0.61, and consensus level of agreement = 94.2%-100%). Self-regulating medication administration correctly and continuously consisted of 22 statements (Mdn = 4.57-4.80, IR = 0.50-0.91, and consensus level of agreement = 88.2%-100%). Lastly, participating in the medication treatment plan consisted of six statements (Mdn = 4.67-4.75, IR = 0.50-0.65, and consensus level of agreement = 100%).

DISCUSSION

This study found that from the nursing perspective, medication adherence for persons with CAD refers to actions, including proper knowledge of prescribed medication, storing medication appropriately, self-regulating medication administration correctly and continuously, and participating in the medication treatment plan. The findings show that the characteristics of medication adherence differ from the existing definition of medication adherence in previous studies: taking medication as prescribed following healthcare provider recommendations [5, 7-10, 20, 21]. The nursing perspective focuses on the actions demanded by a specific illness or situation as well as the person's ability and competence to perform the required actions [22]. It is clear that medication adherence includes not only taking medication as prescribed, but also practicing the

Table 1 Expert panel consensus on characteristics of medication adherence

Dimension/Statement	Mdn	IR	Consensus level of agreement (%)
1. Proper knowledge of prescribed medication			
1. Knowing how to take medication correctly	4.64	0.80	100
2. Knowing the disadvantage if medication is not taken	4.64	0.80	100
3. Knowing the benefit of each medication taken	4.61	0.91	100
4. Knowing how to evaluate medication usage	4.57	0.97	100
5. Knowing what to do if an adverse reaction occurs	4.57	0.97	100
6. Knowing how to appropriately store medication	4.57	1.03	100
7. Knowing how to prepare medication	4.52	1.00	100
8. Knowing the adverse reactions of each medication taken	4.52	1.06	94.1
2. Storing medication appropriately			
9. Never leaving pills out of the foil before administration time	4.75	0.50	100
10. Storing sublingual medication in brown container, bottle, or bag that protects from light	4.75	0.50	100
11. Discarding expired medication	4.73	0.53	100
12. Keeping medication in a sealed container	4.69	0.61	100
13. Keeping medication in the correct location	4.69	0.61	94.2
14. Never keeping more than one medication in a single container	4.69	0.61	94.2
3. Self-regulating medication administration correctly and continuously			
15. Taking medication in the right dosage	4.80	0.50	100
16. Taking medication regularly	4.75	0.50	100
17. Taking medication as prescribed continuously throughout the duration of treatment	4.75	0.50	100
18. Refilling medication continuously	4.75	0.50	100
19. Asking for help from relatives or caregivers if there is a problem with medication usage at home	4.75	0.50	100
20. Taking the right medication	4.73	0.53	100
21. Taking medication using the right method	4.73	0.53	100
22. Taking medication at the right time on the correct schedule	4.73	0.53	100
23. Taking medication as prescribed by the health care provider	4.73	0.53	100
24. Not discontinuing the medication even if feeling better	4.73	0.53	100
25. Never using medication of other people even if it is the same medication	4.71	0.57	94.1
26. Never adjusting the dosage without the health care provider's order	4.71	0.57	88.2
27. Bringing medication when outside of the home	4.71	0.57	94.1
28. Self-directing medication administration as prescribed continuously	4.71	0.57	100
29. Asking the health care team about medication usage if there is a problem at home	4.69	0.61	100
30. Seeking help from a caregiver if having difficulty	4.69	0.61	100
31. Taking medication completely	4.67	0.65	94.1
32. Asking relatives for medication preparation assistance	4.67	0.65	94.1
33. Using appropriate devices for medication usage, such as a pill box, pill splitter, diary, or alarm clock	4.64	0.80	100
34. Asking relatives for help with medication regulation	4.64	0.80	100
35. Never using supplementary food, herbs, or fruit juice that interferes with medication effectiveness	4.61	0.91	100
36. Asking pharmacists for instructions on how to use medication correctly in case of receiving an unfamiliar medication	4.57	0.87	94.1
4. Participating in the medication treatment plan			
37. Sharing information with a health care provider to facilitate adjusting the medication treatment plan to harmonize with daily life patterns	4.75	0.50	100
38. Informing the health care provider if there are questions about medication usage	4.75	0.50	100
39. Observing for common adverse reactions of medication	4.73	0.53	100
40. Evaluating symptoms after taking medication	4.73	0.53	100

Table 1 Expert panel consensus on characteristics of medication adherence (Cont.)

Dimension/Statement	Mdn	IR	Consensus level of agreement (%)
41. Informing the health care provider if adverse reactions or complications are experienced	4.73	0.50	100
42. Reaching agreement with the health care provider on appropriate medication treatment	4.67	0.65	100

four main concepts related to medication administration.

First, the nurse experts reached the consensus that proper knowledge of prescribed medication is an attribute of medication adherence for persons with CAD. Treatment for persons with CAD is complex; therefore, adequate patient knowledge of medication is essential for appropriate administration [23].

Second, the nurse experts gained consensus that storing medication appropriately is an attribute of medication adherence for persons with CAD. For patients who rely on medications to stay alive, such as heart medications, expired medication can be dangerous because they may not be getting the full effectiveness. Improper storage can also affect efficacy and shelf life of medication [24]. Therefore, storing medication appropriately is a necessary action for persons with CAD.

Third, the nurse experts reached the consensus that self-regulating medication administration correctly and continuously is an attribute of medication adherence for persons with CAD. Persons with CAD require long-term medication therapy to prevent disease progression and recurrent cardiovascular events [3]. Therefore, they must take medication as prescribed correctly and continuously. Likewise, Klein et al. [9] state that medication adherence refers to taking medication following both the proper schedule and proper technique. Similarly, Ho, Bryson, and Rumsfeld [11] state that medication adherence usually refers to taking medication as prescribed and continuing to take the prescribed medication.

Lastly, the nurse experts gained consensus that participation in the medication treatment plan is an attribute of medication adherence for persons with CAD. Likewise, one study found that communicating and negotiating the treatment regimen is an attribute of medication adherence among persons with chronic disease [25]. This finding is also consistent with a more patient-centered approach to medication adherence [26], which is dependent on the collaborative relationship between the patient and health care provider [27]. When patients are involved in decision making

regarding medication administration, they have a sense of ownership and are partners in the treatment plan [28]. It is acknowledged that patients make the initial decision to follow a prescribed regimen and sustain adherence over time [26].

The findings of this study contribute to the concept of medication adherence for persons with CAD. Nurses can use the characteristics of medication adherence to guide patient assessment and develop appropriate interventions.

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