

Treatment adherence: A Concept Analysis Using the Walker & Avant Method

Jian Tang¹, Pimpaporn Klunklin², Sumalee Lirtmunlikaporn², Yanan Wang³

¹Department of Infectious Diseases, The Affiliated Hospital, Southwest Medical University, Luzhou, People's Republic of China; ²Faculty of Nursing, Chiang Mai University, Chiang Mai, Thailand; ³School of Medicine and Health Care, Jiangyang City Construction College, Luzhou, People's Republic of China

Correspondence: Jian Tang, Email tangjian034@swmu.edu.cn

Purpose: To clarify the meaning of treatment adherence and identify its attributes, antecedents, consequences, and empirical referents.

Design: A concept analysis.

Methods: Walker and Avant's method was used to analyze treatment adherence. PubMed, Web of Science, Wiley Online Library, and EBSCO databases were searched from 2013 to 2023. The PRISMA 2020 checklist was used.

Results: Seventeen studies were included in this analysis. The defining attributes were the ability to comply with the treatment, consistency in the treatment plan, communication with the healthcare provider, and willingness to treat. Antecedents included multiple medicines, lifestyle changes, illness perceptions and beliefs, and long-term treatment. The outcomes included treatment success, improved long-term treatment, and improved clinical outcomes.

Conclusion: Treatment adherence is a positive reaction of a patient to have the ability to comply with the treatment, consistency in the treatment plan, communication with the healthcare provider, and willingness to treat. This study proposes a detailed definition, attributes, antecedents, consequences, and empirical referents for treatment adherence. It is instructive to clinical nursing of treatment adherence, can be extended to various diseases, helps to improve clinical nursing practice regarding treatment adherence, and contribute to improving human health.

Keywords: treatment adherence, concept analysis, clinical nursing, nursing practice

Introduction

Maintaining treatment adherence is crucial to improve the health and quality of life of patients,¹ especially for the elderly with chronic diseases, post-traumatic recovery, or someone with a particular virus infection that must accept treatment lifetime to maintain viral depression, such as human immunodeficiency virus (HIV).² Studies have found that poor treatment adherence can lead to poor health and health care costs.^{3,4}

Many factors contribute to poor treatment adherence, including level of education, poor health literacy, the side effects of treatment medicines, poor living habits, and social support, and so on.^{5,6} Poor health literacy and family support are widely believed to be the leading causes of poor treatment adherence,^{7,8} because patients or their relatives lack an understanding of diseases and treatments, which increases the prevalence of non-adherence to treatment. Although studies have identified factors affecting treatment adherence, few have focused on the concept of treatment adherence.

Research on treatment adherence initially focused on hypertension,⁹ followed by out-patients,¹⁰ stroke,¹¹ arthritis,¹² myocardial infarction,¹³ cancer,¹⁴ Chronic Obstructive Pulmonary Disease,¹⁵ HIV infection,¹⁶ schizophrenia patients,¹⁷ diabetes,¹⁸ and many other diseases. Adhering to multiple treatments is challenging for them.¹⁹

Background

According to the Cambridge Dictionary, “adherence” refers to the act of doing something according to a particular rule, standard, agreement, etc. Adherence is a positive proactive behavior in which patients match the recommendations of the prescriber.²⁰ Compared with “compliance”, adherence emphasize that the patient is free to decide whether to adhere to

the doctor's prescription.²⁰ Adherence refers to the proportion of treatment within a specific time interval, whereas "persistence" refers to the continued (timely) use of prescribed treatment.²¹ Compared to concordance, adherence and compliance focus on the behavior of patients during treatment, while concordance highlights the processes of treatment.²² As for the word "treatment" in the Cambridge Dictionary, it means the use of drugs, exercises, etc. to improve the condition of an ill or injured person, or to cure a disease.

Blackwell first proposed the concept of treatment adherence in 1976.³ He classified treatment adherence into the following types: adherence to drug therapy, treatment dropout, and failed first attendance. By understanding the concept of treatment adherence, patients can understand the importance of treatment adherence and what facilitates treatment adherence, which may play an important role in improving their health. Regarding clinical nursing practice, a clear understanding of treatment adherence could help nurses gain comprehensive knowledge and effective coping strategies to improve nursing practice regarding successful treatment and well-being.

Many studies over the past few decades have focused on treatment adherence. With improvements in treatment beliefs, techniques, and effects in recent years, the concept of treatment adherence may have some new features. In this concept analysis, we aimed to clarify the meaning of treatment adherence and identify its attributes, antecedents, and empirical referents based on the literature from the last ten years. By analyzing the concept of treatment adherence, future research could better understand this area and contribute to clinical nursing.

Methods

Concept Analysis Method

Walker and Avant's concept analysis method (2019) was used to analyze the concept of treatment adherence. It has eight steps to capture the essence of the analysis process: (1) select a concept, (2) determine the aims or purposes of the analysis, and (3) identify all uses of the concept that can be discovered. (4) Determine the defining attributes; (5) identify a model case; (6) identify borderline, related, contrary, invented, and illegitimate cases; (7) identify antecedents and consequences; and (8) define empirical referents.

Data Source

A systematic literature review of treatment adherence was conducted, and the following databases or search engines were searched from 2013 to 2023: PubMed, Web of Science, Wiley Online Library, and EBSCO. The search terms were treatment and adherence to the title. Articles were screened and included if they were in English, the full text was available, and the content focused on treatment adherence. The PRISMA 2020 checklist was used to ensure that all the important information was captured and to ensure completeness.

Data Analysis

Endnote 20.4.1, was used to manage references and remove duplicates. The titles and abstracts of the references were screened by two researchers independently based on the inclusion criteria. Any disagreements were resolved by a third researcher. Full texts of the studies were screened using the same methodology. Each article included in this study was extracted and analyzed by two researchers to determine the meaning of treatment adherence and identify its attributes, antecedents, and empirical referents of treatment adherence.

Results

The original search retrieved 9039 articles. After removing duplicates, 6295 articles remained. No records were identified through other sources such as books, magazines, or conferences. After screening the titles, abstracts, and full texts, 17 studies were included in the concept analysis (See [Figure 1](#)). There were seven quantitative studies, six reviews, two qualitative studies, and two mixed-methods studies. The uses of the concept, defining attributes, model, borderline, related, and contrary cases, antecedents, consequences, and empirical referents were identified. The antecedents, attributes, and consequences of treatment adherence are presented in [Figure 1](#).

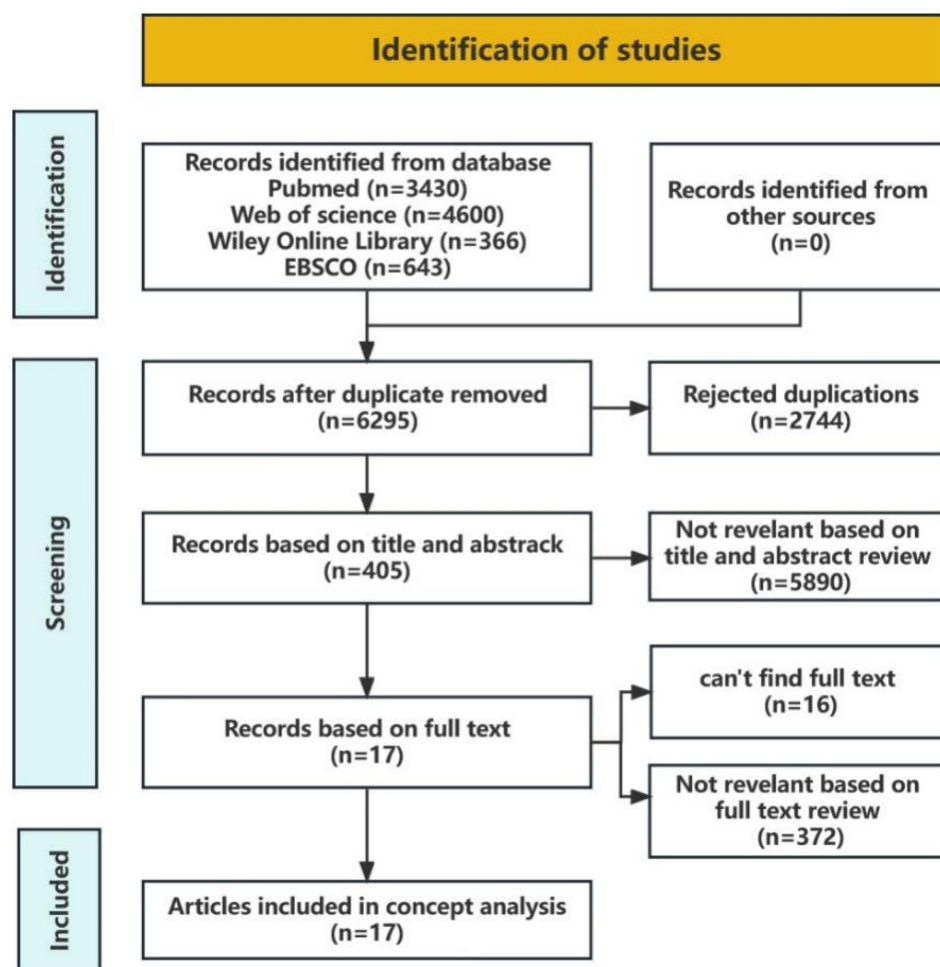


Figure 1 PRISMA flow diagram.

Uses of the Concept of Treatment Adherence

The concept of treatment adherence is widely used in the medical and nursing sciences. The degree of treatment adherence is an outcome of health status.²³ According to the World Health Organization, treatment adherence is the extent to which a person's behavior of taking medication, following a diet, and/or executing lifestyle changes corresponds to the recommendations agreed upon by a healthcare provider (World Health Organization, 2003). From the perspective of the American Medical Association, treatment adherence of a patient is considered adherent if they take 80% of their prescribed medicines.²⁴ In medication areas, adherence to treatment within a specified period is defined as "the length of time from the start to cessation of treatment".²⁵

Defining Attributes

According to Walker and Avant (2019), determining the defining attributes of a concept is at the heart of a concept analysis. Defining attributes refers to the characteristics of a concept that are most frequently associated with the concept. The definition of attributes, antecedents, consequences, and empirical referents of treatment adherence based on an analysis of the literature has been identified. The defining attributes are as follows (As shown in [supplementary Table 1](#)).

(1) The ability to comply with the treatment: The patient's capacity to follow the prescribed treatment, including taking medication as prescribed,^{7,26–28} following physical and mental exercise as prescribed,^{28–31} and following a special diet or lifestyles.^{27,28,32,33}

(2) Consistency on the treatment plan: The patient can use the plan regularly and stick to it in the long-term.^{28,31,34,35} This is a continuation and persistent state of the ability to comply with the treatment. It is an important part of patients who require long-term and standardized treatment for conditions such as HIV infection, chronic diseases, and schizophrenia.

(3) Communication with healthcare provider: Patients can follow the appointment of seeing doctors for regular disease monitoring, consulting, and exchanging information and feedback.^{31,36} This is an essential part of disease treatment of diseases.^{37,38} Timely assessment of changes in disease, drug response, and health status provides evidence of successful treatment.³⁶

(4) Willingness to treatment: The previous three attributes are from the perspective of behavior that adheres to treatment, and this attribute comes from the perspective of the psychology of patients who are willing to receive treatment.³¹ The patient has sufficient health literacy³⁹ and believes in the treatment of health benefits and in the voluntary decision to comply with the treatment regime.²⁹

Identify a Model Case

In the following case, all defining attributes of treatment adherence were included. This case is a fictional case for illustrative purposes only.

Jason is a 40-year-old company manager who was diagnosed with an HIV 3 years ago. He was well educated, understood the importance of treatment, and showed a willingness to receive treatment (Willingness to treatment). To maintain health, he quit smoking and drinking, and remembered every dose of the medicine (ability to comply with the treatment). He had persisted in this lifestyle and medication adherence since he was diagnosed and believed that he could maintain this lifelong (consistency in the treatment plan). Moreover, he would go to the HIV consulting clinic every three months to assess his health and communicate with doctors about the latest treatments (communication with healthcare providers). The patient showed good long-term treatment adherence and remained healthy.

Identify Borderline, Related, Contrary Cases

Borderline Case

Borderline cases contain most of the defining attributes of the concepts being examined. In the following cases, the most defined attributes of treatment adherence were included. This case is a fictional case for illustrative purposes only.

Jack was a 24-year-old man with persistent low-grade fever for the last two weeks. He then went to the hospital for biochemical tests and was diagnosed with an HIV infection. Doctors require the patient to start antiretroviral treatment immediately, which is a lifelong therapy. He was upset after the infection; he knew that this could not be cured, and felt like life had been done. After searching from the Internet, he knew the importance of treatment and willingness to accept treatment (willingness to treatment), and he could follow the prescribed treatment (ability to comply with the treatment) and persist all the time (consistency in the treatment plan). However, he was worried that the healthcare providers would reveal his privacy, and he always covered his face so that no one could see him and never communicated with them, just left after receiving the medicine (without communication with the healthcare provider).

Related Case

Related cases are related to and similar to the concept being studied but are not the concept itself. In the following case, the concept of medication adherence was described as being related to treatment adherence, and the main attribute of medication adherence was the ability to take medication as prescribed. This case is a fictional case for illustrative purposes only.

Angela is a 27-year-old female who was diagnosed with mild depression and sleep disorders. The doctor prescribed antidepressant and insomnia drugs and asked her to take them every day before going to bed. However, she thought that her depression would ease if she got good sleep during the night, so she only took drugs for insomnia but not for antidepressants every night. Two weeks later, her depressive symptoms worsened, and she required higher doses of sleeping pills. She failed to adhere to taking the medicine as prescribed and had to go to the hospital again to seek help from a doctor.

Contrary Case

In the following case, defining attributes of treatment adherence were not included. This case is a fictional case for illustrative purposes only.

Jepson is a 20-year-old college student who was diagnosed with HIV infection, but without any clinical symptoms. Although doctors required him to take antiretroviral treatment every day, he was very upset, thought it could not be cured, and refused all treatments. Due to the HIV control policy, he had to earn medicine because he was afraid that if he did not take it, the doctor would notify his parents (no willingness to treatment). However, he never talked to the healthcare providers (no communication with them). He threw away medicine as soon as he left the hospital and refused to quit smoking, drinking, and exercise (no ability to comply with the treatment and consistency of the treatment plan).

Identify Antecedents and Consequences

Antecedents

Walker and Avant (2019) described antecedents as events or occurrences that must have occurred or existed before a concept. According to the literature review, antecedents include multiple medicines,³⁴ lifestyle changes,³⁷ illness perceptions and beliefs,³⁸ and long-term treatment²⁹ (see Figure 2). Long-term treatment is an important antecedent of treatment adherence^{29,40–42} (As shown in [supplementary Table 1](#)). Because it is hard for patients to keep good adherence of long-term treatment, especially for elderly who with cognitive dysfunction or poor health literacy,^{43,44} they cannot remember to take medicine on time or cannot understand why they need to take medicine all the time.^{39,45} For some young patients that need to have long-term treatment, it is hard for them to follow the treatment as prescribed either. Especially for diseases that suffer stigma or discrimination, patients do not want others to know their disease and refuse to accept treatment.^{42,46}

Consequences

Walker and Avant (2019) described consequences as events or incidents that occur because of the concept, which refers to the outcomes of the concept. The main outcome of treatment adherence was improvement in health. However, this concept analysis has many consequences such as treatment success,^{39,40,42} improved long-term treatment,^{26,29} and improved clinical outcomes^{47,48} (As shown in [supplementary Table 1](#)). The core consequence is to improve health because the purpose of treatment is to improve health or help people recover from diseases. Therefore, in this concept analysis, all consequences are indicated as improving health.

Define Empirical Referents

Walker and Avant (2019) described empirical referents as classes or categories of actual phenomena that can be measured. Treatment adherence was measured using the following method (As shown in [supplementary Table 1](#)).

Self-Report Measure

Self-report measures are one of the most common methods for measuring treatment adherence based on the attributes of the ability to comply with the treatment and the consistency of the treatment plan. It is usually self-reported by patients to recall their missing dose of medication,⁴⁹ level of following a diet or exercise, or burden of treatment in the past days.⁵⁰

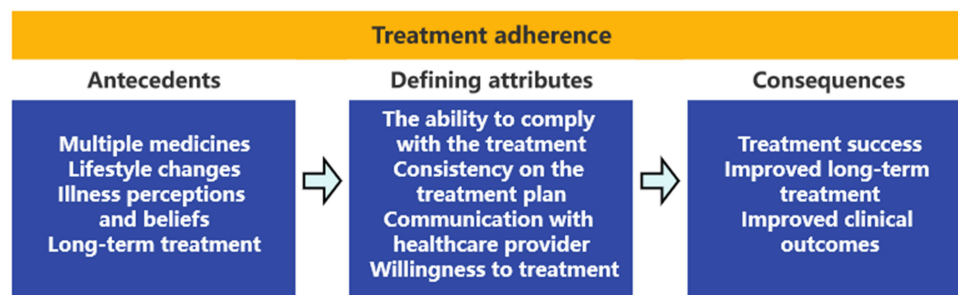


Figure 2 Antecedents, attributes, and consequences of treatment adherence.

Self-reporting measures are primarily achieved using different scales or questionnaires. Some scales can be used to measure the willingness to treatment.^{51,52}

Electronic Devices

There are some electronic devices can be used to measure treatment adherence. An electronic pill box is one of the devices that the patient can take medicines as prescribed; it can record the time the patients opened the box and the dose taken out from the box.^{53,54} Some electronic devices record the exercise of a patient and then measure their adherence to the exercise.^{55,56}

Keeping Scheduled Appointment

This method measures the attributes of communication with healthcare providers regarding treatment adherence. Patients could follow the appointment as prescribed for long-term for regular disease communicating is an important part of treatment of diseases,^{37,38} and it can be another one objective method to measure the treatment adherence.³⁶

Discussion

Adherence to treatment is an important concept in both medicine and nursing. With the increasing number of patients suffering from chronic diseases, an increasing number of studies have been conducted.^{19,23,33} Research has addressed the importance of treatment adherence and ways to improve treatment adherence.^{57,58}

Through concept analysis of treatment adherence, defining attributes, model cases, antecedents and consequences, and empirical referents of treatment adherence were identified. Four key defining attributes revealed the characteristics of treatment adherence: ability, consistency, communication, and willingness. These key defining attributes could help clinical nurses gain a clearer understanding of treatment adherence and devise more strategies to improve treatment adherence.

The findings of this concept analysis indicate that poor health literacy and beliefs are associated with poor long-term treatment adherence.^{59,60} This is a common cause of poor treatment adherence, which reminds researchers to conduct more disease health education so that patients can truly understand and adhere to treatment. The core consequence of adhering to treatment is to improve health, which means that the measurement of treatment adherence should not only concentrate on adherence but also measure the health outcome, which could reflect treatment adherence.

This study had some limitations that need to be acknowledged. First, this study only searched the literature from 2013 to 2023, and the included literature may not be sufficiently comprehensive. However, the term treatment adherence is broad, and many related studies have been published long ago; therefore, there is no need to include the literature of the previous century into the analysis of the latest concepts. Second, we did not perform a concept analysis for a certain disease but for the entire healthcare field, which might lead to a lack of specificity in clinical nursing for treatment adherence to a disease. Corresponding to this limitation, it is instructive in clinical nursing for treatment adherence and can be extended to various chronic diseases.

Conclusion

Treatment adherence is a positive reaction of a patient to have the ability to comply with the treatment, consistency in the treatment plan, communication with the healthcare provider, and willingness to treat. This study identified the definition, origin, uses, defining attributes, model case, borderline case, contrary case, antecedents, consequences, and empirical referents of the concept of treatment adherence. Which is instructive to clinical nursing of treatment adherence, and can be extended to various diseases, helps to improve clinical nursing practice on treatment adherence, and contributes to improving the quality of healthcare.

Data Sharing Statement

Data sharing is not applicable to this article, as no new data were created or analyzed in this study.

Ethics Statement

Ethical approval was not required for the research presented in this study.

Acknowledgments

We would like to thank Dr. Thanee Kaewthummanukul and Dr. Tareewan Chaiboonruang, Faculty of Nursing, Chiang Mai University, for their help with data analysis.

Funding

This study was supported by National Natural Science Foundation of China (Grant No. 82304256).

Disclosure

The authors declare no conflict of interest.

References

- Martin LR, Haskard-Zolnieriek KB, DiMatteo MR. *Health Behavior Change and Treatment Adherence: Evidence-Based Guidelines for Improving Healthcare*. USA: Oxford University Press; 2010.
- Altice F, Evuarherhe O, Shina S, Carter G, Beaubrun AC. Adherence to HIV treatment regimens: systematic literature review and meta-analysis. *Patient Prefer Adherence*. 2019;Volume 13:475–490. doi:10.2147/PPA.S192735
- Blackwell B. Treatment adherence. *Br J Psychiatry*. 1976;129(6):513–531. doi:10.1192/bjp.129.6.513
- Jack K, McLean SM, Moffett JK, Gardiner E. Barriers to treatment adherence in physiotherapy outpatient clinics: a systematic review. *Manual ther*. 2010;15(3):220–228. doi:10.1016/j.math.2009.12.004
- Brown MT, Bussell JK. Medication adherence: WHO cares? In: *Mayo Clinic Proceedings*. Elsevier; 2011.
- Zoungrana-Yameogo WN, Fassinou LC, Ngwasiri C, et al. Adherence to HIV antiretroviral therapy among pregnant and breastfeeding women, non-pregnant women, and men in Burkina Faso: nationwide analysis 2019–2020. *Patient Prefer Adherence*. 2022;Volume 16:1037–1047. doi:10.2147/PPA.S354242
- Coskun S, Bagcivan G. Associated factors with treatment adherence of patients diagnosed with chronic disease: relationship with health literacy. *Appl Nurs Res*. 2021;57:151368. doi:10.1016/j.apnr.2020.151368
- Yusra A, Waluyo A. Family support toward adherence and glycemic control of type 2 diabetes patient: a systematic review. *Problems of Endoc Patho*. 2022;79(1):100–111. doi:10.21856/j-PEP.2022.1.14
- Blackwell B. Treatment adherence in hypertension. *Am J Pharm Sci Support Public Health*. 1976;148(3):75–85.
- Abiodun O, Akinpelu A, Oyekanmi M, Monehin S, Olorunfemi O. Factors influencing the level of adherence to treatment protocols among hypertensive out-patients in federal medical centre, Owo, Ondo State, Nigeria. *Achievers J Sci Res*. 2023;4(2):9–18.
- Noseworthy PA, Branda ME, Kunneman M, et al. Effect of shared decision-making for stroke prevention on treatment adherence and safety outcomes in patients with atrial fibrillation: a randomized clinical trial. *J Am Heart Assoc*. 2022;11(2):e023048. doi:10.1161/JAHA.121.023048
- Tanaka E, Inoue E, Abe M, et al. Changes in treatment adherence and behaviour during the COVID-19 pandemic in Japanese patients with rheumatoid arthritis: results from cross-sectional study in the IORRA cohort. *Mod Rheumatol*. 2022;32(6):1193–1195. doi:10.1093/mr/roab120
- Zorina O, Fatkulina N, Saduyeva F, Omarkulov B, Serikova S. Patient adherence to therapy after myocardial infarction: a scoping review. *Patient Prefer Adherence*. 2022;16:1613–1622. doi:10.2147/PPA.S356653
- Cheli S, Lam WW, Estapé T, et al. Risk perception, treatment adherence, and personality during COVID-19 pandemic: an international study on cancer patients. *Psycho-Oncology*. 2022;31(1):46–53. doi:10.1002/pon.5775
- Poletti V, Pagnini F, Banfi P, Volpato E. Illness perceptions, cognitions, and beliefs on COPD patients' adherence to treatment—a systematic review. *Patient Prefer Adherence*. 2023;Volume 17:1845–1866. doi:10.2147/PPA.S412136
- Long-acting antiretrovirals and HIV treatment adherence. *Lancet HIV*. 2023;10:e332–42.
- Velligan DI, Rao S. Adverse Events and Treatment Adherence in Schizophrenia. *J Clin Psych*. 2023;84(1):45116. doi:10.4088/JCP.MS21078COM8
- Ren Z, Xu X, Yue R. Preferences and adherence of people with prediabetes for disease management and treatment: a systematic review. *Patient Prefer Adherence*. 2023;Volume 17:2981–2989. doi:10.2147/PPA.S437267
- Danielson E, Melin-Johansson M C, Modanloo M. Adherence to treatment in patients with chronic diseases: from alertness to persistence. *Int J Community Based Nurs Midwifery*. 2019;7(4):248–257. doi:10.30476/IJCBNM.2019.81303.0
- Horne R, Weinman J, Barber N, et al. Concordance, adherence and compliance in medicine taking. *London*. 2005;2005(40):6.
- Cramer JA, Benedict A, Muszbek N, Keskinaslan A, Khan ZM. The significance of compliance and persistence in the treatment of diabetes, hypertension and dyslipidaemia: a review. *Int J Clin Pract*. 2008;62(1):76–87. doi:10.1111/j.1742-1241.2007.01630.x
- Chakrabarti S. What's in a name? Compliance, adherence and concordance in chronic psychiatric disorders. *World J Psychiatry*. 2014;4(2):30–36. doi:10.5498/wjp.v4.i2.30
- Marinda E, Zungu N, Chikovore J, et al. Association between ART Adherence and Mental Health: results from a National HIV Sero-Behavioural Survey in South Africa. *AIDS Behav*. 2022;26(5):1517–1529. doi:10.1007/s10461-021-03505-4
- 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(4):455–461. doi:10.1001/jama.288.4.455
- Forbes CA, Deshpande S, Sorio-Vilela F, et al. A systematic literature review comparing methods for the measurement of patient persistence and adherence. *Curr Med Res Opin*. 2018;34(9):1613–1625. doi:10.1080/03007995.2018.1477747

26. Sidorkiewicz S, Tran VT, Cousyn C, Perrodeau E, Ravaud P. Development and validation of an instrument to assess treatment adherence for each individual drug taken by a patient. *BMJ Open*. 2016;6(5):e010510. doi:10.1136/bmjopen-2015-010510
27. Ramsey RR, Ryan JL, Hershey AD, Powers SW, Aylward BS, Hommel KA. Treatment adherence in patients with headache: a systematic review. *Headache*. 2014;54(5):795–816. doi:10.1111/head.12353
28. Kaplan A, Price D. Treatment adherence in adolescents with asthma. *J Asthma Allergy*. 2020;Volume 13:39–49. doi:10.2147/JAA.S233268
29. Lopez-Campos JL, Quintana Gallego E, Carrasco Hernandez L. Status of and strategies for improving adherence to COPD treatment. *Int J Chron Obstruct Pulmon Dis*. 2019;14:1503–1515. doi:10.2147/COPD.S170848
30. Marinho FS, Moram CBM, Rodrigues PC, Leite NC, Salles GF, Cardoso CRL. Treatment adherence and its associated factors in patients with type 2 diabetes: results from the rio de janeiro type 2 diabetes cohort study. *J Diabetes Res*. 2018;2018:8970196. doi:10.1155/2018/8970196
31. Hood MM, Corsica J, Bradley L, Wilson R, Chirinos DA, Vivo A. Managing severe obesity: understanding and improving treatment adherence in bariatric surgery. *J Behav Med*. 2016;39(6):1092–1103. doi:10.1007/s10865-016-9772-4
32. Le P, Ayers G, Misra-Hebert AD, et al. Adherence to the American diabetes association's glycemic goals in the treatment of diabetes among older Americans, 2001–2018. *Diabetes Care*. 2022;45(5):1107–1115. doi:10.2337/dc21-1507
33. Pourhabibi N, Mohebbi B, Sadeghi R, et al. Determinants of poor treatment adherence among patients with type 2 diabetes and limited health literacy: a scoping review. *J Diabetes Res*. 2022;2022:2980250. doi:10.1155/2022/2980250
34. Panjabi S, Lacey M, Bancroft T, Cao F. Treatment adherence, clinical outcomes, and economics of triple-drug therapy in hypertensive patients. *J Am Soc Hypertens*. 2013;7(1):46–60. doi:10.1016/j.jash.2012.11.001
35. Pan J, Wu L, Wang H, et al. Determinants of hypertension treatment adherence among a Chinese population using the therapeutic adherence scale for hypertensive patients. *Medicine*. 2019;98(27):e16116. doi:10.1097/MD.00000000000016116
36. Dibaba D, Kajala G, Chego M, et al. Antiretroviral treatment adherence level and associated factors among adult HIV-positive patients on both HIV/AIDS care models: comparative study in selected hospitals of Western Ethiopia, 2019. *HIV AIDS*. 2021;13:1067–1078.
37. Adisa R, Ilesanmi OA, Fakeye TO. Treatment adherence and blood pressure outcome among hypertensive out-patients in two tertiary hospitals in Sokoto, Northwestern Nigeria. *BMC Cardiovasc Disord*. 2018;18(1):194. doi:10.1186/s12872-018-0934-x
38. Shakya R, Shrestha S, Gautam R, et al. Perceived illness and treatment adherence to hypertension among patients attending a tertiary hospital in Kathmandu, Nepal. *Patient Prefer Adherence*. 2020;14:2287–2300. doi:10.2147/PPA.S270786
39. Rivera E, Clark-Cutaia MN, Schrauben SJ, et al. Treatment adherence in CKD and support from health care providers: a qualitative study. *Kidney Med*. 2022;4(11):100545. doi:10.1016/j.xkme.2022.100545
40. Afonso P, Brissos S, Canas F, Bobes J, Bernardo-Fernandez I. Treatment adherence and quality of sleep in schizophrenia outpatients. *Int J Psychiatry Clin Pract*. 2014;18(1):70–76. doi:10.3109/13651501.2013.845219
41. McCullough AR, Tunney MM, Quittner AL, Elborn JS, Bradley JM, Hughes CM. Treatment adherence and health outcomes in patients with bronchiectasis. *BMC Pulm Med*. 2014;14(1):107. doi:10.1186/1471-2466-14-107
42. Inzaule SC, Hamers RL, Kityo C, Rinke de Wit TF, Roura M. Long-term antiretroviral treatment adherence in HIV-infected adolescents and adults in Uganda: a qualitative study. *PLoS One*. 2016;11(11):e0167492. doi:10.1371/journal.pone.0167492
43. Cabellos-Garcia AC, Martinez-Sabater A, Castro-Sanchez E, Kangasniemi M, Juarez-Vela R, Gea-Caballero V. Relation between health literacy, self-care and adherence to treatment with oral anticoagulants in adults: a narrative systematic review. *BMC Public Health*. 2018;18(1):1157. doi:10.1186/s12889-018-6070-9
44. Sudharsanan N, Ali MK, McConnell M. Hypertension knowledge and treatment initiation, adherence, and discontinuation among adults in Chennai, India: a cross-sectional study. *BMJ Open*. 2021;11(1):e040252. doi:10.1136/bmjopen-2020-040252
45. Kalaitzidis RG, Panagiotopoulou T, Stagikas D, Pappas K, Balafa O, Elisaf MS. Arterial stiffness, cognitive dysfunction and adherence to antihypertensive agents. is there a link to hypertensive patients? *Curr Vasc Pharmacol*. 2020;18(4):410–417. doi:10.2174/1570161117666190415112953
46. Mabunda K, Ngamasana EL, Babalola JO, Zunza M, Nyasulu P. Determinants of poor adherence to antiretroviral treatment using a combined effect of age and education among human immunodeficiency virus infected young adults attending care at letaba hospital hiv clinic, Limpopo Province, South Africa. *Pan Afr Med J*. 2019;32:37. doi:10.11604/pamj.2019.32.37.17722
47. Eicher L, Knop M, Aszodi N, Senner S, French LE, Wollenberg A. A systematic review of factors influencing treatment adherence in chronic inflammatory skin disease - strategies for optimizing treatment outcome. *J Eur Acad Dermatol Venereol*. 2019;33(12):2253–2263. doi:10.1111/jdv.15913
48. Xue J, Conwell Y, Tang W, et al. Treatment adherence as a mediator of blood pressure control in Chinese older adults with depression. *Int J Geriatr Psychiatry*. 2019;34(3):432–438. doi:10.1002/gps.5032
49. Mannheimer S, Thackeray L, Huppler Hullsiek K, et al. A. terry beirn community program for clinical research on. A randomized comparison of two instruments for measuring self-reported antiretroviral adherence. *AIDS Care*. 2008;20(2):161–169. doi:10.1080/09540120701534699
50. Tran VT, Montori VM, Eton DT, Baruch D, Falissard B, Ravaud P. Development and description of measurement properties of an instrument to assess treatment burden among patients with multiple chronic conditions. *BMC Med*. 2012;10(1):68. doi:10.1186/1741-7015-10-68
51. Mah A, Hull MW, DeBeck K, et al. Knowledge of hepatitis C and treatment willingness amongst people who inject drugs in an era of direct acting antivirals. *Int J Drug Policy*. 2017;47:137–143. doi:10.1016/j.drugpo.2017.02.006
52. Kim BK, Lee S, Jun M, Chung HC, Oh SS, Lee WS. Perception of hair loss and education increases the treatment willingness in patients with androgenetic alopecia: a population-based study. *Ann Dermatol*. 2018;30(4):402–408. doi:10.5021/ad.2018.30.4.402
53. Kalichman SC, Cain D, Cherry C, Kalichman M, Pope H. Pillboxes and antiretroviral adherence: prevalence of use, perceived benefits, and implications for electronic medication monitoring devices. *AIDS Patient Care STDs*. 2005;19(12):833–839. doi:10.1089/apc.2005.19.833
54. Bionghi N, Daftary A, Maharaj B, et al. Pilot evaluation of a second-generation electronic pill box for adherence to bedaquiline and antiretroviral therapy in drug-resistant TB/HIV co-infected patients in KwaZulu-Natal, South Africa. *BMC Infect Dis*. 2018;18(1):171. doi:10.1186/s12879-018-3080-2
55. Chan TC, Griswold WG, Buono C, et al. Impact of wireless electronic medical record system on the quality of patient documentation by emergency field responders during a disaster mass-casualty exercise. *Prehosp Disaster Med*. 2011;26(4):268–275. doi:10.1017/S1049023X11006480
56. Gil B, Anastasova S, Yang GZ. A smart wireless ear-worn device for cardiovascular and sweat parameter monitoring during physical exercise: design and performance results. *Sensors*. 2019;19(7):1616. doi:10.3390/s19071616

57. Tae CH, Jung SA, Moon HS, et al. Importance of patients' knowledge of their prescribed medication in improving treatment adherence in inflammatory bowel disease. *J Clin Gastroenterol*. 2016;50(2):157–162. doi:10.1097/MCG.0000000000000431
58. Guix Comellas EM, Force Sanmartin E, Rozas Quesada L, Noguera Julian A. the importance of proper adherence to anti-tuberculosis treatment. *Rev Enferm*. 2015;38(1):8–15.
59. Kalichman SC, Pope H, White D, et al. Association between health literacy and HIV treatment adherence: further evidence from objectively measured medication adherence. *J Int Assoc Physicians AIDS Care*. 2008;7(6):317–323. doi:10.1177/1545109708328130
60. Miller TA. Health literacy and adherence to medical treatment in chronic and acute illness: a meta-analysis. *Patient Educ Couns*. 2016;99(7):1079–1086. doi:10.1016/j.pec.2016.01.020

Patient Preference and Adherence

Dovepress

Publish your work in this journal

Patient Preference and Adherence is an international, peer-reviewed, open access journal that focusing on the growing importance of patient preference and adherence throughout the therapeutic continuum. Patient satisfaction, acceptability, quality of life, compliance, persistence and their role in developing new therapeutic modalities and compounds to optimize clinical outcomes for existing disease states are major areas of interest for the journal. This journal has been accepted for indexing on PubMed Central. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/patient-preference-and-adherence-journal>