

# The Development of Theory of Adherence Behavior to Treatment Regimens among Older Adults Utilizing the Deductive Axiomatic Approach

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## ABSTRACT

This study aims at developing a theory that endeavors to explore the process of developing adherence behavior to treatment regimens among older people that can lead to a successful aging experience and develop effective health strategies to minimize vulnerability set by aging. In the development of a theory, this study utilized a deductive reasoning approach specifically using the axiomatic approach. Adherence behavior to Treatment Regimens Theory was developed by three propositions generated from five axioms that were derived after reviewing and critical appraisal of multiple sets of relevant literatures and studies. Specifically, the developed theory implies the following propositions: 1) Adherence behavior among older adults is the result of different responses; 2) adherence behavior among older adults is influenced by certain factors; and lastly 3) variation in adherence behavior among older adults can influence individual health outcomes. Thus, it can be concluded that gerontology nurses are effective, if they were able to promote adherence behavior among older adults. Thus, Nurses must encourage older adults to adhere to their therapeutic regimen. Therefore, emphasizing to improve adherence behaviors to treatment regimen to ensure successful aging experience, healthier lifespan and develop effective health strategies to minimize vulnerability set by aging.

**Keywords:** aged; aging; patient compliance; treatment adherence; community health nursing

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## 1. INTRODUCTION

Adherence to medication is one of the most intriguing and complex behavior demonstrated by older adult patients (Hinkle & Cheever, 2018). The World Health Organization cited that compliance is the extent to which a person's behavior-taking medication, following a diet, and executing lifestyle changes- corresponds with agreed recommendations from a health care provider (2). Meanwhile, poor adherence to treatment of chronic diseases is a worldwide challenge of striking magnitude. It is undeniable that many patients experience difficulty in following treatment recommendations. Failure to follow healthcare professionals' advice is a public health concern globally leads to the worst possible clinical health outcomes (3). Poor compliance is described as the extent to which patients are unable to follow the recommendations for treatment (4). Specifically, studies have reported that only 50% of general population has been estimated to adhere to their medications (5). Among patients with chronic illness, approximately 50% do not take medications as prescribed. This poor adherence to

medication leads to increased morbidity and death and is estimated to incur costs of approximately \$100 billion per year (6) Thus, the rates of adherence are generally low (1). Poor compliance among older persons is a public health concern, as it accounts for adverse outcomes, medication wastage with increased cost of healthcare, and substantial worsening of the disease with increased disability or death (7). The fact that many people do not adhere to their prescribed regimens cannot be ignored or minimized. Nonadherence to prescribed therapy has been the subject of many studies. For the most part, the findings have been inconclusive, and no one predominant causative factor has been found (6). This study aims at developing a theory that endeavors to explore the process of developing adherence behavior to treatment regimens among older people that can lead to a successful aging experience, promote healthier lifespan and develop effective health strategies to minimize vulnerability set by aging. Older adults act not only as recipients of care but as partners to successful aging (8,9). Older adults are empowered with a challenge

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to develop effective health strategies to minimize vulnerability set by aging (10,11).

## 2. METHODS

This study utilized Theory-building research as a major strategy for theory development. This theory-then-research strategy to create a theory that would explain the occurrence, nature and meaning of the phenomena (12). This is done to propose a priori theory where hypothesis is derived, verified, tested, and refuted through research (13). Specifically, the study utilized a deductive reasoning approach to theory development to create and test a theory that would explain the occurrence of the phenomenon that was observed in terms of the adherence to therapeutic regimen among older adults. This type of theory generation presents the propositions and axiomatic approach which is later on is supported by literatures and studies to provide a logical explanation of the specific circumstances and phenomena of interest (14). This systematic approach uses logical reasoning from general to specific to explore its application to certain occurrences (13). In here, it begins by employing a pre-existing theories and existing models to deduce a hypothesis that is

subjected later on for empirical results and data collection (15). The theory is substantiated with rigorous technical reviews of related studies that encompassed formulation of review objective, screening for inclusion, extant literature search, quality assessment of information sources, data extraction, and critical analysis of literature data (16). After gathering relevant information and facts from literature review, it is then followed by developing axioms. The respective axiom represents as the basis and foundation for proposition formulation that is the theoretical stand as it explores possible relatedness of theoretical concepts and assumptions. (15). Afterwards, literatures that explain the process of adherence behavior among older adults where included to support the extracted axioms and proposition. Relevant concepts were identified and what have already been learned about them were discovered to create propositional structures that could explain the topic under study. These were inferences derived from the axiomatic discussion using logical reasoning. The protocol of this theory development is considered an exemption for review, which allows the authors to proceed in the study.

## 3. RESULTS AND DISCUSSION

**Table 1. Propositional Structures from Axiomatic Extractions**

| Axiom                                                                                                                                                   | Proposition                                                                                                 | Theory                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Axiom 1. Older adults undergo aging process.                                                                                                            | Proposition 1. Adherence behavior among older adults is the result of different responses.                  | Gerontology nurses are effective if they were able to promote adherence to therapeutic regimens among older adults. |
| Axiom 2. Different people have different responses and ways to address health promotion, health maintenance, disease prevention and illness management. |                                                                                                             |                                                                                                                     |
| Axiom 3: Patient factor is a contributing factor associated with adherence behavior among older adults.                                                 | Proposition 2. Adherence behavior among older adults is is influenced by certain factors.                   |                                                                                                                     |
| Axiom 4: Health care system factor is another factor attributed to the adherence behavior among older adults.                                           |                                                                                                             |                                                                                                                     |
| Axiom 5: The clinical outcomes is a consequence as a result to variation to adherence behavior among older adults.                                      | Proposition 3: Variation in adherence behavior among older adults can influence individual health outcomes. |                                                                                                                     |

As stipulated in Axiom 1: Older adults undergo aging process. The apparent physiological changes that occur in the elderly are responsible for the emergence of chronic illnesses (17). The pathological restrictions set by age-related diseases influence other areas of functioning like cognitive decline, physiological limitations (9,10,11). Next, as stated in Axiom 2: Different people have different responses and ways to address health promotion, health maintenance, disease prevention and illness management. The said axiom is supported by a literature which states that adherence to a therapeutic regimen usually requires that the person make one or more lifestyle changes to carry out and faithfully following specific activities that promote and maintain health (1). Furthermore, Compliance is an active choice of patients to follow through and take responsibility for the prescribed treatment. It is a more proactive, positive behavior resulting from a patient's lifestyle change, following prescribed treatment, taking responsibility of oneself, aligns behavior with agreed health recommendations from a provider, such as taking medication or following a diet (18). Compliance to long-term pharmacotherapy in chronic disease management is considered crucial for treatment success (4). Common examples of adherent healthcare behaviors include taking prescribed medications, maintaining a healthy diet, increasing daily activities and exercise, self-monitoring for signs and symptoms of illness, practicing specific hygienic measures, seeking periodic health evaluations, and performing other therapeutic and preventive measures (19). On the contrary, non-adherence pertains to the non-use or discontinuity of the treatment process and inattention or failure to follow the prescribed treatment by the older adult (20). Noncompliance is the most common cause of non-responsiveness toward a treatment which is interpreted as treatment or drug failure. Noncompliance is the result of a behavior of person that fails to coincide with a health-promoting or therapeutic plan agreed on by the patient and healthcare professional. From this context, the Proposition 1: Adherence behavior among older adults is the result of different responses is formulated.

As stipulated in Axiom 3: Patient factor is a contributing factor associated with adherence behavior among older adults. The said axiom is supported by a study which states that Patient factors such as old age, male gender, demographics, low education level, physical ability, mental status, disease condition, knowledge, behavior/attitude, health belief, cognitive level and health literacy of patient were identified as various risk factors associated with non-adherence in the elderly (21). Next, as stated in Axiom 4: Health care system factor is another factor attributed to the adherence behavior among older adults. According to recent literature, the identified Health care system factor include complexity in treatment regimen, complex dosing schedule, health care providers, provider-patient trusting relationship, patient satisfaction, various risk factors associated with non-adherence in the elderly. Health care factors play an interestingly important role in patient's adherence to medications (22). In addition, Factors contributing to poor medication adherence are patients' suboptimal health literacy, lack of family involvement in the treatment decision-making, communication barriers, multiple physicians or care providers, visit time limitations, and limited access to care. Nurses play an important role in improving patients' health-related knowledge and compliance through health education (23). The need to provide a very structured and well-defined health protocols to meet educational opportunities and learning needs is of significant importance (24,25). The critical roles of nurses include not only awareness-raising, public advocacy, public campaigns, health literacy, health education but ensuring delivery of effective healthcare services (26,27,28,29). Hence, the involvement of older adult in health care decision making would be more likely to adhere to therapeutic regimens (22). To promote adherence among the elderly, time and effort must be taken to assess all variables that may affect health behavior (1). From this context, the Proposition 2: Adherence behavior among older adults is influenced by certain factors is formulated. Accordingly, reasons for nonadherence can be broadly classified into patient factors and health care system factors (30).

As stipulated in Axiom 5: The clinical outcomes is a consequence as a result to variation to adherence behavior among older adults. The said axiom is supported by a study which states that non-compliance to therapeutic regimens among older adults is directly associated with direct clinical consequences, deterioration of medical condition, disease progression, poor treatment outcomes, adverse and unfavorable health outcomes (21). Poorly compliance with therapy is the most important reason for organ failure, complications, multiple comorbidities and mortality (22). Further, suboptimal compliance is characterized by failure to begin pharmacotherapy, to persist on long-term therapy, and to take medications as frequently as ordered (31). Thus, suboptimal compliance among patients poses multiple challenges like overall clinical outcomes, poor disease prognosis, increasing complication risks, increasing hospitalization costs and unnecessary healthcare visits (32, 33, 34, 35). Further, Patients' poor adherence behavior is a complex problem for health care services, especially in the care of chronic

illness, as it can lead to poor quality of life, low survival rate, poor therapeutic outcomes, wasted health care resources and inappropriate treatment changes (31).

Hence, the nurse must be in a pivotal role to address the clinical implications of adherence behavior. From this context, the Proposition 3: Variation in adherence behavior among older adults can influence individual health outcomes is formulated. From the three propositions developed namely: 1) adherence behavior among older adults is the result of different responses; 2) adherence behavior among older adults is influenced by certain factors; and lastly 3) variation in adherence behavior among older adults can influence individual health outcomes. The theory of adherence behavior among older adult is developed which states that "Gerontology nurses are effective if they were able to promote adherence behavior among older adults.

## CONCLUSION

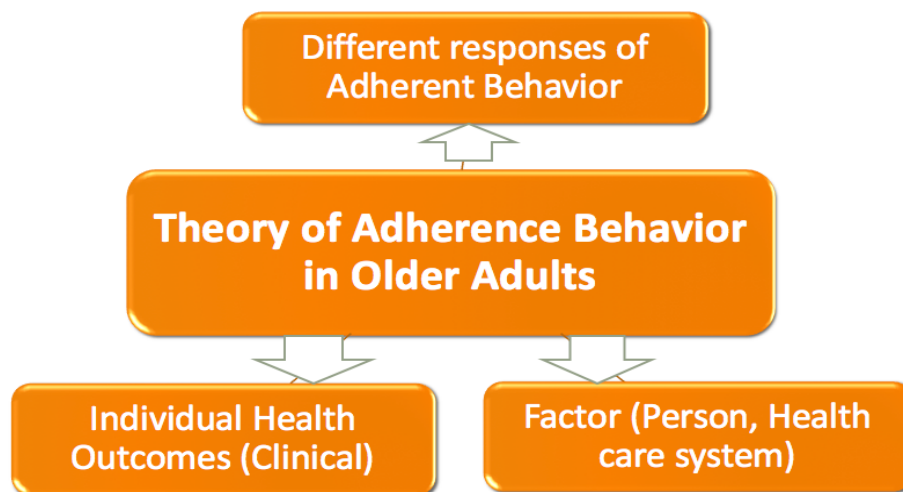


Figure 1: Paulo Mejia's Health Care Adherence Theory in Older Adults

Based from the findings of the study, the following conclusions were drawn from the Theory of Adherence Behavior among Older Adults: 1) Adherence behavior among older adults is the result of different responses; 2) adherence behavior among older adults is influenced by certain factors; and lastly 3) variation in adherence behavior among older adults can influence individual health outcomes. Thus, it can be concluded that gerontology nurses are effective, if they were able to promote adherence behavior among older adults. Thus, Nurses must encourage older adults to adhere to their therapeutic regimen.

### Declaration of Conflicting Interest

All authors declare no potential conflict of interest.

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## REFERENCES

1. Hinkle JL, Cheever KH. Brunner and Suddarth's Textbook of Medical-Surgical Nursing. 14th edition. Philadelphia: Lippincott Williams & Wilkins. 2018;46-47
2. Al-Qasem A, Smith F, Clifford S. Adherence to Medication among Chronic Patients in Middle Eastern Countries: Review of studies. Eastern Mediterranean Health Journal: World Health Organization. 2011;17(4):356-363. [https://applications.emro.who.int/emhj/V17/04/17\\_4\\_2011\\_0356\\_0363.pdf](https://applications.emro.who.int/emhj/V17/04/17_4_2011_0356_0363.pdf)
3. Al-Tarawneh F, Ali T, Al-Tarawneh A, Altwalbeh D, Gogazeh E, Bdair O, Algaralleh A. Study of Adherence Level and the Relationship between Treatment Adherence, and Superstitious Thinking Related to Health Issues among Chronic Disease Patients in Southern Jordan: Cross-Sectional Study. Patient Preference and Adherence. 2023;17:605-614. DOI: 10.2147/PPA.S390997.

4. Hugtenburg JG, Timmers L, Elders PJ, Vervloet M, van Dijk L. Definitions, Variants, and Causes of Nonadherence with Medication: A Challenge for Tailored Interventions Patient Preference and Adherence. 2013;7:675-682. DOI: /10.2147/PPA.S29549.
5. Tsai KT, Chen JH, Wen CJ, Kuo HK, Lu IS, Chiu LS, Wu SC, Chan DC. Medication Adherence among Geriatric Outpatients Prescribed Multiple Medications. The American Journal of Geriatric Pharmacotherapy. 2012;10(1):61-68. DOI: 10.1016/j.amjopharm.2011.11.005.
6. Brown MT, Bussell JK. Medication Adherence: WHO Cares? Mayo Clinic Proceedings. 2011;86(4):304-14. DOI: 10.4065/mcp.2010.0575.
7. Osterberg L, Blaschke T. Adherence to Medication. New England Journal of Medicine. 2005;353(5):487-497. DOI: 10.1056/NEJMra050100.
8. Kim, ES, James P, Zevon ES, Fitzgerald CT, Kubzansky LD, Grodstein, F. Optimism and Healthy Aging in Women and Men. American Journal of Epidemiology. 2019;188(6):1084–1091. DOI: 10.1093/aje/kwz056
9. Moreno AM, Perez RJ, García FC, Noguera FC. The Influence of Physical Activity, Anxiety, Resilience and Engagement on the Optimism of Older Adults. International Journal of Environmental Research and Public Health. 2020;17(21):8284. DOI: 10.3390/ijerph17218284
10. Araujo L, Ribeiro O, Teixeira L, Paul C. Successful Aging at 100 Years: The Relevance of Subjectivity and Psychological Resources. International Psychogeriatrics, 2016;8(2):179–188. DOI: 10.1017/S1041610215001167
11. Chaves CF, Mazzotti DR, Cendoroglo MS, Ramos LR, Tufik S, Silva V, D’Almeida, V. Genes Related to Maintenance of Autophagy and Successful Aging. Arquivos de Neuro-Psiquiatria. 2018;76(12):831–839. DOI: 10.1590/0004- 282X20180142
12. Garcia LL. Readiness for Retirement: A Theory Development Approach. CNU Journal of Higher Education. 2013;7(1):10. DOI: 10.70997/2546-1796.1092
13. Meleis AI. Theoretical Nursing: Development and Progress. 5<sup>th</sup> edition. Philadelphia: Wolters Kluwer Health, Lippincott Williams and Wilkins. 2012. pp. 300-307
14. McEwen M, Wills E. Theoretical Basis for Nursing. 3<sup>rd</sup> edition. Philadelphia: Wolters Kluwer Health, Lippincott Williams and Wilkins. 2011. pp. 139-144.
15. Feliciano E, Feliciano A, Palompon D, Boshra, A. Aging-related resiliency theory development. Belitung Nursing Journal. 2022;8(1):4-10. DOI: 10.33546/bnj.1631
16. Lau F, Kuziemsky C. Handbook of eHealth Evaluation: An Evidence-Based Approach. University of Victoria. 2017. <https://www.ncbi.nlm.nih.gov/books/NBK481583>
17. McGrath R, Snih S, Markides K, Faul J, Vincent B, Hall O, Peterson M. The Burden of Health Conditions Across Race and Ethnicity for Aging American. Medicine. 2019;98,46 (e17964). DOI: 10.1097/MD.00000000000017964
18. Mir TH. Adherence Versus Compliance. HCA Healthcare Journal of Medicine. 2023;4(2):219-220. DOI: 10.36518/2689-0216.1513.
19. Berman A, Snyder S, Kozier B, Erb G. Kozier & Erb’s Fundamentals of Nursing: Concepts, Process and Practice. 10<sup>th</sup> edition. Singapore: Pearson Education South Asia Pte. Ltd. 2018. pp. 46-47
20. Walsh CA, Cahir C, Tecklenborg S, Byrne C, Culbertson MA, Bennett KE. The Association Between Medication Non-Adherence and Adverse Health Outcomes in Ageing Populations: A Systematic Review and Meta-Analysis. British Journal of Clinical Pharmacology. 2019;85(11):2464-2478. DOI: 10.1111/bcp.14075.
21. Jin H, Kim Y, Rhie SJ. Factors Affecting Medication Adherence in Elderly People. Patient Preference Adherence. 2016;10:2117-2125. DOI: 10.2147/PPA.S118121.
22. Yap AF, Thirumoorthy T, Kwan YH. Systematic Review of the Barriers Affecting Medication Adherence in Older Adults. Geriatrics & Gerontology International. 2015;16(10):1093-1101
23. Mejia PCG, Feliciano EE, Feliciano AZ, Sadang JM, Pangandaman HK, Garcia LL, Al-Noemi MC, Abdelhafiz IM, Breboneria BL, ElRazkey JY, Albougami A, Lorica JD. The Effectiveness of Health Education and Lifestyle Program in Improving the Blood Pressure of Hypertensive Patients. International Journal of Advanced and Applied Sciences. 2019;7(2):113-120. DOI: 10.21833/ijaas.2019.11.004
24. Dahbi A, Breboneria BJL, Ali SHA, Mejia PCG, Cordero RP, Rosita A. Effectiveness of Basic Trauma Nursing Management Course in the Level of Knowledge among Staff Nurses. International Journal of Africa Nursing Sciences. 2025;22:100839. DOI: 10.1016/j.ijans.2025.100839
25. Cordero RP, Breboneria BJL, Sayson EJH, Martinez JT, Joksimovic D, Aslam M, Mejia PCG, Al Hmairat N. Perceived Implementation of Prehospital Emergency Care of Emergency Medical Services Personnel in the Philippines: A Sequential Explanatory Mixed-Method Design. Open Access

- Emergency Medicine. 12026;18:612905. DOI: 10.2147/OAEM.S2612905.
26. Sadang, JM, Mala ND, Mejia PCG, Othman A, Feliciano EE, ElRazkey JY, Gonzales FM, Tachavijitjaru C. Preparedness of Rural Health Unit Nurses in Responding to Patients of Suspected Sexually Transmitted Infections in Lanao del Sur Province, Philippines. *International Journal of Advanced and Applied Sciences*. 2019;6(9):31-37. DOI: 10.21833/ijaas.2019.09.005
27. Feliciano AZ, Feliciano EE, Feliciano JRD, Fernandez ZS, Mejia PCG, Diamla MRL, Devkota S, Boshra AY, Cabanayan MTS, Mallari MFM, Pelayo SRP, Si MC, Viray AB. Philippine Professional Core Competencies' Impact on Nurses' Key Performance Indicators for Patient Safety Outcomes. *International Journal of Advanced and Applied Sciences*. 2019;7(1):1-5. DOI: 10.21833/ijaas.2020.01.001
28. Mejia PCG, Breboneria, BJL, Pangandaman HK, Sadang JS, Hengnalen B, Calaycay JM, Mala ND, Estanislao AM, Diamla RL, Estanislao AM, Diamla RL, Penullar WS, Phumchasai P, Dijamco ME, Acedera LVC. Student Nurses' Leadership and Management Competencies and Key Performance Indicators (KPIs) for Patient Safety Outcomes in Nakhon Pathom, Thailand. *International Journal of Advanced and Applied Sciences*. 2020;6(11):21-29. DOI: 10.21833/ijaas.2020.02.015
29. Diamla MR, Mejia PCG, Breboneria BJL, Rajan JK, Lawi AJB, Mala ND, Isra SB, Manalundong JQ, Mukattil NP, Hayudini MAA. Public Health Nurses' Demographic Factors and Level of Awareness as Determinants to Safe Vaccine Administration. *International Journal of Advanced and Applied Sciences*. 2020;7(6):103-109. DOI: 10.21833/ijaas.2020.06.013
30. Muller B, Nienaber C, Reis O, Kropp P, Meyer W. Sexuality and Affection Among Elderly German Men and Women in Long-Term Relationships: Results of a Prospective Population-Based Study. *PLoS ONE*. 2014;9(11):e111404. DOI: 10.1371/journal.pone.0111404
31. Burnier M, Egan BM. Adherence in Hypertension. *Circulation Research – American Heart Association Journals*. 2019;124(7):1124-1140. DOI: 10.1161/CIRCRESAHA.118.313220.
32. Kim HJ, Kim BS, Kim H, Lee J, Shin JH, Sung KC. Impact of Blood Pressure and Medication Adherence on Clinical Outcomes in Patients with Hypertension. *Frontiers in Medicine (Lausanne)*. 2025;12:1564791. doi: 10.3389/fmed.2025.1564791.
33. Poulter NR, Borghi C, Parati G, Pathak A, Toli D, Williams B. Medication Adherence in Hypertension. *Journal of Hypertension*. 2020;38(4):579-587. DOI: 10.1097/HJH.0000000000002294.
34. Mamaghani EA, Soleimani A, Zirak M. Trust in Nurses and its Association with Medication Adherence of Cardiovascular Patients: A Descriptive Correlational study. *International Journal of Nursing Studies Advances*. 2024;8:100278. DOI: 10.1016/j.ijnsa.2024.100278.
35. Hamrahian SM, Maarouf OH, Fülöp T. A Critical Review of Medication Adherence in Hypertension: Barriers and Facilitators Clinicians Should Consider. *Patient Preference and Adherence*. 2022;16:2749-2757. DOI:10.2147/PPA.S368784