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Original Research

# Model Theory of Planned Behavior to Improve Adherence to Treatment and the Quality of Life in Tuberculosis Patients

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## ABSTRACT

**Introduction:** Tuberculosis (TB) is a global public health problem and a leading cause of death from infectious diseases. The research objective was to determine the relationship between the theory of planned behavior, adherence and quality of life using the path model.

**Methods:** This study employed a cross-sectional design with 154 tuberculosis patients. The research was conducted in all community health centers in the Buleleng, Bali. Data on subjective norms, attitudes, perceived behavior control, intention, physical and mental HRQoL domains and medical adherence were collected. Data were analyzed using a descriptive and structural equation model feature using structural equation model.

**Results:** Most respondents have attitudes in the positive category and subjective norms in the good category. Perceived behavior is control in the good category, intentions in the good category and physical health in the good category. Almost all respondents have mental health in the good category and are married. All respondents in this study had adherence to treatment. The influence of subjective norms on intentions (p = <0.01), the influence of intentions on adherence (p = <0.01) and the effect of adherence on quality of life (p = <0.01) were found.

**Conclusion:** Subjective norms are the most important part to influence intention. Adequate TB treatment causes HRQoL to improve.

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## INTRODUCTION

Tuberculosis (TB) remains a major cause of health problems. Worldwide, around 10 million people are diagnosed with TB each year. There were 1.2 million (range 1.1-1.3 million) TB deaths among HIV-negative people in 2018. TB is one of the 10 leading causes of death worldwide, and the main cause of TB is an infectious agent ( Mycobacterium tuberculosis), ranking above HIV / AIDS (WHO, 2019). Based on the results of the 2013-2014 TB Indonesia Prevalence Survey, the estimated TB prevalence was 1,600,000 cases while the TB incidence was 1,000,000 and the TB mortality was 100,000 cases. In 2018, the second highest case finding was in the Regency of Buleleng at 114.6 per 100,000 population (Dinas Kesehatan Provinsi Bali, 2019).

It was evaluated that, in terms of treatment, medication adherence is one of the main obstacles faced by patients due to adverse reactions, long-term therapy and initial perception of healing, which weakens adherence and contributes to treatment neglect; Therefore, adherence to TB has become a challenge for patients, as well as for health services, and it is necessary to formulate strategies that minimize the difficulties encountered (Carla et al., 2015). Therefore, it is important to consider the social and clinical effects caused by this disease, especially those related to decreased quality of life. It should be understood that the quality of life in people with TB is a meeting of complex elements, such as disease, poverty, and stigma, which are negatively reflected in family life, work, and social activities. It is, therefore, considered important to create professional-patient-

family relationships in care and follow-up, and it is necessary to implement health measures that seek to improve treatment adherence (Farias, Medeiros, Paz, Lobo, & Ghelman, 2013).

Health-related quality of life (HRQoL) is defined as "the extent to which a patient's subjective perception of physical, mental and social well-being by an illness and its treatment"(Dion, Tousignant, Bourbeau, Menzies, & Schwartzman, 2004; Leidy, Revicki, & Genesté, 1999). Patients with chronic diseases value their mental and social wellbeing in addition to physical health (Sherbourne, Sturm, & Wells, 1999). The need to measure HRQoL is important because of the broader concept of measuring health status beyond conventional indicators, such as mortality and morbidity. HRQoL is an indicator of the effects of disease and related morbidity on regular activities and functions. As a result, HRQoL evaluations have become important health outcomes and areas of interest for policy makers, healthcare professionals and researchers. HRQoL evaluation in patients with TB is very important to identify appropriate actions to improve their health status and quality of life (Chamla, 2004).

Thus, one of the main goals in TB control is to reduce the rate of treatment neglect, because stopping treatment causes greater spread of bacilli, because patients remain as a source of transmission, contribute to preventative drugs and increase treatment time and care costs, jeopardizing the quality of life of patients (Chirinos & Meirelles, 2011). We employed the Theory of Planned Behavior as the conceptual framework to guide this process. In a systematic review of guideline implementation studies, it was the most likely theory to predict guideline adherence (Godin, Bélanger-Gravel, Eccles, & Grimshaw, 2008). This theory asserts that intention is the best predictor of behavior and that three factors mediate the strength of intention: (1) attitudes (expected value of behavioral performance); (2) subjective norms (what important others think about the behavior); and (3) self-efficacy (perception of ability to overcome barriers to behavioral performance) (Ajzen, 1985). The lack of research on the application of theory planned behavior on the quality of life of tuberculosis patients made researchers interested in conducting this research. The research objective was to determine the relationship between the theory of planned behavior, adherence and quality of life using the path model.

## MATERIALS AND METHODS

This study employed a cross-sectional design with 154 tuberculosis patients who were selected using random sampling. Data collection was conducted from May to September 2019. The research was conducted in all community health centers in the Buleleng. The variables in this study are perceived behavior control, subjective norms, attitude, intention, adherence and quality of life.

The instrument in this study consisted of six questionnaires. a) *Perceived behavior control assessment questionnaire*: A closed questionnaire sheet containing questions about perceived behavioral control based on the development of the theory of planned behavior-based adherence approach model on type II DM clients (Lestarina, 2018) where researchers make modifications to the topic of questions in the questionnaire. The

Table 1. Characteristic of Respondent

| Characteristic Respondent | n (%) |
|---|---|
| Age (Mean ± SD) | 50 years ± 13.79 |
| Gender | |
| Male | 92 (40.26) |
| Female | 62 (59.74) |
| Education level | |
| No school | 7 (4.55) |
| Elementary school | 51 (33.12) |
| Middle school | 70 (45.45) |
| High school | 19 (12.34) |
| Higher education | 7 (4.55) |
| Employment | |
| Labor | 67 (43.51) |
| Government employees | 6 (3.90) |
| Not working | 40 (25.97) |
| Entrepreneur | 41 (26.62) |
| Marital status | |
| Single | 12 (7.79) |
| Married | 142 (92.21) |
| Family size member | |
| Less than 3 members | 52 (33.77) |
| More than 3 members | 102 (66.23) |
| Socioeconomic status | |
| < 1 million | 57 (37.01) |
| 1-2 million | 54 (35.06) |
| > 3 million | 43 (27.92) |
| Attitude | |
| Positive | 87 (56.49) |
| Negative | 67 (43.51) |
| Subjective norms | |
| Good | 93 (60.39) |
| Poor | 61 (39.61) |
| Perceived behavior control | |
| Good | 80 (51.95) |
| Less | 74 (48.05) |
| Intention | |
| Good | 101 (65.58) |
| Less | 53 (34.42) |
| Physical health | |
| Good | 113 (73.38) |
| Less | 41 (26.62) |
| Mental health | |
| Good | 142 (92.21) |
| Less | 12 (7.79) |
| Adherence to treatment | |
| Yes | 154 (100) |
| No | 0 (0) |

Table 2. Characteristic Variable

| Variable | n (%) |
|---|---|
| Attitude | |
| Positive | 87 (56.49) |
| Negative | 67 (43.51) |
| Subjective norms | |
| Good | 93 (60.39) |
| Poor | 61 (39.61) |
| Perceived behavior control | |
| Good | 80 (51.95) |
| Less | 74 (48.05) |
| Intention | |
| Good | 101 (65.58) |
| Less | 53 (34.42) |
| Physical health | |
| Good | 113 (73.38) |
| Less | 41 (26.62) |
| Mental health | |
| Good | 142 (92.21) |
| Less | 12 (7.79) |
| Adherence to treatment | |
| Yes | 154 (100) |
| No | 0 (0) |

determination of the questionnaire answers using a 4-point Likert scale consists of eight questions, both if the score ≥ means data and less if the scores ≤ mean data. b) *Subjective norms assessment questionnaire*:A closed questionnaire sheet containing questions about subjective norms based on the development of a theory of planned behavior-based adherence approach model on type II DM clients (Lestarina, 2018). The researcher modified the topic of questions in the questionnaire. The determination of the questionnaire answers uses the 4-point Likert scale and consists of eight questions, both if the score ≥ means data and less if the scores ≤ mean data. c) *Attitude assessment questionnaire*: A closed questionnaire sheet containing questions about attitudinal factors modified from Knowledge and Attitudes on LTBI Treatments Acceptance (Biedenharn, 2015) and the development of a theory of planned behavior-based adherence approach model for type II DM clients (Lestarina, 2018). The researcher modified the topic of questions in the questionnaire. This questionnaire consists of 10 questions. d) *Intention assessment questionnaire*: A closed questionnaire sheet containing questions about intentions / intentions based on the development of the theory of planned behavior-based adherence approach model on type II DM clients (Lestarina, 2018). The researcher modified the topic of questions in the questionnaire. Determination of the questionnaire answers using the 4-point Likert scale consists of six questions, both if the score ≥ mean data and less if the score ≤ mean data. e) *Adherence assessment questionnaire*: The Morinsky Medication Adherence Scale (MMAS) questionnaire was used in the study, which consisted of eight statements (De las Cuevas & Peñate, 2015) which had been translated into Indonesian. Questionnaire answers using the Guttman scale, where respondents' answers are only limited to two answers, "Yes" and "No". The higher the total value indicated the patient is compliant in treatment. f) *Quality of Life assessment questionnaire*: The SF-36v2 was used in the study. This questionnaire consisted of 36 question items consisting of eight scale items of health and welfare function profiles. The following are the detailed questions asked in this questionnaire, namely Physical Functioning (PF) in question number 3, Role-Physical (RP) in question number 4, Bodily Pain (BP) in questions number 7 and 8, General Health (GH ) in questions number 1 and 11, Vitality (VT) questions number 9 (a, e, g, i), Social Functioning (SF) in questions number 6 and 10, Role-Emotional (RE) question number 5, Mental Health ( MH) question number 9 (b, c, d, f, h) and Self-Evaluated Transition (SET) on question number 2. Two main items assessed are: Physical Health Summary: score 30-70, with an average of 50 and Mental Health Summary: a score of 30-70, with an average of 50. For all scales and summary components, higher scores demonstrate better HRQoL (Zhou et al., 2013).

Data were analyzed using a descriptive and structural equation model feature using STATA software. Ethical approval for this study was obtained from the School of Health Sciences Buleleng Committee of Ethic Research No. 092/EC-KEPK-SB/VII/2019.

## RESULTS

Table 1 shows the average age of the respondent is 50 years. Nearly half the respondents have a middle school level of education, work as a laborer, have a socioeconomic status <1 million and most respondents have more than three family members. Table 2 shows most respondent have attitudes in the positive category, subjective norms in the good category, Perceived behavior control in the good category, intentions in the good category and physical health in the good category. Almost all respondents have mental health in the good category and are married. All respondents in this study had adherence to treatment.

Table 2 shows the influence of subjective norms on intention, the effect of intention on adherence and the effect of adherence on quality of life. Goodness of fit results: $\chi 2$: 93.02, RMSEA: 0.220, CFI: 0.673, TLI: 0.464, SRMR: 0.158, AIC: 5640.15. Based on the results of the output goodness of fit statistics, the SEM model developed in this study is not yet good

Table 2. Summary of structural equation model

| Variable | z | P |
|---|---|---|
| Attitude → Intention | 1.39 | 0.16 |
| Subjective Norms → Intention | 6.34 | <0.01 |
| Perceived Behavior Control → Intention | -0,58 | 0.563 |
| Intention → Adherence | 2.64 | <0.01 |
| Adherence → QoL | 14.35 | <0.01 |

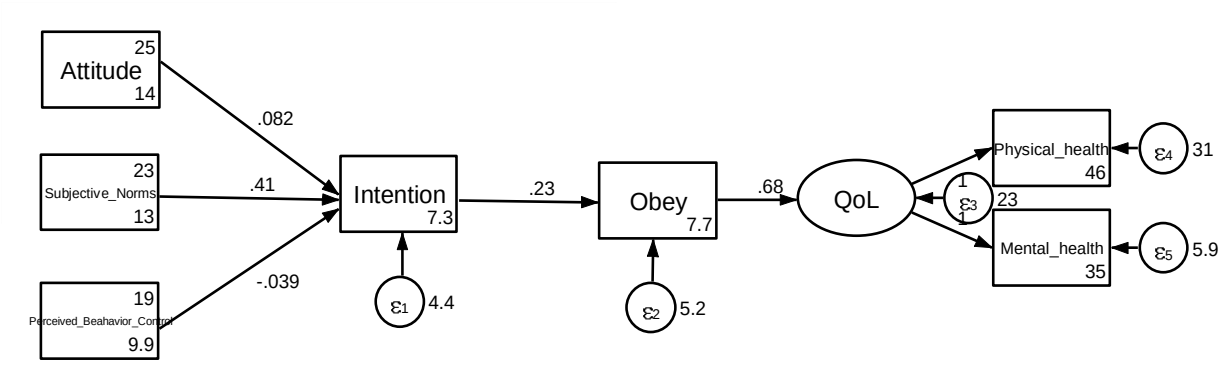


Figure 1. Path model of Relationships Between Variables

## DISCUSSION

This study found that all respondents who had medication adherence were influenced by intention. A pulmonary TB patient who has good intentions with high values will have a tendency to adhere to routine treatment. The new knowledge of this research is quality of life is influenced by medication adherence to TB patients. According to Ajzen (2005) intention to perform behavior is a tendency for someone to choose to do / not do something work. This intention is determined by the extent to which the individual has a positive attitude to certain behaviors and the extent to which he chooses to do certain behaviors and he has the support of others who are influential in his life. Intention is a factor that drives how someone has a strong desire to strive for a behavior, if they have the desire / interest to do it. Intention is influenced by attitudes, subjective norms, and perceptions in controlling behavior. Research (Lestarina, 2018) shows that intention has an influence on adherence. Intention / intention is the closest factor that can predict the emergence of behavior (Alberta, Proboningsih, & Almahmudah, 2016). Adherence in taking daily medication is the behavior to adherence the suggestions or procedures from doctors about the use of drugs, which was preceded by the consultation process between patients and doctors as health service providers. Some aspects that are used to measure adherence in taking daily drugs are frequency, number of pills / other drugs, continuity, metabolism in the body, biological aspects in the blood, and physiological growth in the body. The determinants of the emergence of adherence in taking daily medication include: patient perception and behavior, interaction between patient and doctor, and medical communication between the two parties as well as intention to recover (Lailatushifah, 2012).

This study shows that respondents who have medication adherence have good quality of life. After treatment, TB still has an impact on the physical, emotional, psychological, social and economic dimensions of HRQOL (Kastien-Hilka et al., 2016). Significant side effects associated with prolonged pharmacological treatment affect TB patients in health-related quality of life (HRQoL). Thus, successful TB treatment is essential for public health (Park, George, & Choi, 2020). HRQoL is important to consider at three critical points in treatment: at the beginning of TB treatment, during the intensive treatment phase (first two months), and at the completion of treatment (Chirwa et al., 2013). In clinical research, quality of life related to health (HRQL) has become an accepted measure of outcome (Hansel, Wu, Chang, & Diette, 2004) and has been described as an individual's perception of wellbeing in physical, psychological and social aspects (Guo, Marra, & Marra, 2009). Physical and mental stress are common in TB patients and as a result lead to poor disease outcomes or poor treatment outcomes (Babikako, Neuhauser, Katamba, & Mupere, 2010). Physical function reflects the patient's capacity to perform basic daily activities, while psychological health takes into account several aspects of the mood and emotional wellbeing of the individual. This disease also affects nearly half of daily activities among patients with tuberculosis. Most patients are worried, frustrated, or disappointed with the diagnosis, and nearly a quarter initially did not receive their diagnosis (Rajeswari, Muniyandi, Balasubramanian, & Narayanan, 2005). Adequate TB treatment causes HRQoL to improve (Louw, Mabaso, & Peltzer, 2016).

## CONCLUSION

TB patients who have good intentions with high scores will have a tendency to adhere to routine treatment. Quality of life is a complex concept which includes physical and mental health. Patients who take adequate TB treatment affect their quality of life,

mentally and physically. In providing health promotion related to medication adherence, community service center nurses must increase the TB patient's intention to seek treatment so that quality of life is good. A limitation in the study was that adherence was observed only once. The study cannot be a reference adherence of TB patients in Indonesia.

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