Associate factors of medication non-adherence for tuberculosis in Moroccan patients

Sanaa El Bahlaoui¹, Meryeme El Marini¹, Mounir Ouzir¹,²
¹Higher Institute of Nursing Professions and Health Techniques, ISPITS Beni Mellal, Regional Hospital Center, Beni Mellal
²Department of Biology, Faculty of Science, University Mohammed V, Rabat, Morocco

Non-adherence for tuberculosis in Moroccan patients

Abstract
Aim: In Morocco, tuberculosis is endemic and therapeutic adherence remains unsatisfactory. The objective of our study is to describe the factors influencing therapeutic adherence in tuberculosis patients in Morocco.

Material and Methods: In this cross-sectional study, 98 patients were recruited at the Center for Diagnosis and Treatment of Respiratory Diseases (CDTMR) of Beni Mellal, Morocco. Data were collected through face-to-face interview using a pre-structured questionnaire and analyzed with a binary regression model to highlight factors that may lead to poor adherence.

Results: Our results showed that 46.9% of the patients had good adherence and 53.1% had poor adherence. In addition, binary regression analysis showed that four factors significantly influenced the break in the continuity of treatment, namely: the communication problems with the healthcare staff, the means of transport used to reach the Health Center, stock-outs of anti-tuberculosis drugs, and the frequent closures of the Health Center.

Discussion: In Morocco, therapeutic adherence remains a major challenge in the care of tuberculosis patients. Monitoring programs and patient education are needed to end the major barriers to adherence. In addition, the restructuring of the health establishments to improve proximity and accessibility, and the continuous supply of drugs could help to good therapeutic compliance.

Keywords
Tuberculosis, Adherence, Morocco
Introduction

Tuberculosis is a major public health concern worldwide. According to WHO, 10 million people contracted tuberculosis and 1.5 million died of it in 2018 (including 251,000 infected with HIV), especially in low- and middle-income countries. The epidemiological data for 2016 show a total of 31,542 cases of tuberculosis, all forms combined, corresponding to an incidence of 91 per 100,000 population. Morocco, tuberculosis remains endemic and still a significant public health problem. Good therapeutic adherence was defined as patients who had on anti-bacillary therapy for less than a month were excluded. Medication non-adherence can be affected by various factors, which can be linked to patient, treatment, healthcare staff, and the organization of health services. In Morocco, there is very little data available in the literature on the factors associated with tuberculosis therapeutic adherence. This work aimed to assess the factors related to therapeutic adherence in Moroccan tuberculosis patients.

Material and Methods

All tuberculosis patients treated at the Center for Diagnosis and Treatment of Respiratory Diseases (CDTMR) of Beni Mellal, Morocco, in 2017 were included in this study. The study was carried out on a sample of 98 patients with sputum smear-positive tuberculosis. Patients with non-tuberculous pneumonia, those with extra-pulmonary tuberculosis, and patients who were on anti-bacillary therapy for less than a month were excluded. Socio-demographic variables noted were sex, age, level of education, marital status, occupation, urban or rural origin, and the presence or absence of health insurance. Other variables such as tuberculosis cases (new case, relapse, failure) smoking status, associated diseases (diabetes, high blood pressure, etc.), BCG vaccination, and hospitalization were also noted. Good therapeutic adherence was defined as patients who had completed the treatment with no history of non-adherence. Data were collected using a semi-structured interview after obtaining informed consent from each participant. The study was approved by the local research ethics committee.

Statistical Analysis

Results were expressed as frequency and percentage. Categorical variables were analyzed using the Chi-square. Variables with significant p-values (p<0.05) from univariate analysis were included in binary logistic regression analysis using the Forward Stepwise (Likelihood Ratio) method to identify factors predicting medication adherence. SPSS version 20 was used for data analysis.

Results

1. Sociodemographic and clinical characteristics of patients

The study involved 98 patients, 54.1% of them were men (n = 53). Patient characteristics are presented in Table 1. The two age groups with the greatest percentage of the tuberculosis cases were 20-45 years old and >45 years old, accounting for 45.9% and 35.7% of total tuberculosis cases, respectively. Regarding marital status, 51% of the patients were married, 49% were single, widowed, or divorced. We also note that 33.7% of the patients were illiterate, 24.5% had reached a primary school level, and 41.8% had reached a secondary level or superior. The majority of cases lived in urban areas (n = 68, 69.4%), the rest (n = 30, 30.6%) lived in rural localities close to Beni Mellal. There were 40 unemployed study subjects (40.8%) and 53 with no health insurance (54.1%). Clinically, the vast majority of patients (81.6%) were new cases of tuberculosis, and relapses in 13.3% of cases. Only 5 cases were reported as therapeutic failure (5.1%). The majority of patients (65.3%) were already hospitalized for tuberculosis. Also, 17.43% of our patients had comorbidities associated with tuberculosis, including diabetes (n = 6), hypertension (n = 8), cardiopathy (n = 2) and asthma (n = 1). Only 24.5% (n = 24) did not receive the BCG tuberculosis vaccine and 22.4% (n = 22) were smokers.

2. Adherence rate

Regarding the therapeutic adherence to therapy, our results showed that more than half of the patients (53.1%) had poor adherence and 46.9% had good adherence. No significant differences were observed between the two categories in terms of sociodemographic and clinical characteristics (Table 1).

3. Factors influencing medication adherence

Several reasons have been put forward by patients for non-adherence, including the distance between patient residence and health facilities (Table 2). In fact, 77.6% of the patients declared that they were far from the CDTMR, while 30.6% were far from a nearby health center. This shows that the health center remains more accessible to patients than the CDTMR. To access the health center, 73.5% of the subjects walk, while the rest use public transportation. In addition, patients stated that they had problems with the supply of anti-bacillary medication by the health center either because of the depletion of the stock (50%) or because of its closure (34%). Communication problems have also been reported. Thus, more than half of the patients (53.1%) were dissatisfied with the reception given to them by the healthcare staff at the health center, and 41.8% of them had difficulty in communication. In addition, 56.1% of patients reported a lack of necessary information and explanations concerning their disease and...
the duration of treatment by healthcare staff. The absence of informative posters on tuberculosis in the health center was reported by the majority of patients (82.7%). The univariate analysis identified six factors that were significantly associated with medication adherence. These were as follows: the proximity of the patient’s residence to the health center (p=0.031), the means of transport used to reach the health center (p<0.001), communication problems with the healthcare staff (p=0.028), the closure of the health center (p=0.002), unsatisfying quality of reception by the healthcare staff at the Health Center (p=0.075), and the means of transport used to reach the Health Center (p<0.001). These factors were further analyzed using binary logistic regression analysis, where the dependent variable was adherence status (Yes-No) and the independent variables were the factors identified in the univariate analysis. The binary logistic regression model was significant (χ²=16.153, df=6, p=0.005), indicating that the factors identified in the univariate analysis were indeed associated with adherence status. The odds ratios (Exp(B)) for the factors identified in the univariate analysis were as follows: the proximity of the patient’s residence to the Health Center (Exp(B)=2.265, p=0.044), the means of transport used to reach the Health Center (Exp(B)=2.265, p=0.044), communication problems with the healthcare staff (Exp(B)=2.265, p=0.044), unsatisfying quality of reception by the healthcare staff (Exp(B)=2.265, p=0.044), and the means of transport used to reach the Health Center (Exp(B)=2.265, p=0.044).
Non-adherence for tuberculosis in Moroccan patients

4. Factors predicting medication adherence

The variables that were significantly related to high adherence in univariate analysis were entered into binary regression analysis with a forward stepwise (Likelihood Ratio) method. Table 3 shows the results of the binary logistic regression analysis identifying significant factors that predict medication adherence. Six significant factors from the univariate analysis were included in the binary logistic regression model. Only four variables (closure of the Health Center, means of transport used to reach the Health Center, tuberculosis treatment availability at the Health Center, communication problems with the healthcare staff at the Health Center) of all six variables entered, remained after Forward Stepwise (Likelihood Ratio) method. Our model was statistically significant ($x^2 (4) = 39.4$, $p<0.001$) and explained 44.2% of the variation in medication adherence level (Nagelkerke $R^2 = 0.442$). Significant factors that were independently associated with medication adherence were as follows: tuberculosis treatment availability at the health center [OR 0.187 (95% CI: 0.064-0.546); $p=0.002$], communication problems with the healthcare staff at the health center [OR 4.573 (95% CI: 1.575-13.285); $p=0.005$], closure of the health center [OR 0.246 (95% CI: 0.081-0.747); $p=0.013$], and the means of transport used to reach the health center [OR 0.252 (95% CI: 10.066-0.955); $p=0.043$].

Discussion

The aim of the current study was to determine factors related to medication adherence in Moroccan tuberculosis patients. In our sample, we note that 46.9% of patients were able to correctly observe their anti-tuberculosis treatment, which remains very low compared to other studies; 76% in South Africa [9], 73% and in Nigeria [10]. In addition, none of the socio-demographic (such as age, gender, education level, place of residence, marital status, and profession) or clinical (smoking habit, associated comorbidities, BCG vaccine, hospitalization) characteristics significantly affected the level of medication adherence.

According to univariate analysis, six independent factors significantly affect adherence. Some factors were linked to the organization of the health system such as the shortage of anti-tuberculosis drugs and the frequent closure of the health center have shown a significant influence on medication adherence, which is in line with the results of other studies carried out in other African countries [8, 11]. These results suggest that for good adherence to treatment, it is essential to ensure the supply of health centers with the necessary anti-tuberculosis drugs and to ensure continuity of services there even during strikes and holidays.

Moreover, the distance between the Health Center and the patient's home and the means of transport used to reach the health center emerged as significant factors for good adherence to treatment, which suggests that providing transportation for those who live far from health centers would be beneficial for good adherence. Consistent with these findings, studies conducted in many countries showed that there was an association between the distance to health facility and the level of medical adherence [12-14]. Thus, the health facilities should be structured to reconcile proximity and accessibility and thus ensure the quality and continuity of care for tuberculosis patients.

Moreover, therapeutic adherence has been shown to be associated with the quality of the relationship between the healthcare staff and the patient [15]. This is supported by our results showing that the quality of the reception of patients by the staff of the Health Center and the communication problems affect therapeutic adherence. In fact, an adequate healthcare staff-patient relationship implies mutual trust and the capacity for mutual listening in order to guarantee good adherence and avoid therapeutic failure. Patients should also be educated and informed about the different aspects of their disease in order to improve adherence to treatment.

In this study, the binary logistic regression model using forward stepwise based on the Likelihood Ratio had good predictive ability for medication adherence. In this model, the closure of the health center, the means of transport used to reach the health center, tuberculosis treatment availability at the health center, and communication problems with the healthcare staff at the health center were found to be independent predictors of medication adherence.

Limitations of the study

This study has some limitations that should be mentioned. In particular, the limited sample size and the use of a face-to-face interview to assess adherence, which may therefore overestimate the prevalence of medication adherence. The final limitation is that the study is only for the Beni Mellal region and questions can be raised over how representative this would be for other regions in Morocco and other countries.

Conclusion

Poor adherence to anti-tuberculosis treatment is a recurring problem in third world countries [16-18]. Specifically, tuberculosis remains endemic in Morocco, and medication adherence remains unsatisfactory. There is a clear need for intervention programs aimed at monitoring medication adherence. These programs must deal with the different causes and factors that generate medication non-adherence.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Funding: None

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

References

1. Tachfouti N, Slama K, Berrahou M, Elfakir S, Benjelloun MC, El Rhazi K, et al. Determinants of tuberculosis treatment default in Morocco: results from a national cohort study. Pan Afr Med J. 2013; 14:121; DOI:10.11604/pamj.2013.14.121.2335.
2. Dooley KE, Lahliou O, Knudsen J, Elmessoudi MD, Cherkouai I, El Aouad R. Risk factors for tuberculosis treatment failure, default, or relapse and outcomes of retreatment in Morocco. BMC Public Health. 2011; 11(1):140. DOI: 10.1186/1471-2458-11-140.
3. Groupe de travail du conseil supérieur d'hygiène publique, France. Observance et suivi de traitement (Observance and treatment follow-up). Médecine et Maladies Infectieuses. 2004; 34(8-9):386–90. DOI: 10.1016/j.medmal.2004.07.020
4. Benoit M, Pon J, Zimmermann MA. Comment évaluer la qualité de l’observance? (Expert opinion on APAP (prolonged action atypical antipsychotic agents). How to evaluate the quality of observations). L’Encéphale/Encephale. 2009; Suppl. 3: 567-90. DOI:10.1016/S0013-7006(09)75542-3.

5. M’Bousa J, Martins H, Adicofle-Metoul JM, Loubaki F. L’influence des facteurs socio-culturels sur les abandons du traitement de la tuberculose pulmonaire. Médecine d’Afrique Noire. 1999; 46(10).

6. Slama K, Tachfouti N, Oubel M, Nejjar C. Factors associated with treatment default by tuberculosis patients in Fez, Morocco. East Mediterr Health J. 2013; 19 (8):687-93.

7. Ibrahim LM, Hadeija IS, Nguku P, Dankali R, Waziri NE, Akhimmien MO, et al. Factors associated with interruption of treatment among Pulmonary Tuberculosis patients in Plateau State, Nigeria. 2011. Pan Afr Med J. 2014; 17:78. doi:10.11604/panbj.2014.17.78.3464.

8. Nimagan S, Bopaka RG, Diallo MM, Diallo BD, Diallo MB, Sow OY. Facteurs prédictifs de l’échec de traitement antituberculeux en Guinée Conakry. Pan Afr Med J. 2015; 22:146. DOI: 10.11604/pamj.2015.22.146.7216.

9. Kasu-Bikila T, Rosenkranz B, Schwenkglenks M, Bennett BM, Sinanovic E. Association between health-related quality of life and medication adherence in pulmonary tuberculosis in South Africa. Front Pharmacol. 2017; 8:919. DOI: 10.3389/fphar.2017.00919.

10. Obadiora AH. Comparative influence of health locus of control on medication adherence among tuberculosis and HIV-positive outpatients in Edo State, Nigeria. International Journal of Psychology and Counselling. 2016; 8(3):18-27. DOI: 10.5897/IPJC2015.0337.

11. Kistumbu J, Nsawha F, Sekandi JN. Adherence to treatment and supervision for tuberculosis in a DOTS programme among pastoralists in Uganda. Int J Tuberc Lung Dis. 2014;18(7):799-803. DOI: 10.5588/ijtld.13.0753.

12. Woomo TT, Yimer WK, Bati T, Geseseew HA. The prevalence and factors associated for anti-tuberculosis treatment non-adherence among pulmonary tuberculosis patients in public health care facilities in South Ethiopia: a cross-sectional study. BMC Public Health. 2017; 17(1):269. DOI: 10.1186/s12889-017-4188-9.

13. Naing NN, D’Este C, Isi AR, Salleh R, Bakar N, Mahmod MR. Factors contributing to poor compliance with anti-TB treatment among tuberculosis patients. Southeast Asian J Trop Med Public Health. 2001;32(2):369-82.

14. Mishra P, Hansen EH, Sabroe S, Kafle KK. Socio-economic status and adherence to tuberculosis treatment: a case-control study in a district of Nepal. Int J Tuberc Lung Dis. 2005; 9(10):1134-9.

15. Illoye-Ayet M, Okemba-Okombi FH. Facteurs inhérents à l’observance du traitement antituberculeux au centre antituberculeux de Brazzaville. Revue des Maladies Respiratoires. 2016; 33: A224. DOI: 10.1016/j.rmr.2015.10.485.

16. Dje Bi ID, Annor JC, Yeo L, Bi YT, Achi V, Meliane NS. Facteurs de mauvaise observance au traitement antituberculeux à Bouaké. Revue des Maladies Respiratoires. 2019; 36: A258-9. DOI: 10.1016/j.rmr.2018.10.600.

17. Mejri I, Saad SB, Daghiouas H, Megdiche L, Tritar F. Facteurs associés à la mauvaise observance du traitement antituberculeux. Revue des Maladies Respiratoires. 2017; 34: A223. DOI: 10.1016/j.rmr.2016.10.533.

18. Ngangro NN, Ngarhounoum D, Ngangro MN, Rangar N, des Fontaines VH, Chauvin P. Evaluation des facteurs associés aux abandons du traitement antituberculeux au Tchad. Médecine et Santé Tropicales. 2013; 23(1):60-5. DOI: 10.1684/mst.2013.0159.

How to cite this article:
Sanaa El Bahlaoui, Meryeme El Marini, Mourir Ouzir. Associated factors of medication non-adherence for tuberculosis in Moroccan patients. Ann Clin Anal Med 2021;12(10):1114-1118