Knowledge, care-seeking behavior, and factors associated with patient delay among newly-diagnosed pulmonary tuberculosis patients, Federal Capital Territory, Nigeria, 2010

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Abstract

Introduction: Early treatment of Tuberculosis (TB) cases is important for reducing transmission, morbidity and mortality associated with TB. In 2007, Federal Capital Territory (FCT), Nigeria recorded low TB case detection rate (CDR) of 9% which implied that many TB cases were undetected. We assessed the knowledge, care-seeking behavior, and factors associated with patient delay among pulmonary TB patients in FCT.

Methods: We enrolled 160 newly-diagnosed pulmonary TB patients in six directly observed treatment short course (DOTS) hospitals in FCT in a cross-sectional study. We used a structured questionnaire to collect data on socio-demographic variables, knowledge of TB, and care-seeking behavior. Patient delay was defined as > 4 weeks between onset of cough and first hospital contact.

Results: Mean age was 32.8 years (± 9 years). Sixty two percent were males. Sixty percent first sought care in a government hospital, 26% with a patent medicine vendor and 22% in a private hospital. Forty one percent had unsatisfactory knowledge of TB. Forty two percent had patient delay. Having unsatisfactory knowledge of TB (p=0.032) and multiple care-seeking (p=0.02) were significantly associated with patient delay.

Conclusion: Failure to immediately seek care in DOTS centers and having unsatisfactory knowledge of TB are factors contributing to patient delay. Strategies that promote early care-seeking in DOTS centers and sustained awareness on TB should be implemented in FCT.

Introduction

Tuberculosis (TB) is a major cause of illness and death worldwide, especially in Asia and Africa. Globally, 9.2 million new cases and 1.7 million deaths from TB occurred in 2006 [1]. Nigeria ranked fourth globally and first in Africa among World Health Organization’s (WHO’s) list of 22 TB high-burden countries [2]. In 2007, Nigeria had an estimated TB incidence rate of 311 cases per 100,000 population per year and a TB mortality rate of 93 deaths per 100,000 population per year [2]. In 1994, WHO introduced directly observed treatment short course (DOTS) as a global strategy to reduce TB burden [3]. The DOTS strategy recommends detecting 70% of TB cases. By the end of 2008, DOTS services attained 100% coverage of all 774 Local Government Areas (LGAs) in Nigeria [4]. In line with recommendations of WHO, TB case detection in Nigeria is based on passive case finding using sputum-smear microscopy. This requires TB patients seek an adequate health facility for diagnosis and treatment. The tendency and urgency of TB patients to seek care may be influenced by their knowledge of the disease and the perceived risk it poses to individuals, families, and communities at large [5]. It is important to identify and treat TB cases as early as possible because each day that an open case of TB goes untreated, the risk of infecting others increases [5]. However, studies have shown that many TB patients adopt multiple care-seeking before consulting a healthcare
We conducted the study in six hospitals in FCT, Nigeria. The calculation of the sample size was analyzed using Epi Info version 3.5.1. Descriptive and analytical statistics were used to summarize the data. Descriptive statistics involved use of frequencies, proportions, tables and graphs. Analytical statistics through bivariate analysis and stepwise logistic regression were performed to identify factors associated with patient delay in treatment. For bivariate analysis, odds ratios were measured to identify associations while 95% confidence interval (CI) and p-values were used to determine statistical significance. For stepwise logistic regression, all factors with p-values < 0.1 in the bivariate analysis were included in the logistic regression model. Adjusted odds ratios were measured with 95% confidence interval (CI) to identify independent factors. Seven questions were used to assess awareness for TB. These questions were divided into two: one who suspects case of TB is caused by TB, mode of transmission of TB, relationship between TB and HIV, need for screening of household members, duration of TB treatment, and awareness on drug-resistant TB. Answering five or more questions correctly was regarded as satisfactory knowledge. In this study, we defined patient delay as delay more than 4 weeks from onset of symptoms to first contact with a hospital [18]. Multiple care-seeking was defined as seeking care in two or more non-DOTS centers before reaching the DOTS hospital where patient was interviewed. A patient medicine vendor (PMV) was defined as a person without formal pharmacy training who sells pharmaceutical products on a retail basis for profit.

Ethical Consideration: The study was approved by FCT Health Research Ethics Committee. Informed consent was obtained from each respondent.

Results

Socio-demographic Characteristics

The mean age was 32.8 years (standard deviation ± 9.60 years). Sixty two percent were males, 54% had secondary education, while 76% lived within 20 minutes travel time from residence to nearest health facility [18]. The occupation, marital status and religion of the patients are shown in Table 1.

Knowledge of Tuberculosis

Eighty four percent were aware that cough is a symptom of pulmonary TB, but were less aware of the other symptoms (Table 2). On the cause of cough, 14% thought it was caused by TB, 6% by TB or other disease, 10% by cold or flu, while 28% did not know.Forty percent think TB patients can be treated at home, while 31% were not aware of TB transmission. Ninety percent believe TB patients were treated for 6 months while 31% were not aware of clinical symptoms. Ninety percent believe that TB patients were treated for 6 months while 31% were not aware of clinical symptoms. Ninety percent believe that TB patients were treated for 6 months while 31% were not aware of clinical symptoms. Ninety percent believe that TB patients were treated for 6 months while 31% were not aware of clinical symptoms. Ninety percent believe that TB patients were treated for 6 months while 31% were not aware of clinical symptoms. Ninety percent believe that TB patients were treated for 6 months while 31% were not aware of clinical symptoms. Ninety percent believe that TB patients were treated for 6 months while 31% were not aware of clinical symptoms. Ninety percent believe that TB patients were treated for 6 months while 31% were not aware of clinical symptoms. Ninety percent believe that TB patients were treated for 6 months while 31% were not aware of clinical symptoms.

Discussion

We found limited knowledge about TB and multiple care-seeking efforts among newly-diagnosed pulmonary TB patients in FCT in 2010. Patients who had multiple care-seeking efforts were significantly more likely to be effective unless erroneous beliefs among people are identified and corrected. Better understanding of the places where TB patients first seek care and factors responsible for delay is important to improve TB control and case-finding. In the study, the association of preceding multiple care-seeking with patient delay is consistent with findings from Argentina, Norway, and Queensland, Australia [27]. TB is a possible sequelae in improperly-treated TB patients [27]. The use shorter treatment regimens outside the recommendations of NTBLCP may be related to the practice of untreated TB patients [27]. The prevalence of patient delay was found to be high at 42%, similar to findings from Ondo, Nigeria [22]. Determinants of patient delay were identified as lack of knowledge of TB, misconceptions about TB transmission, and beliefs that TB is contagious. The TB transmission is the need for screening of household members. A TB patient needs to know that people living close to him or her are at risk of getting the disease or may already have latent infection. Up to a quarter of TB patients did not see the need for household members to be screened for TB disease, which could indicate that they did not understand the risk they posed to people living around them [25]. Health workers were the main source of TB information similar to what was previously documented in Tanzania [19]. This finding may be because health workers in DOTS hospitals typically counsel TB patients before commencement of treatment. In contrast, 15% of respondents cited the mass media as their main source of information on TB, which was observed in a study in Iraq [20]. This proportion could be an underestimate due to the mass media, a channel of communication that has not been effective in reaching people at large. However, health education alone through the mass media may not be enough to reach all population of potential TB users. Also, 15% of respondents obtained information on TB from friends and relatives. The implication of this is that if some patients depend on information that friends and relatives give, there would be need to sensitize communities on TB to prevent misinformation.

In this study, 27% of TB patients first sought care from non-medical facilities, similar to findings from Lagos, Nigeria [18] but higher than for Malawi [26]. The fact that there has been 100% coverage for DOTS services in Nigeria since 2008 [4]. Among the TB patients, PMVs were the most sought place for initial care as documented in other studies [27, 28]. This high patronage of PMVs may be related to the general practice of purchase of over-the-counter drugs for common ailments in Nigeria. Based on this finding, there is need to involve PMVs in the referral chain of TB patients to DOTS centers in order to enhance case-finding. That TB patients get information on PMVs as their first point of care for many health-related complaints, making it imperative to involve them in the fight against TB. Among those who first presented in medical facilities, majority sought care in public health facilities. This proportion is high considering the fact that there has been no significant association between level of education and age with patient delay (Table 2). After controlling for age and travel time from residence to nearest hospital, multiple care-seeking was significantly associated with patient delay (AOR=2.18, 95% CI=1.09-4.35) (Table 4).
The calculation of the sample size was based on a hypothesized proportion (p) of TB patients who present early of 17% [18], significance level of 5% - corresponding to a standard normal deviate (z) of 1.96, power of 80% , and precision (d) of 6%. We calculated the minimum sample size by the formula:**

\[
\text{Sample Size} = \frac{z^2 \times p \times (1-p)}{d^2}
\]

where z is the normal deviate, p is the hypothesized proportion, and d is the precision. The formula was then adjusted for finite population correction if the population size was known. A random sample of 160 patients was selected from each of the 10 secondary hospitals where the study was conducted. This was a power calculation to ensure that the study had a 95% confidence interval for the estimate of the proportion of TB patients who present early, with a margin of error of 6%.

Methods

Study Setting: We conducted the study in six hospitals in FCT, the capital of Nigeria. The projected population for FCT for 2010 was 2.0 million people, based on the 2006 national population census. The hospitals where the study was conducted are University of Abuja Teaching Hospital (UATH) Gwagwalada, and Maitama, Asokoro, Nyanya, Bwari, and Kuje General Hospitals. UATH Gwagwalada is a tertiary referral hospital for FCT and adjoining Kogi and Niger States while the remaining five hospitals are secondary hospitals that serve mainly people from FCT. All the hospitals have free TB diagnostic and treatment under the coordination of Nigeria’s National TB and Leprosy Control Programme (NTLCP). An average of 12 new pulmonary TB patients are diagnosed in both tertiary and secondary hospitals in Abuja, each month.

Study Design: We conducted a cross-sectional study from March to June 2010. Newly-diagnosed pulmonary TB patients were recruited consecutively and interviewed within 1 week of commencement of anti-TB treatment. To maintain the confidentiality of the data, the patients were recruited from secondary and tertiary hospitals offering both diagnostic and treatment services for DOTS in FCT. Primary-level hospitals were not included because of the very few that would be obtained within the 4 months scheduled for the study.

Results

Table 1: Socio-demographic Characteristics of Newly-diagnosed Pulmonary Tuberculosis Patients, Federal Capital Territory, Nigeria, 2010

| Variable          | Frequency (n=160) | Proportion (%) |
|-------------------|-------------------|----------------|
| Age               |                   |                |
| ≤ 20              | 2                  | 1.3            |
| 21-30             | 33                 | 20.6           |
| 31-40             | 54                 | 33.8           |
| 41-50             | 44                 | 27.5           |
| > 50              | 37                 | 23.1           |
| Gender            |                   |                |
| Male              | 38                 | 50.0           |
| Female            | 22                 | 30.0           |
| Occupation        |                   |                |
| Student            | 12                 | 7.5            |
| University worker  | 38                 | 23.8           |
| Business          | 23                 | 14.4           |
| Government        | 25                 | 15.6           |
| Other              | 40                 | 25.0           |
| Level of education|                   |                |
| Primary            | 34                 | 21.3           |
| Secondary         | 40                 | 25.0           |
| Tertiary          | 86                 | 53.8           |
| Religion          |                   |                |
| Muslim             | 124                | 77.5           |
| Christian          | 22                 | 13.8           |
| Other              | 14                 | 8.8            |
| Marital status    |                   |                |
| Single             | 75                 | 46.9           |
| Married            | 80                 | 50.0           |
| Widowed            | 2                  | 1.3            |
| Level of education|                   |                |
| Primary            | 34                 | 21.3           |
| Secondary         | 40                 | 25.0           |
| Tertiary          | 86                 | 53.8           |
| Age group         |                   |                |
| 15-20             | 37                 | 23.1           |
| 21-35             | 81                 | 50.6           |
| 36-45             | 37                 | 23.1           |
| 46-65             | 5                  | 3.1            |
| Travel time (minute) |               |                |
| ≤ 20              | 33                 | 20.6           |
| > 20              | 127                | 79.4           |

Knowledge of Tuberculosis

Eighty four percent were aware that cough is a symptom of pulmonary TB, but were less aware of the other symptoms (Table 2). On the cause of TB, 80% (128/160) of the patients knew that TB is caused by TB bacteria. On factors that could increase transmission, 33% were aware of overcooking while 11% were aware of depressed immunity. Ninety eight percent knew that TB is treated for over a period of 8 months and 66% felt there was need for screening of household members. The main source of information about TB was health worker for 61% while 15% heard from each of friend/relative and news media. Based on the response to the seven questions used to assess tuberculosis knowledge, 73% of patients had unsatisfactory knowledge and there was no significant association between level of education and knowledge (p = 0.20).

Discussion

We found limited knowledge about TB and multiple care-seeking efforts among newly-diagnosed pulmonary TB patients in FCT in 2010. Patients who presented late sought health care from a non-medical provider, after multiple care-seeking before going to a DOTS center. The association of preceding multiple care-seeking with patient delay is comparable to the 38% in Pakistan, 30% in Tanzania (19) but much lower than 64% in Argentina (23). The patients who delayed being referred to a TB specialist center could possibly be explained by the higher level of education among the patients. The association between knowledge and level of education has been further supported by studies in Tanzania (19) and Vietnam (21) but this has not been demonstrated in our study. Also, 40% did not know that TB could be transmitted through kissing, which is an important step to adopt preventive measures. Even though occurrence of M. bovis infection in humans has largely reduced globally, this finding shows that TB is still a disease that patients may ask about TB through drinking infected cow’s milk still occurs. However, our study showed low awareness on this mode of TB transmission. The implication of this is that TB is again a common preventable and curable disease called “murun” in FCT and other parts of northern Nigeria may be exposing many inhabitants to TB transmission. Patients who delayed being referred to a TB specialist center could have been infected by M. bovis drinking infected cow’s milk. The low awareness on TB transmission is the need for screening of household members. A TB patient needs to know that people living close to him or her are at risk of getting the disease or they may already have latent infection. Up to a quarter of TB patients did not see the need for household members to be screened for TB disease, which could indicate that they did not understand the risk they posed to living around them (25).

Health workers were the main source of TB information similar to what was previously documented in Tanzania (19). This finding may be because health workers in FCT hospitals typically counsel TB patients before commencement of treatment. In contrast, 15% of respondents cited the mass media as their main source of TB information. This was observed in a study in Iraq (20). This low proportion could suggest inadequate coverage on TB through the mass media, a channel of communication that has the potential to reach several people at the same time. However, health education alone through the mass media may not be enough to reach all potential TB carriers. Also, 15% of the respondents obtained information on TB from friends and relatives. The implication of this is that some patients depend on information that friends and relatives give, which would need to be sensitized on communities to TB to prevent misinformation.

In this study, 27% of TB patients first sought for care from non-medical facilities, similar to findings from Lagos, Nigeria (18) but higher than for Malawi (26). This is because there has been 100% coverage for DOTS services in Nigeria since 2008 (4). Among the non-TB patients, the most sought place for initial care was as documented in other studies [27, 28]. This high patronage of PMNs may be related to the general practice of purchase of over-the-counter drugs for common ailments in Nigeria. Based on this finding, there is need to involve PMNs in the referral chain of TB patients to DOTS centers in order to reach out to more patients at the initial stage. Knowledge on PMNs as their first point of care for many health-related complaints, making it imperative to involve them in the fight against TB. Among those who first presented in medical facilities, more than a quarter of TB patients did not see the need for household members to be screened for TB disease, which could indicate that they did not understand the risk they posed to living around them (25).

The median time from onset of illness to first hospital contact was 4 weeks (range: 1 - 30 weeks). Patient delay was observed in 42% patients. Multiple care-seeking and unsatisfactory knowledge were significantly associated with patient delay (p < 0.05). There was no significant association between level of education and age with patient delay (Table 3). After controlling for age and travel time from residence to nearest hospital, multiple care-seeking was significantly associated with patient delay (AOR = 2.18, 95% CI = 1.09-4.35) (Table 4). The main source of information about TB was health worker for 61% while 15% heard from each of friend/relative and news media. Based on the response to the seven questions used to assess tuberculosis knowledge, 73% of patients had unsatisfactory knowledge and there was no significant association between level of education and knowledge (p = 0.20).
consistent with findings from India [7]. It can be explained that a patient who visits a PMT or other unorthodox places would have wasted ample time before reaching the right place for treatment. The multiple care-seeking pattern of one third of our respondents is similar to findings from Enugu, Nigeria [27]. The interpretation of the findings of our study is subject to some limitations. First, it is important to note that the study was conducted in a public DOTs center. Their characteristics and views may be different from those that never sought care in these centers, so the findings cannot be generalized to the total population of TB patients in FCT. Secondly, patient delay in care-seeking was recorded on patient’s recall ability. However, we recruited and interviewed our respondents within 1 week of commencement of anti-TB treatment to minimize recall bias.

Conclusion

PMVs and private hospitals are among the major places where TB patients first seek care following onset of illness. Multiple and delayed care-seeking were found in many patients before they reported to the DOTs center. Patient delay was associated with having unsatisfactory knowledge of TB and multiple care-seeking before reporting at the DOTs center. FCT TB Control Program should organize sensitization programs on TB for PMVs and owners of private hospitals to increase their understanding of TB and ensure that they refer suspected TB cases promptly to DOTs centers where they can be diagnosed and properly treated.

Competing interests

The authors declare no competing interests.

Authors’ contributions

Biya, Gidado, Nguku, and Sabitu were involved in the study design and data collection. Biya, Ajikelo, Nguku, Warri, Idri, Oyemakinde, Nazli, Nisubuga and Sabitu were responsible for data analysis and interpretation. All authors have read and approved the final version of this manuscript.

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References

1. World Health Organization. Global tuberculosis control - surveillance, planning, financing, WHO Report. 2008; Geneva: WHO/HTM/TB/2008 393.
2. World Health Organization. Global tuberculosis control - epidemiology, strategy, planning, WHO Report. 2009; Geneva: WHO/HTM/TB/2009 411.
3. World Health Organization. Framework for effective tuberculosis control, WHO Tuberculosis Programme. 1994; Geneva: WHO, 1994.
4. National Tuberculosis and Leprosy Control Programme, Federal Ministry of Health, Abuja, Nigeria. NTBLCP Annual Report, 2008; WHO/HTM/TB/2009 411.
5. Alvarez Gordillo. Seeking tuberculosis care in Chiapas, Mexico. Revista Panamericana de Salud Publica. 2001; 9(5):285-293.
6. Sadik H, Muynck AD. Health care seeking behavior of pulmonary tuberculosis patients visiting TB center Rawapindi. J Park Med Assoc. 2001; 51(1):15-6.
7. Pathania Vikram, Almeida Joel, Koshi Arata. Tuberculosis patients and private for profit health care providers in India. Global TB Programme of the World Health Organization. 1997; Geneva: WHO/ TB/1997 223.
8. Auer Chlinka, Sarol Jesus X; Tanner Marcel, Weiss Mitchell. Health-seeking and perceived causes of tuberculosis among patients in Manila, Philippines, Traph Med Int Health. 2000; 5:648-656.
9. Barker RD, Miladar FJ, Malati J. Traditional healers, treatment delay, performance status and death from tuberculosis in rural South Africa. Int J Tuberc Lung Dis. 2006; 10(6):676-679.
10. Golub JE, Bur S, Cronin WA. Delayed tuberculosis diagnosis and tuberculosis transmission. Int J Tuberc Lung Dis. 2006; 10(1):24-30.
11. Lin Xu, Chongsuvivatwong Virasakgi, Lin Lu, Geater Alan, Lijuan Ren. Dose-response relationship between treatment delay of smear-positive tuberculosis patients and intra-household transmission: a cross-sectional study. Trans R Soc Trop Med Hyg. 2008; 102(8):797-804.
12. Madebo T, Lindtjorn B. Delay in Treatment of Pulmonary Tuberculosis: An Analysis of Symptom Duration Amongst Ethiopian Patients. Med Gen Med. 1999:65.
13. Nair Dinesh, George Annie, Chacko K. Tuberculosis in Bombay: new insights from poor urban patients. Health Policy and Planning. 1997; 12(2):77-85.
14. Meidlin Mengisto, Teddy Tasse, Isaac Tanke, Madeley Richard. Delays and care-seeking behavior among Tuberculosis patients in Tigray of northern Ethiopia. Ethio J Health Dev. 2005; 19(1):7.
15. National Tuberculosis and Leprosy Control Programme. Federal Ministry of Health, Abuja, Nigeria. NTBLCP Annual Report. 2007; Nigeria: NTBLCP.
16. National AIDS and STDS Control Program. National HIV/AIDS Sero-prevalence Sentinel Survey Report. 2008; Nigeria: NASCP.
17. Khan Amin, Valley John, Newell James, Sindad Nafina. Tuberculosis in Pakistan: Socio-Cultural Constraints and opportunities in treatment. Soc Sci Med. 2000; 25:389-99. PubMed | Google Scholar
18. Olumuyiwa Odusanya, Babatemi Joseph. Patterns of delays amongst pulmonary tuberculosis patients in Lagos. BMC Public Health. 2004 May 29;4:18.
19. Wandwalo ER, Morvke O. Knowledge of disease and treatment among tuberculosis patients in Rwanda, Tanzania. Int J Tuberc Lung Dis. 2000; 4(11):1041-1046.
20. Nguyen Hsa, Anna Thorson, Vinod Diwan. Knowledge of tuberculosis and associated health-seeking behaviour among rural Vietnamese adults with a cough for at least three weeks. Scand J Public Health. 2003; 31(suppl 61):59-65.
21. Hashim OS, Ali Kubayi W. Ali Dulayme A. Knowledge, attitudes and practices survey among health care workers and tuberculosis patients in Iraq, Eastern Mediterranean Health Journal. 2005; 9(4): 107-112.
22. International Center for Gender and Social Research. National Tuberculosis Survey: Report of the knowledge, attitude, behavior, experiences and practices in Southeast, Southwest and North central zones, Nigeria. 2008; 99.
23. Mohammed AI, Youaf MA, Obasa P. Knowledge of Tuberculosis: A survey among Tuberculosis patients in Omdurman, Sudan. Sudanese Journal of Public Health. 2007; 2(1): 22. PubMed | Google Scholar
24. Bhat S, Singh N, Aggarwal CS, Jain RC. Knowledge attitudes and practices of newly diagnosed sputum positive cases of pulmonary tuberculosis. Journal of Communicable Diseases. 1999; 31(4): 247-252. P
25. Lian OK, Lim KH, Wong CMM, Tang BG. Attitudes and knowledge of newly diagnosed tuberculosis patients regarding the disease, and factors affecting treatment compliance, Malaysia. Int J Tuberc Lung Dis. 1999; 3(12):300-306.
26. Salaripour PM, Harnes AD, Banda HT, Kang’ombe C, et al. Care seeking behaviour and diagnostic processes in patients with smear-positive pulmonary tuberculosis in Malawi. Int J Tuberc Lung Dis. 2000; 4(4):327-332.
27. Okeibunor JC, Onyeneho NG, Chukwu JN, Post E. Where do Tuberculosis patients go for treatment before reporting to DOTs clinics in Southern Nigeria?: A study report submitted to the German Leprösy and Tuberculosis Relief Association, Enugu, Nigeria. 2005.
28. Kibwira Mpungu, Charles Karamagi, Harriet Mayanja. Patient and health care system delays in the start of Tuberculosis treatment in Tanzania. BMC Infect Dis. 2006; 6:33.
29. Zerbini E, Chinchio M, Salvadoris B. Delay in Tuberculosis diagnosis and treatment in four provinces of Argentina. Int J Tuberc Lung Dis. 2008; 12(1):63-68.
30. Farah Mohamed, Rhay Jams, Steen Tore, Gunna Bjune. Patient and health care system delays in the start of Tuberculosis treatment in Norway. BMC Infect Dis. 2006; 6:33.
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The interpretation of the findings of our study is subject to some limitations. The first is that respondents were those that eventually sought care in a public DOTs center. Their characteristics and views may be different from those that never sought care in these centers, so the findings cannot be generalized to the total population of TB patients in FCT. Secondly, patient delay in care-seeking was recorded based on patient’s recall ability. However, we recruited and interviewed our respondents within 1 week of commencement of anti-TB treatment to minimize recall bias.

Conclusion
PMVs and private hospitals are among the major places where TB patients first seek care following onset of illness. Multiple and delayed care-seeking were found in many patients before they reported to the DOTs center. Patient delay was associated with having unsatisfactory knowledge of TB and multiple care-seeking before reporting at the DOTs center. FCT TB Control Program should organize sensitization programs on TB for PMVs and owners of private hospitals to increase their understanding of TB and ensure that they refer suspected TB cases promptly to DOTs centers where they can be diagnosed and properly treated.

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References
1. World Health Organization. Global tuberculosis control - surveillance, planning, financing. WHO Report. 2008; Geneva: WHO/HTM/TB/2008 391.
2. World Health Organization. Global tuberculosis control - epidemiology, strategy, financing. WHO Report. 2009; Geneva: WHO/HTM/TB/2009 411.
3. World Health Organization. Framework for effective tuberculosis control. WHO Tuberculosis Programme. 1994; Geneva: WHO.
4. National Tuberculosis and Leprosy Control Programme, Federal Ministry of Health, Abuja, Nigeria. NTLBCLP Annual Report, 2008;
5. Alvarez Gordillo. Seeking tuberculosis care in Chiapas, Mexico, Revista Panamericana de Salud Publica. 2001; 9(5):285-293.
6. Sadiq H, Muynck AD. Health care seeking behavior of pulmonary tuberculosis patients visiting TB center Rawalpindi. J Park Med Assoc. 2001; 51(1):10-6.
7. Pathania Vikram, Almeida Joel, Kochi Arata. Tuberculosis patients and private for profit health care providers in India. Global TB Programme of the World Health Organization. 1997; Geneva: WHO/ TB/1997 223.
8. Auer Chipling, Sarol Jesus X; Tanner Marcel, Weiss Mitchell. Health-seeking and perceived causes of tuberculosis among patients in Manila, Philippines, Trichop Med Int Health. 2000; 5:649-656.
9. Barker RD, Millard FJ, Malabi J. Traditional healers, treatment delay, performance status and death from tuberculosis in rural South Africa. Int J Tuberc Lung Dis. 2006; 10(6):676-679.
10. Golui JE, Bur S, Cronin WA. Delayed tuberculosis diagnosis and tuberculosis transmission. Int J Tuberc Lung Dis. 2006; 10(1):24-30.
11. Lin Xu, Chongsuvivatwong Viraesigk, Lin Lu, Geater Alan, Ulian Ren. Close-response relationship between treatment delay of smear-positive tuberculosis patients and intra-household transmission: a cross-sectional study. Trans R Soc Trop Med Hyg. 2008; 102(8):797-804.
12. Madebo T, Lindtjorn B. Delay in Treatment of Pulmonary Tuberculosis: An Analysis of Symptom Duration Among Ethiopian Patients. Med Gen Med. 1999:65.
13. Nair Dinesh, George Annie, Chacko K. Tuberculosis in Bombay: new insights from poor urban patients. Health Policy and Planning. 1997; 12(1):77-85.
14. Mezin Mageote, Toddy Tayoe, Isac Talorie, Madeley Richard. Delays and care-seeking behavior among Tuberculosis patients in Tigray of northern Ethiopia. Ethic J Health Dev. 2005; 19(1):7.
15. National Tuberculosis and Leprosy Control Program. Federal Ministry of Health, Abuja, Nigeria. NTLBCLP Annual Report, 2007; Nigeria: NTLBCLP.
16. National AIDS and STDS Control Program. National HIV/AIDS Sero-prevalence Sentinel Survey Report. 2008; Nigeria: NASCP.
17. Khan Amr, Walley John, Newell James, Imad Naghema. Tuberculosis in Pakistan: Socio-Cultural Constraints and opportunities in treatment. Soc Sci Med. 2000; 25:389-99, PubMed | Google Scholar.
18. Alakpa GE, Edet EA. Management of pulmonary tuberculosis: A survey among Tuberculosis patients in Omdurman, Sudan. Sudanese J Tuberc Dis. 1999;18(2):119-123.
30. Zerbini E, Chiniro M, Salvadores B. Delay in Tuberculosis diagnosis and treatment in four provinces of Argentina. Int J Tuberc Lung Dis. 2008; 12(1):63-68.
31. Farah Mohamed, Rygh Jens, Steen Tore, Gunna Bjune. Patient and health care system delays in the start of Tuberculosis treatment in Norway. BMC Infect Dis. 2006; 6:33.