

Knowledge and Practice of Direct Observation Treatment Short-Course (DOTS) Components in Effective Treatment of Tuberculosis among Patients of Buea and its Environs, Cameroon

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Full implementation of Directly Observed Treatment Short-Course (DOTS) has been recommended by international tuberculosis authorities and has been shown to be effective in achieving a high successful treatment rate. Patients' Knowledge on supervision, frequency of drug supply, duration of treatment, duration of admission for the seriously ill, bacteriology follow up and the number of times for tuberculosis control were assessed. The practice of effective DOT was also assessed using drug administration; drug supervision and bacteriology follow up. A cross-sectional study was conducted at Diagnostic and Treatment Centers (DTCs) with default rate, deaths and transfer rates of more than 10% in 2012 treatment outcome in the South West Region of Cameroon. TB patients diagnosed with Sputum Positive Pulmonary Tuberculosis (SPPTB) participated in the study. Participants' knowledge in the use of DOTS was 20%, their practice was assessed to be 25%, below WHO recommendation. Frequency of drug supply to TB patients was affected monthly for the majority of participants, contrary to the World Health Organization (WHO) recommendation. The results can be used to increase knowledge of patients on DOTs, its implementation and benefits.

Key words: Direct Observation Treatment Short-course (DOTS), Tuberculosis, patients, knowledge, practice.

INTRODUCTION

The global target for TB control through full DOTS expansion was the attainment of 70% case detection and attainment of 85% cure rate by 2005. Unfortunately, these targets were not achieved, especially in Africa by the year 2005 [2]. However, DOTS has been credited with a number of large-scale successful programs in the developing world to control TB [1]. Since 1995, over 56 million people have been successfully treated and an estimated 22 million lives saved through the use of DOTS and the Stop TB Strategy recommended by the WHO [2].

DOT strategy started in Cameroon in the mid-1990s and was expanded to the entire country in the year 2000. Despite this, available evidence suggests that anti-tuberculosis treatment discontinuation has remained relatively high [3]. In accordance with international directives and the Global Strategy and Plan to Stop TB, Cameroon has established the National Tuberculosis Control Program (PNLT) for the fight against tuberculosis [4]. In Cameroon; the therapeutic success

rate is around 77%, while the cure rate is around 65% [4]. The S W Region report of a cure rate of 70.9% in 2011 and in 2012 a cure rate of 72% is below World Health Organization recommended standard of at least 85% cure rate in Sputum Positive Pulmonary Tuberculosis (SPPTB) patients [5]. The expected therapeutic success target of 85% among newly diagnosed individuals with positive smears is largely unachieved in many settings in sub-Saharan Africa [3].

Directly Observed Treatment Short-Course (DOTS) stands for "Directly Observed Treatment Short-course" and is a major plank in the WHO Global Plan to Stop TB [6]. The DOTS strategy focuses on five main points of action, these include government commitment to control TB, diagnosis based on sputum-smear microscopy tests done on patients who actively report TB symptoms, direct observation short-course chemotherapy treatments, a definite supply of drugs, and standardized reporting and recording of cases and treatment outcomes [7, 8, 6, 9]. To be classified as DOTS a country must

have accepted and adopted the strategy in 2004 and must have implemented the four technical components of DOTS in at least part of the country ^[10]. The WHO advises that all TB patients should have at least the first two months of their therapy observed (and preferably the whole of it observed): this means an independent observer watching patients swallow their anti-TB therapy. The independent observer is often not a healthcare worker and may be a shopkeeper or a tribal elder or similar senior person within that society ^[6]. The patients would be better placed to ensure their by safety by compliance with the short-course.

Their (patient) support services provided in addition to the routine education of TB patients and supervised swallowing of TB medication prevent the emergence of drug resistance. The lack of awareness and knowledge of what the DOTS entails would be dangerous to patients who can stop treatment without completing leading to poor practices that are responsible for resistance. Resistance is caused by inconsistent or partial treatment, when patients do not take all the medicines regularly for the required period because they start to feel better or lack of knowledge in DOTS, and, or the drug supply is unreliable. Drug-resistant TB is more difficult and more expensive to treat and more likely to be fatal.

Problem Statement

One of the principles of DOTS is an uninterrupted drug supply to patients ^[8] which should go in glove with education, however, the frequency of drug supply to patients is not known in the study setting. It is very important that people who have TB disease know that they must complete their treatment, taking the drugs exactly as prescribed ^[11]. Available evidence suggests that anti-tuberculosis treatment discontinuation has remained relatively high in Cameroon ^[4, 11]. More importantly, knowledge of the components of DOTS and the implementation of the components is very vital in maintaining good standard of practice. These have been found to be somehow inadequate requiring proper assessment.

Research questions

1. What are the various levels of knowledge with regards to the use of DOTS in TB treatment in the SWR?
2. What are various levels of implementation of components of DOTS in TB treatment in the SWR as proof of good standard of practice?

Objectives

1. To assess Patients' Knowledge in the use of DOTS in TB treatment in the S W Region.
2. To determine the proportion of patients with good practices with respect to the use of DOTS in TB treatment.

Methods and Materials

This was a cross-sectional study that was conducted in five Diagnostic and Treatment Centers (DTCs) in the South West

Region (SWR) from July to August 2014. The population is a mobile one involved in all works of life cosmopolitan in nature, thickly populated, very mobile population and poor town planning. This can be the reasons why defaulting and transfer rates are high and also a high incidence rate if compared to other Districts. The inclusion criteria were patients diagnosed of sputum positive pulmonary TB (SPPTB). Patients with diseases (except HIV) like severe bacterial pneumonia, heart disease, diabetes mellitus, and kidney problems were excluded.

Sample and sampling technique

The estimated sample was 385 respondents who were registered in the Tuberculosis register, and had completed treatment, were admitted in the wards and those who have been on treatment for three months and above in the above diagnostic and treatment centres (DTCs) and were willing to take part in the study. Study participants were recruited from five diagnostic and treatment centers (DTCs) in the South West Region. Out of the 20 DTCs in the SWR, 12 had annual cure rates of 60% and less [5] with death, defaulting and transfer rates of > 10% (these variables are considered to affect the cure rate) so DTCs selected to participate in this study were those with at least two or three of the following variables, death, defaulting and transfer rates of >10% from the 2012 treatment outcome in the SWR.

The number of respondents from the selected DTCs was decided on using a probability proportionate to size (PPS) sampling method and study participants were determined through a convenient sampling method (a PPS sampling method means larger DTCs has more participants to sample than less populated ones and a convenient sampling method is a method that selects and works with the first 385 patients in the TB register who met the inclusion criteria). A structured questionnaire designed with respect to research questions was used to collect necessary information from patients to answer research questions. The questionnaires were interviewer administered since knowledge was being tested.

Results

The results presented show a picture of the socio-demographic characteristics of the participants, knowledge, practice and a number of times for TB control. The characteristics of participants are as in table 1. A total of 310 (including twelve - 3.9% participants who were found admitted in the wards during the period of data collection) participants were successfully enrolled and investigated in this study with a response rate of 80.5%. The mean age of participants was 39.1 years (SD: 10.8). The majority of participants 161 (51.93%) were females (Table 1). More than half of the participants 122 (39.35%) and 109 (35.2%) had attained primary and secondary school levels of education and 175 (56.45%) and 102 (32.9%) were married and single respectively. Two hundred and ninety seven (95.8%) participants were gainfully employed, but majority of them 247 (83.2%) work with the private sector. Two hundred and ninety seven (97.8%) were non-smokers and 175 (56.5%) were non alcoholics

Table 1: Socio-demographic characteristics of the study participants

| Socio demographic characteristics | No | % |
|-----------------------------------|-----|-------|
| Gender | | |
| Male | 149 | 48.06 |
| Female | 161 | 51.93 |
| Age: MEAN±SD (39.11 (10.82) | | |
| Educational level | | |
| None | 3 | 1.0 |
| Primary | 122 | 39.4 |
| Secondary | 109 | 35.2 |
| High school | 57 | 18.4 |
| Higher institute | 18 | 6.2 |
| Marital status | | |
| Single | 102 | 32.9 |
| Married | 175 | 56.5 |
| Divorced | 20 | 6.5 |
| Widow | 13 | 4.2 |
| Occupation | | |
| Government | 50 | 16.1 |
| Private | 247 | 79.7 |
| Student | 13 | 4.2 |
| Smoking status | | |
| Smokes | 13 | 4.2 |
| Do not smoke | 297 | 95.8 |
| Alcohol status | | |
| Drinks | 135 | 43.5 |
| Do not drink | 175 | 56.5 |

*No level of education means has not completed seven years in the primary education; Primary education involves at most seven years; secondary level at most five years; high school level at most two years and higher institute involves attaining either a professional school or University education; frequency; frequency in percentage and SD mean standard deviation.

Description of levels of knowledge of participants in the use of DOTS in TB treatment

Table 2 below shows levels of knowledge of study participants with respect to the use of DOTS in TB treatment. Knowledge of supervision of treatment, frequency of drug supply to patients, duration of treatment, and admission during the intensive phase of treatment and bacteriological follow-up of patients was assessed. Generally, participants' knowledge on 4 of the 5 aspects assessed was 20% indicating low /little /inadequate knowledge.

1. Supervision of TB treatment

A few participants, 83 (26.8%) said supervision of TB treatment was necessary and among them, 7 (8.4%) said it should be done by another patient. In effect, only 76 (24.5%) had good knowledge on this aspect.

2. Frequency of drug supply to patients

The majority of participants 250 (80.6%) had good knowledge here as they reported that drug supply to patients should depend on appointment dates for drug re-fill.

3. Duration of treatment

One hundred and ninety five (62.9%) did not know the duration of their treatment.

4. Admission/duration during the intensive phase of treatment

One hundred and forty (47.0%) refused admission in the intensive phase of treatment and among those who said admission was necessary, 108 (68.4%) did not know the duration of the admission during this phase, meaning that only 50 (16.1%) actually knew duration of admission in the intensive phase.

5. Bacteriological follow-up of patients

Knowledge on the number of times a TB patient is expected to do a sputum control test before the end of treatment was inadequate for the majority of participants 225, (72.6%). Only 85 (27.4%) knew that they need to do a control of their sputum three times before the end of their treatment.

Table 2: Levels of knowledge in the use of DOTS in TB treatment

| Items | No (%) | Assessment |
|--|------------|---|
| Should you be supervised when taking your drugs? | | Poor knowledge. |
| No | 227(73.2) | (227 +7 participants =234(75.5%) did not know that supervision is needed. only 50(16.1%)actually knew duration of admission in the intensive phase. |
| Yes | 83(26.8) | |
| If yes ,who should supervise you? | | |
| -Healthcare provider/ family. | 76(91.6) | |
| -another patient. | 7(8.4) | |
| How often should drugs be supplied to you? | | |
| -on appointment. | 250 (80.6) | good knowledge 250(80.6%) |
| -when drugs are available. | 20(6.5) | |
| -when I asked for drugs. | 5(1.7) | |
| -when my drugs are finished. | 35(11.3) | |
| Do you know how long your treatment will last? | | Poor knowledge. |
| -no | 102(32.9) | Of the 208 participants who said they knew the duration of their treatment, only 115 said the right answer(that of six month duration).102+26+67=195(62.9%) did not know that the duration of their treatment was six months. Therefore, only 115 (37.1%) choose the right option. |
| -yes | 208 (67.1) | |
| If yes, how long? | | |
| Six months. | 115 (55.3) | |
| -eight months. | 26(12.5) | |
| -one year | 67(32.2) | |

For three months to eight months. Most of them were on treatment for five months 92(31.0%), three months 82(27.6%) and six months 75 (25.3%) respectively. It should be noted that the Observational checklist was also used here to directly observe only one aspect under practice which was supervision of drug administration, whether it was done by either a healthcare provider/family member or by patients themselves. The checklist was used only for those admitted in the ward at the time of data collection in the selected DTCs that participated in this study. Twelve participants were seen in the wards and data was collected

1. Drug administration

The majority of participants 164 (55%) reported that they took their drugs at home at the beginning of their treatment but more than half 227 (93.0%) confirmed they took their medications every day on an empty stomach.

2. Drug supervision

With regard to supervision of treatment, the majority of participants 274 (88.8%) supervised their treatment. It should be noted that all the 12 patients in the ward who took part in this study were not supervised by either a health care provider/family member. They indicated taking their drugs early in the morning without any supervision as recommended.

3. Bacteriological follow-up

For bacteriological follow up, 290 (97.3%) affirmed to have done a control test, but if asked the number of times, the majority had done it only one time 211 (72.8%), 66 (22.8%) had done so two times and 13 (4.5%) three times. Out of a total number of 588 sputum control examinations to be done by study participants, only 290 (49.3%) controls were done. For all the items that were assessed for standards of practice, (75%) did not meet the recommended standard of practice (implementation).

Table 3: Levels of practice in the use of DOTS in TB treatment

| Items | No (%) | Assessment |
|--|-----------|--|
| When did you start your treatment? | | |
| Three months ago. | 24 (8.1) | |
| -four months ago. | 82(27.6) | |
| -five months ago. | 92(31.0) | |
| -six months ago. | 75(25.3) | |
| -seven months ago. | 12(4.0) | |
| -eight months ago | 12(4.0) | |
| Where do you take your TB treatment at the beginning of your treatment | | Poor practice. 164(55%) of participants took drugs at home not in the hospital as recommended. |
| - In the hospital. | 134(45.0) | Good practice. 227(93.0%) of participants took drugs as required. |
| -At home | 164(55.0) | |
| How do you take your drugs? | | |
| -once a day on an empty stomach. | 227(93.0) | Poor practice. 36(12.1%) of participants had their treatment supervised. |
| -Any time I remember to take it. | 2(0.7) | |
| -After eating food. | 19(6.4) | |
| Who supervises your treatment? | | Poor practice. of 588 sputum control test to have been done by participants in this study, only 290 (49.3%) was done. |
| -No body but myself. | 274(88.4) | |
| -Family member. | 32(10.3) | |
| -health care worker | 4(1.3) | |
| Have you ever done a test of your sputum since you started TB treatment? | | |
| -Yes. | 290(97.3) | |
| -no. | 8(2.7) | |
| How many control test have you done? | | |
| One time. | 211(72.8) | |
| -two times. | 66(22.8) | |
| -three times. | 13(4.5) | |

* N=frequency, %=frequency in percentages

Discussion

The full implementation of DOTS cannot be achieved adequately when the components are not well known by the sufferers of tuberculosis. This study has demonstrated that knowledge of the basic components of DOTS like supervision, follow up, bacteriological studies among others is lacking among the sufferers. This is indication that in the absence of any of the components, the patient cannot ask questions as he/she is not even aware. The lack of awareness of any component further complicates the implementation of the components. When one does not know something, he/she is not expected to implement. The positively implemented aspects could just have been by routine activities. Consciousness of a component and implementation is better than just tumbling over the component during routines. The foregoing was found to be true as patients' knowledge in the use of DOTS in the management of TB was inadequate (20%) their practice as regards the use of DOTS was (25%) and the recommended frequency of drug supply to patients following DOTS approach was not respected (less than 50%)., meaning that what was followed was by routines or chance. The issue of drug supply was found to be very disturbing.

For adequate tuberculosis treatment an appropriate combination of anti-tuberculosis drugs taken regularly by the patients under direct observation for the prescribed period of

time are required ^[1,6,8]. Also, an un-interrupted drug supply and bacteriological follow-up of sputum in the course of treatment is necessary ^[3] but which were found too inadequate in this study. Many reasons could be advanced for this, but if the sufferers were well educated on what DOTS was all about, questions would have been asked always enabling the conscious implementation and not routines or chance. Thus, patient education on the causes and effects of TB, the dosing and possible adverse reactions of their medication, and the importance of taking their medication according to the treatment plan to facilitate adherence ^[2] is very necessary. In general, knowledge on the use of DOTS in the management of TB was poorest 20.0%.

However, some variations were noticed in levels of knowledge in the aspects assessed. Knowledge on whether admission is necessary and duration of admission in the intensive phase of TB treatment was very low (20.0%) followed by knowledge on supervision of TB treatment (24.5%), bacteriological follow-up (27.4%) and finally, knowledge on duration of TB treatment (37.1%). Even though knowledge on frequency of drug supply appeared to be good (80.6%), in public health, it is expected that patients respect appointment dates for drug refill in order to prevent resistance that comes as a result of drug interruption. Therefore (19.4%) of

participants who did not know that drug supply to patients should be on appointments might likely interrupt treatment as they reported contrary to the accepted recommendation of drug supplied. Similar to this finding were those carried out in the Southeastern part of Nigeria on TB patients accessing services in TB centers, the study revealed that patients had low knowledge about TB disease and poor contact tracing practice [9]. Other studies conducted in Nigeria, India, Tanzania and Ethiopia revealed gross inadequacies in TB knowledge among medical students [7] and the general public [1]. A study in Nigeria revealed gross inadequacies in levels of knowledge of tuberculosis management, according to the DOTS regimen among final year medical students in South Western, Nigeria. Knowledge on duration of regimen in the intensive phase was higher in their study (34.5%) compared to (20%) reported in our study [7].

This slight difference might have been because the majority of participants in this study 122 (39.4%) and 109 (35.2%) attained primary and secondary levels of education compared to participants in their studies who were medical students. The lack of knowledge in those areas by patients explains the reason why their practice in the use of DOTS is also poor and why the objective of the National Tuberculosis Control Program (NTBCP) has not been achieved in the SWR (that of an 85% cure rate). It could also imply that patients are not well educated at the initial phase of treatment [5]. Poor knowledge on a treatment regimen poses an obstacle to efforts made to achieve health for all. Tuberculosis (TB) is a highly communicable disease with a long duration of treatment. Poor knowledge in the use of DOTS in TB management as it appears to be in this study may be a huge barrier to the achievement of the goal of controlling the spread of TB. Several other studies carried out to investigate the effect of DOT on treatment outcome of tuberculosis patients reveal that when DOT is effectively implemented it reduces drug resistance and improves treatment outcome [4, 6].

The implementation of the components of DOTS was found to be disturbing to any health care provider as it was revealed that only (11.6%) of study participants had their treatment supervised either by a family member or a nurse 32 (10.3%) and 4 (1.3%) respectively. A total of 588 sputum test was expected to be done by study participants who have been on treatment for over two months as recommended [2,4,9] but study participants did only 284 (48.3%). It is recommended that

TB patients be admitted for two months during the initial phase of treatment (especially very ill patients) and that treatment must be supervised and the patient's bacteriology must be monitored during the course of treatment [1,2,6,7]. Treatment success in DOTS remains much higher than in non-DOTS areas.

The DOTS strategy can be successfully implemented even in difficult conditions as those found in Cambodia [1]. Poor practice in the use of DOTS among TB patients in the SWR might be as a result of poor knowledge on TB as a disease and its management amongst health care providers [8]. Inadequate practice as revealed in this study also suggests that patients do not want to expose their status because TB is associated with HIV/AIDS and this may result in many patients hiding their diagnosis of TB or only disclosing it to selected people, mostly close families [9]. The investigators have not seen any study that specifically assessed the four aspects under patient practice in the use of DOTS as done in this study, but several studies have been conducted comparing treatment outcome between the practice of self-administered treatment and supervised treatment using DOTS. Such studies revealed a high cure rate in those whose treatment was supervised [1,2,6,8,9] meaning that effective use of DOTS improves on treatment outcome [9]. Although results of other studies contradict their findings because according to them DOTS is only a technical intervention and is less likely to improve treatment seeking behavior of patients which could be better influenced by aggressive health education and sensitization [1,2,4,6,8,9].

Recommendations

The knowledge patients had in the use of DOTS in the management of TB was inadequate and this affected their practice

1. Intensify health education and sensitization of the communities within the region.
2. A respectful atmosphere should be instituted within the clinic. This is fundamental to maintain adherence to treatment.
3. Institute a patient centered approach in the treatment of TB.

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