

## **Factors contributing to poor performance of Directly Observed Treatment Short-course (DOTS) in Mopani District of Limpopo Province, South Africa**

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### **Abstract**

The purpose of the study was to assess factors contributing to poor performance of Directly Observed Treatment Short-Course (DOTS) in Mopani district of Limpopo Province, South Africa. An exploratory qualitative approach was used to investigate the factors that contribute to poor performance of the DOTS Strategy. Four focus group discussions were conducted, two with Directly Observed Therapy (DOT) Supporters and two with patients on treatment for more than 6 months. The focus groups (4) discussions were tape-recorded. Data collected were descriptively analyzed using thematic methods. The patients generally found supervision of TB treatment helpful as they were motivated and encouraged to continue treatment. Some of the aspects identified as being unhelpful were the inconvenient times for treatment support and stigma due TB supporters' visit to patients home. Patients often preferred family members as supporters, whereas health workers favoured trained volunteers as DOT supporters. Other factors affecting DOTS were poverty, food shortage, cultural beliefs, and side-effects of the medication. Patients receiving disability grants prefer to remain uncured so as to continue receiving the grant. Behavioural factors seem to play a major role in noncompliance with TB treatment. The findings of the study support the importance of initial counseling and motivation of patients in improving adherence in the programme. Self-motivation was mentioned rather than the motivation from the DOT supporters. Further exploration of alternative DOTS supporters other than trained volunteer demands further investigation.

**Key words:** Directly observed Treatment Short-course, poor performance, tuberculosis, non-adherence, Directly Observed Therapy.

### **Introduction**

Tuberculosis (TB) is a global health concern and a major contributor to the burden of disease particularly in low and middle income families where it is closely associated with HIV/AIDS. It is the second leading cause of death among infectious diseases and one of the deadliest diseases in the world today as TB bacilli infect a third of the global population. In 2004, TB ranked seventh in the global ranking of causes of death (Montoro & Rodrigues, 2007).

TB remains as a major public health burden in many countries due to non-adherence to treatment. One way to ensure that patients adhere to treatment is to use Directly

Observed Treatment Short-course (DOTS). DOTS is a comprehensive strategy recommended by the World Health Organisation and is used around the world to detect and cure cases of tuberculosis. The strategy ensures that infectious TB patients are identified and cured using standardized drug combination. DOT supporters observe patients as they swallow their drugs daily.

Inadequate treatment can lead to relapse, continued transmission and development of drug resistance. TB treatment adherence is a complex behavioural issue. In order to improve treatment outcomes for TB, it requires a full understanding of the factors that prevent people from taking their medications correctly including factors that could help them complete treatment (Munro et al., 2007). According to Waisbord (2005), both delay in diagnosis and non-completion of treatment are two major central challenges in TB control. Cases with non-adherence were characterized by one or more of the following: TB symptoms subsided and patients feeling better then felt it is not necessary to continue treatment, treatment course is too long and the dose is too large, adverse drug reactions are severe, worry that her/his body will be damaged by TB drugs (Waisbord, 2005). According to Garner et al. (2007), non-adherence is caused by recalcitrant patients. These patients do not know, do not care and do not understand why they need to complete the treatment. The recommendations from the study were that there is a need to move away from the dominant paradigm of controlling patients to one that focuses on developing health systems and responding to patients' health care requirements to help them choose to complete treatment themselves.

Cultural beliefs also influence how patients treat their symptoms. Some groups, particularly in remote or isolated poor population, have cultural or traditional values about health that lead to seeking traditional or herbal use, ancestral or spiritual healing first and seeking modern medicine only when these traditional interventions fail (Kuwahara, 2002; WHO, 2005).

Mopani district has been implementing the DOTS strategy since 1996 and thus has a TB cure rate ranging between 44–60% despite the extensive training conducted for both voluntary supporters and health workers. The cure rate was 48.7 % in 2004 as compared to the provincial cure rate of 54 % (WHO, 2005). The low cure rate suggests ineffectiveness of the DOTS strategy in the district, which raises the question “What are the factors that contribute to poor performance of the DOTS strategy in the Mopani District of the Limpopo Province?” It is acknowledged that from a public health perspective, programmes that fail to cure 80% of sputum positive patients can do more harm than good (Bamford, 1999). The purpose of the study was to identify factors that contribute to poor performance of DOTS in Mopani district of Limpopo Province.

## **Study location**

The study was carried out in the Greater Giyani Local Municipality, one of the local municipalities under the Mopani District of Limpopo Province in South Africa. This is one of the municipalities with the lowest TB cure rate and was expected to provide information rich cases for in-depth study.

### **Study design**

An exploratory, qualitative approach was selected to investigate the factors that contribute to poor performance of DOTS in the district.

### **Study sample**

Non-probability purposive sampling was used to select participants. Eighteen TB patients and 23 DOT supporters were selected with the assistance of Health Educators from their respective areas.

### **Data collection**

Four focus group discussions were conducted in 2004; two with DOT supporters and two with TB patients (one group of cured and the other group of patients who were still on treatment for more than 6 months). The focus group discussions were conducted in Xitsonga, one of the local languages in the local municipality. The participants were asked to describe their lived experiences as DOTS supporters and patients on DOT. The discussion was kept as informal as possible and the participants were encouraged to talk whatever was in their mind. On average each focus group discussion session took one and a half hours.

The main question was asked in Tsonga to initiate the discussion and other issues were picked up to clarify the participant's responses and to narrow the discussion. Data generation continued until saturation was achieved (Streubert & Carpenter, 1999). The researcher not only listened to what was said, but also observed non-verbal cues such as facial expressions. To achieve this, the researcher listened to what was said as well as to what was implied. The focus groups discussions were recorded using a tape recorder and were transcribed verbatim. Field notes were collected on the entire process and key phases were written down. Extensive detailed notes were compiled immediately following the group discussion including non-verbal cues and social processes in the group.

### **Data analysis**

Data analysis for both focus group discussions was done concurrently with data collection. The researcher transcribed the data in Xitsonga and then translated to English after listening to each tape twice. The English version was then translated back to Xitsonga. The transcript was read as the tape was played to determine the accuracy of the transcript and corrections made accordingly. Thematic analysis was used; as the data collection method was semi-structured and themes were identified from general concepts that emerged and gave the set of data meaning.

### **Ethical consideration**

Permission to conduct the study was obtained from the Limpopo Provincial Department of Health Ethics Committee and the University of the Western Cape Ethics Committee gave ethics approval. Informed written consent was obtained from all the participants in the focus group discussions.

### **Trustworthiness**

Non-probability purposive sampling was used to ensure information-rich cases for in-depth study. Reviewing the district meeting minutes and reports as well as training records ensured triangulation of data.

Participants conclusion or 'member checks'; feedback was given to the study participants regarding the preliminary findings to enhance verification. Drafts of the preliminary findings were read to the supporters from local area a week after conducting the focus group discussions. This gave the participants the opportunity to confirm and reinterpret the findings to ensure that their experience was truthfully represented. It was therefore necessary for the participants to validate the reported findings. This ensured both credibility and dependability (Streubert & Carpenter, 1999).

To ensure transferability, 'thick description' of the context and findings of the study is discussed. This includes thorough description of the research setting, the transactions and processes observed during the study. The findings were reported verbatim (Polit, Beck & Hungler, 2001). To ensure reflexivity, a diary of actions, body language and experiences, and observations during the focus group discussions was kept.

### **Results**

The focus group discussions provided important information on the perceptions and problems affecting the implementation of DOTS in the Mopani District. A total of 18 patients participated in the focus group discussions, 11 were females and 7 were males; 15 were found to be unemployed, while 14 had elementary level education. Three patients were excluded from the study; two were very young to engage in a discussion and one was still on treatment in the cured group.

A total of 23 DOT supporters participated in the focus group discussion and all were trained female volunteers and unemployed. One participant had no formal education while 21 had elementary education and 1 had tertiary qualification. Length of time as a supporter ranged between a year and eight years.

The findings were grouped into three major key themes; supervision of medication, factors affecting compliance with medication regimen and suggestions for improvement of DOT.

### **Supervision of medication**

A key component of the DOTS approach is supervision. This includes observation of patients on TB treatment swallowing their medication by a DOT supporter. Aspects that patients found helpful under supervision of treatment were the motivation and

encouragement received to continue with the treatment. If they experienced side effects, they were encouraged to still take the medication, they were supplied with extra pills if they vomited the pills and if the side effects are severe they referred for proper management.

Some of the aspects that patients found unhelpful were inconvenient times for treatment support and DOT supporters arriving late. Some patients reported that some supporters did not always properly observe them take their medicines but instead just “ticked the card”. One patient stated:

*“My opinion is that is not a good arrangement e, they may come very late ... let say we agreed that at 10 o'clock will take the pills ... so if haven't arrived... will ask if I have taken the pills and will say yes, what if I'm lying? Will take the small hospital card and make a tick... but the person her/ him should be sure to take the pills”*

Another issue was that of stigma. Being identified as having a support visit implies that you are HIV positive. As a result of this, patients said they would prefer a family member or other people as DOT supporters rather than the volunteer DOT supporter. They suggested that this would overcome some of the negative aspects. Health professionals however, said they would prefer a trained DOT supporter to ensure quality.

Another aspect that impacted on the supervision was the behaviour of DOT patients. DOT supporters reported irresponsible behaviour of some patients. Patients were aggressive when they were supposed to swallow prescribed medicines. They mentioned that it result in a fight when they are told to swallow medicines. Others hide the drugs, not swallow or spit the medicine while some refuse to be watched while swallowing the drug by not complying with the agreed times.

The DOT supporters also raised the impact of cultural beliefs. Firstly cultural beliefs about being bewitched. The disease is interpreted as ‘xifula’ or makhuma’ (associated with breaking cultural rules that demand abstinence from sex after death in the family and sex with a woman who had an abortion) and lately the relationship between TB and HIV/AIDS. In young girls loss of weight was taken as being the result of an abortion or HIV and AIDS.

Cultural beliefs also impacted on supporter’s ability to observe and supervise TB treatment where in most cases they were not allowed to see their patients. Women in particular were not allowed to move close to a patient because it is believed that if she recently had sex the patient’s condition will worsen. Some patients, particularly in remote areas have cultural and traditional values about health that lead to seeking traditional or spiritual healing first and then modern medicine only when these traditional interventions fail. The participants believe that TB patients are bewitched. Patients are then taken to the traditional healers where they establish who caused the

disease and also get help. They will only cooperate with the DOT supporters when the traditional healer had fails. One supporter remarked:

*“They will tell you is ‘xifula’ (bewitched), sometimes you may visit may be for two days and in the fourth visit they will tell you that the patient has been taken to the traditional healers... when he comes back they will call you ...follow up your patient because the traditional healer failed... they agree that is TB and now will be very sick; the perception is not good, it is associated with carelessness”*

Another important issue that was identified was the excessive demands made on them by patients such as being called during the night to assist them, escort or provide transport to the hospital and cooking or providing food for them, which exceeds their envisaged role as DOT supporter. In practice many supporters went to considerable lengths to assist the patients they supported; sometimes seemed to feel that they were being abused. This is probably somehow related to negative perceptions about TB in the community which results in lack of support by community, family members and friends. One supporter reported:

*“ During the night they will send somebody to wake you up instead of taking the patient to the hospital...they leave everything up to you, you must also be an ambulance...it is a burden ...they do not give us support”*

### **Factors affecting compliance with TB medication**

A number of socio-economic factors were mentioned as having an impact on compliance with TB medication. Poverty, leading to lack of money for food and transport, as well as problems relating to the social grant were frequently identified. Patients and supporters highlighted lack of food as a major problem for patients taking TB medicines. Lack of food was reported as a major stumbling block because one cannot take treatment on an empty stomach.

Some mentioned inability to afford transport to collect prescriptions particularly where the patient needed to travel. Geographically, distance presented a major barrier to accessing TB treatment and affects compliance disproportionately.

Not receiving social grant was mentioned as a problem. On the other hand, those receiving the social grant would play some tricks not taking the treatment so that they are not cured in order to continue getting the social grant. Both supporters and health workers raised this issue.

Men not getting the grant dropped out of treatment because of pressure to return to work. Due to the stigma attached to the disease itself some patients refuse to be supervised or want their parents to be their supporters so that people must not know that they have TB, especially with young ones. Older people have no problems. This issue was raised by all participants in the focus groups. Whilst the stigma of TB as ‘a disease of the poor’ persists, more recently HIV/AIDS stigma affects TB patients, particularly in communities where HIV/AIDS is prevalent, they suffer from double

stigma. Patients postpone seeking care due to fears of finding out their HIV status, stigmatization and social rejection as a consequence of their HIV and TB status becoming known. One female patient indicated that younger women in particular bear the highest burden of stigmatization.

Patients dropped out of treatment after one or two months of effective chemotherapy and as a result will lie about being discharged. Both groups of patients on DOT reported side effects as one of the factors contributing to noncompliance to treatment. As a result, patients ended up not taking prescribed pills but hide it from the supporters and later throw up or spit the drugs. The side effects included vomiting, pain, numbness and heartburn. Both groups of TB patients lacked information about the illness and side effects of the medication. One patient (not cured) said:

*“When we find that we cannot tolerate them we hide some of them... to tell the truth, these pills are painful. They count the first pills and give them to you (opening palm of hand), you throw them into mouth and you know how; they will be sure that you have taken them while your aim is that when you take some the others will fall somewhere and make sure that they have not seen them. When they leave you throw them away... you think you lessen the pain that you have when taking the pills”*

Smoking and drinking among adults also affected effectiveness of the treatment. DOT supporters reported very limited support from their supervisors. There is no regular supervision system for the voluntary DOT supporters by health workers and home visits are rarely done. Their supervisors were reported to be always busy. Though supporters reported the support from other areas, others reported that they did not have any support at all.

Supporters reported lack of monetary incentives for volunteers as a serious problem as volunteers withdraw from the programme when they realize that no remuneration would be forthcoming. Some of the supporters migrated to HIV/AIDS programme where stipend is paid to them. The condition is worsened by lack of support from community members who ridicule them. One supporter reported:

*“People have been trained but they drop out...many people were trained but knowing that we just working for nothing they left...if the dotters can be given something...especially young ones they drop out because there is nothing gained (rubbing the index finger and the thumb)”*

All these factors impact on the success of the TB DOTS programme and the DOTS supporters are aware of this but the factors seem to be beyond their control.

### **Suggestions to improve the DOT**

A range of suggestions came up from all participants including aspects on adherence, motivation of DOT supporters and TB management training. Suggestions for

improvement in the programme raised by both supporters and patients were incentives, which can be monetary or kind of reward like issuing of a certificate as a form of recognition. Also, providing uniforms for supporters in other programmes that would help in being more acceptable in the community especially in overcoming the cultural beliefs which restricts them when they see their patients. They also raised an issue of being trained on basic skills like taking blood pressure, temperature so that they are able to check hypertensive patients as they are also assisting them in the community. This will mean that they have a structure in the community where all supporters would keep the equipment and also meet before doing home visits for peer support and encouragement. Incentives for DOT supporters were stressed as a motivation to retain supporters in the programme. The issue of promotional materials as a motivational factor was another issue raised by the supporters. Another suggestion was that if a centre is provided where all TB patients go for their treatment, supporters would watch their patients swallow prescribed drugs in the centre and this would enhance compliance.

Supporters also raised the issue of training of health workers on confidentiality. Suggestions to improve adherence raised by patients were that both health worker (in the facility) and volunteer DOT supporter needed to watch the patient swallow the medicine. Patients and supporters raised an issue of detaining patients in the hospital until they complete treatment as another measure to improve adherence.

## **Discussion**

### **Supervision of treatment**

Despite differences in opinions, the majority of participants felt that observation of TB treatment was a good idea. Most patients felt comforted, hopeful and in control by DOT and understood the importance of taking all medications until end of treatment. However, who supports them was an issue. Patients often preferred family members as supporters while the health workers on the other hand, preferred trained volunteer DOT supporters. Given a choice, most patients would choose a family member to be their direct observer and preferred DOT at home to reduce stigma.

Also not mentioned here is workplace and traditional healers as areas where patients can be supported. A study conducted in Hlabisa showed a high cure rate of 89% and high level of satisfaction was expressed by patients supervised by traditional healers (Colvin et al., 2003).

The fact that health workers only prefer trained volunteers to support the TB patients may be affecting the system negatively. Flexibility is essential for the success of DOT. Patients should be allowed to identify a household member or other person in the community to supervise their treatment daily. Multiple approaches must be taken into account in the design of interventions to improve implementing DOT in order to close the gaps identified.

A study conducted in Indonesia confirmed that because patients were allowed to

choose supporters, a cure rate of 93% was attained (Becx-Bleumink & Djamaluddin, 1999). A similar study in Swaziland showed no statistical difference between the two direct observation options for treatment of patients with TB. Patients who were supervised with direct observation by family members daily and reviewed weekly by health workers demonstrated the same success in treatment as patients who were supervised daily by community health workers (Wright et al., 2004).

A Cape Town doctor, David Green has introduced a short messaging service (SMS) to remind patients to take their medication. Out of 300 patients involved in the pilot there were only five treatment failures and WHO has singled out the scheme as an example of best practice (Green, 2003).

The most critical aspect of adherence is providing support for the patient in a way that is convenient and acceptable. Studies showed successes with alternative model of TB care appropriate to poor rural settings like using store keepers, traditional healers etc. (Task Force of the National TB Training Committee, 1998).

Trying out different options as chosen by patients can improve the working of DOT in the district. A high quality of initial counseling provided to patients and family members, regular home visits by health providers can also make family DOT a success.

From the information obtained in this study, there is a high possibility of patients missing the appointment times and they were not happy about the situations where the supporter will come late sometimes, just asked the patient if he/she had taken the medicine and subsequently signed the book.

Some of the supporters reported that due to cultural belief problems, they leave the medicine with the patient which is problematic as they are not able to observe the actual taking of the medication by the patients.

### **Behavioural factors**

Behavioural factors seem to play a major role in noncompliance with TB treatment. The problem of patients not swallowing pills was reported in all focus group discussions. One contributing factor is the disability grant. Patients receiving disability grants prefer to remain uncured so as to continue receiving the grant. The AIDS consortium indicated that some people who are HIV positive would rather die of AIDS than lose their disability grant (AIDS Consortium, 2005).

It was evident that some patients, though were on the DOT programme, were not well motivated to take treatment and resorted to hiding and spitting out the medicine. An important role of the treatment supporter was identified to be listening to and encouraging TB patients and their families. One of the keys to setting up effective home based DOTS, is educating and supporting people taking treatment.

### **Stigmatization**

In areas where TB is strongly associated with HIV/AIDS, patients appear to be concerned about stigmatization. TB patients suffer from social exclusion and discrimination, and that TB is a highly stigmatized disease, particularly in communities with high HIV/AIDS. Direct observation by a family member can reduce the potential for stigma.

The fact that patients were not keen to be referred to nearby health facilities suggest that they avoided going to nearby facilities for fear of exposure. Patients often seek treatment in a different community as this affords more privacy, but it makes travel and thus completion of treatment more difficult.

TB is a stigmatizing condition that elicits fear and avoidance rather than sympathy. In this study, TB was associated with socially, morally unacceptable behaviour and witchcraft. There is also a perception that if one person is infected other members of the family too will be infected. People try to avoid the patient and the family as a whole. Members terminated or denied relationships with the infected thus patients were reported to be staying alone.

The fear of being blamed for spreading the disease to neighbours can also contribute to self-stigmatization where the patient stays away from the community members and sometimes from their families. Patients on TB drugs often hide their treatment. Once TB is perceived as a curable disease, stigma will be lessened. Effectively treated and cured patients are often best advocates for TB services and may become drivers of social mobilization to support DOT.

### **Poverty and food**

The primary cause for non-compliance with treatment is not that they have different perceptions but it is hunger. Extreme poverty was reported as a major problem that affects the programme, as patients cannot take treatment on an empty stomach. Insecure food environment are regarded as a threat to successful TB treatment. Patients sometimes abandon treatment because they must search for food. Patients are encouraged to take the drug with food to reduce minor side effects such as nausea, so without food it becomes a major problem. Patients were reported to have problems of not having food, no money for transport in case the patient is staying far from the clinic. TB is also a link in the cycle of poverty as it arises from the conditions associated with poverty and it worsens a family's poverty by striking a primary breadwinner (Stop TB, 2002).

Literature shows that providing food support to those on DOT has been tested and has succeeded in helping to keep patients in treatment in a variety of settings; for example some countries provided fortified blended food and nutritional support to the patients and their families (Shoham, 2005).

### **HIV/AIDS and TB Programme integration**

HIV / TB integration was one of key issues raised and is one of the current challenges for the health services. Not only is TB the most common opportunistic disease in AIDS patients but it also occurs earlier in the course of HIV disease than many other opportunistic infections. At the moment there is lack of co-operation between TB and HIV programmes in the district. Each programme has its own budget and the HIV trained home-based care workers serve only the programme while on the other hand the TB programme has DOT supporters. Collaboration with those who work with HIV patients should be established. TB association with HIV has also doubled its social stigma. People with obvious TB symptoms are increasingly being suspected of having AIDS and are at risk of being shunned by their communities. Information and communication with the patient is very important for improvement of compliance.

### **Motivation for Volunteer DOT supporters**

Issues around remuneration and how it relates to health services was raised frequently by DOT supporters. Successful cure of patients helps to motivate volunteer DOT supporters. They feel good when they see the high rates of cure among patients. These achievements have created considerable self-esteem and pride among the volunteers, particularly because their superiors and patients recognize and applaud their work.

However, adequate sustained support is essential to maintain the interest of the DOT supporters and to ensure the stability of the programme. Although the people were told not to expect any payment of any kind, because of the high unemployment in the district, they would expect remuneration down the line. Job seeking motivation in volunteerism has been seen in other schemes and from their comments the expectations are high.

They are expected to work in difficult conditions and are frequently called during the night to assist their patients. The findings of the study tally with the points raised in the review on utilization of community health workers (Lehman, Friedman & Sanders, 2004). It was found that problems associated with these workers are mostly exploitation both by patients and the organisation. Once the home carer is known in the community, expectation heightens and they are frequently called upon after hours to assist people (Lehman et al., 2004). This includes being given the whole responsibility about providing food, transport and escorting the patient to hospital. The task assigned to community health workers are time consuming and they expected to work under difficult conditions without pay, while the professional health workers who are paid are reluctant to carry out these responsibilities.

Incentives have been found to play an important role in developing and maintaining motivation in activities such as volunteerism. In the case of TB care, treatment takes a long time and therefore voluntary work in community based TB treatment requires long-term commitment on the part of the volunteer supporter.

Attrition rates in this type of programmes may thus be high, even if highly motivated

particularly when other programmes in the same department are offering stipends to volunteers. According to the Deputy Director General in the Department of Health, DOTS workers have migrated to HIV/AIDS because there is money to pay them; they had slipped in the way they handled home-based care workers (Thom, 2003).

The debate on whether to pay or not to pay DOT supporters continue. On one hand, there are those who believe that monetary incentives lay workers in resource limited are unsustainable and hence should not be attempted. On the other hand there is also a feeling that since TB affects mainly the disadvantaged so it would be unrealistic and perhaps exploitative to expect lay workers, who often have similar socio-economic needs like the TB patients to supervise treatment- taking for long periods of time without a monetary incentive and hope that programme can be sustainable (Kironde & Banjunirwe, 2002).

By considering the factors leading to non-compliance, the management of tuberculosis could be improved. The factors included rational and intentional decision based on beliefs about the disease, concerns over side effects, cultural and attitudinal factors. The findings of this study suggest that one-way communication and patient education will not solve compliance problems. Initial and continuous motivation is required.

In a study where factors that affect compliance were identified, the conclusion was that interaction and participative decision-making was required to motivate patients to comply (O'Boyle et al., 2002).

### **Limitations**

The study has a number of limitations including those due to limited time available and access to key informants. Selection bias is possible as purposive sample was adopted. Another limitation is the possibility of observer bias in the recording of interviews.

It is possible that the focus group setting may have inhibited some of the participants from expressing their views. There was, however considerable agreement among the four focus groups conducted and the themes highlighted were found in all the groups. Another limitation is that the findings were from a small sample in the Greater Giyani municipality where perceptions and practices may or may not differ in other areas in the district.

### **Conclusion**

The strengths and gaps requiring support for all stakeholders were identified in this study.

As HIV is a key factor in fueling the tuberculosis epidemic, it is crucial that a strong collaboration should be established between the two programmes at all levels of health promotion as a matter of urgency. In addition, strengthening the linking

between different levels of the collaboration is also very important. DOTS supporters have the potential to be a valuable asset to the Department of Health and could be mobilized by DOT programme in a hard-to-reach communities. Mechanisms of how this group might be formally incorporated into the service delivery as well as the thorny issues such as formal comprehensive training and payment need to be clarified urgently. Further exploration of alternative DOTS supporters other than trained volunteer demands further investigation.

Identifying factors that motivated the cured group was very difficult, as patients did not relate it to DOT specifically. The findings of the study support the importance of initial counseling and motivation of patients in improving adherence in the programme and, in fact, self-motivation was mentioned rather than the motivation from the DOT supporters. This area needs to be explored further as these factors are very important in the success of the DOTS programme.

Another crucial area that needs attention is the reduction in the numbers of people living in poverty, as this has an impact both on incidence and treatment of TB. This remains a major challenge in South Africa.

### **Recommendations**

Based on the findings of this study, the following are recommended:

- A strong collaboration between HIV/AIDS and TB programmes should be established as a matter of urgency for DOTS to have synergetic impact.
- There should be flexibility in supervision approaches including observation by family members to strengthen the DOT strategy.
- Health care authorities should consider incentives for Community Based DOTS Programme, whether these be monetary, non monetary or both in order to ensure sustainability.
- More qualitative research should be done to establish factors that motivate individuals to participate in DOT in different settings, only then can managers be sure of sustainability of success of community participation in DOT.

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