An evaluation of the impact of performing arts on the knowledge of Tuberculosis and Clinical Research in adolescents in selected high schools in the Boland Overberg region, Western Cape.

by

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I, **Marwou de Kock**, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
CAB	Community Advisory Board
CDC	Centers for Disease Control and Prevention
DramaAide	Drama for AIDS Education
DDT	Dichloro Diphenyl Trichloroethane
DoH	Department of Health
DoE	Department of Basic Education
ETP	Educational Theatre Program
GYM	Worcester Gymnasium
HIV	Human Immunodeficiency Virus
LTBI -	Latently Infected with TB Negative
LTBI +	Latently Infected with TB Positive
PLWHA	People Living with HIV & AIDS
PACED	Process and Collaboration for Empowerment and Discussion
Q1	Quintiles 1 School
Q2	Quintiles 2 School
Q5	Quintiles 5 School
MCC	Medicines Control Council
MDR-TB	Multidrug Resistant Tuberculosis
MRC	South African Medical Research Council
M*tb*	Mycobacterium tuberculosis
REC	Research Ethics Committee
SA	South Africa
SA GCP	South African Good Clinical Practice Guidelines
SASPI	South African Stroke Prevention Initiative

SATVI	South African Tuberculosis Vaccine Initiative
TB	Tuberculosis
TO	Theatre of the Oppressed
UCT	University of Cape Town
VSS	Vusisizwe Senior Secondary School
WC	Western Cape
WHO	World Health Organisation
WSS	Worcester Senior Secondary School
XDR-TB	Extensively Drug Resistant Tuberculosis
ZN	Zhiel-Neelsen

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Life is not about how fast you run or how high you climb but how well you bounce. ~Vivian Komori

ABSTRACT

***Background*:** There is a high incidence of Mycobacterium tuberculosis (M*tb*) infection and active Tuberculosis (TB) disease among adolescents in high TB burden countries, such as South Africa (SA), which indicates that clinical trials assessing vaccine-induced protection are critical in this age group. In educating adolescents regarding TB and clinical trials it is important to ensure that this population has received some relevant prior information if they are approached for clinical research, as well as for the benefits to their own health.

***Method*:** Applied theatre was used to educate and inform adolescents to improve their knowledge about TB and clinical research. The script used was based on a young mother's decision to enroll her baby as a participant in a TB vaccine trial and the questions asked by her family and the community. The story played itself out in public transport, a local clinic and the participants' household, using singing, dancing and rap in the local dialect. The message was visually delivered by actors from the Worcester Senior Secondary (WSS) School's drama class in an adolescent-friendly format to learners. A pre-performance multiple choice knowledge survey was completed by the study population before they watched the play and approximately seven days after the play the same knowledge survey was completed as a post-test.

***Results*:** Of the total study population 4.56% of the adolescents had had TB previously and 39.15% had been involved in TB research. A high number of the adolescents (97.70%) had heard about TB and 78.39% indicated that they heard about TB at school. The majority of adolescents knew that TB is contagious: 82.92% in pre- and 97.26% in post-test. The results for mode of prevention (covering your mouth when coughing/ sneezing) in the pre-test for all the schools were above 91.28%. In all tested schools combined there was a slight knowledge increase from pre- to post-test that TB is curable. There was a significant knowledge improvement (P=0.009) for the question; "TB can easily be cured if you take your treatment?' Reassuringly, 94.84% (pre-test) and 92.78% (post-test) indicated that they would consult a medical doctor or go to the clinic if they thought they had TB. Clinical research knowledge did not improve.

Conclusion: Using applied theatre to sensitize a rural adolescent population to TB-related clinical research was a novel approach to educate and convey

sensitive information to potential study participants. Through theatre, SATVI raised awareness and established strong partnerships with the Department of Basic Education (DoE), school principals, teachers and adolescents as well as indirectly with their parents. It created a platform to engage with the adolescents as well as sensitizing them for a future clinical trial.

CHAPTER 1 INTRODUCTION

TUBERCULOSIS

TB is an infectious bacterial airborne disease that mostly causes infection in the lungs. Mtb is transmitted through air droplets when people with active pulmonary TB cough, sneeze or spit. If these air droplets are inhaled, Mtb can establish an asymptomatic infection, with a 1 in 10 chance of developing TB disease during a lifetime in people who are Human Immunodeficiency Virus (HIV) negative. If you have an asymptomatic infection it is referred to as being latently infected with TB, also known as LTBI positive (LTBI+). When you are LTBI negative (LTBI-) you have not been infected by *Mtb*. (CDC 2013).

In adults, pulmonary TB is diagnosed on a sputum sample using Zhiel-Neelsen (ZN) stain, GeneXpert or culture (CDC 2013). It is estimated that an individual infected with HIV has a 20 times higher chance of developing TB disease than people not infected with HIV (WHO 2009). Although people living with HIV are more susceptible to developing TB disease, once infected they are less contagious than HIV-uninfected adults and adolescents (CDC 2013).

Even though TB is a curable and preventable disease there were 1.5 million TB deaths and an estimated 9.6 million new TB cases in 2014. Of these deaths 1.1 million were in HIV- negative people, which makes TB currently the leading cause of infectious disease deaths in the world (WHO Global Report 2015). The Department of Health (DoH) in the Western Cape Province (WC) of SA stated that the incidence rate of TB for all ages in the Worcester area is among the highest in the world at 1400 per 100 000 people (DoH, Boland Overberg Annual Health Status Report 2009). This is three times higher than the average TB rate for SA (450 per 100 000), five times higher than the average TB incidence rate on the African continent (280 per 100 000), and more than 10 times higher than the global average (133 per 100 000) (WHO Global Report 2015).

Data for the City of Cape Town (Figure 1) has shown that the incidence of TB is high during early childhood, decreases during later childhood and then increases again in adolescence and early adulthood (City Health Directorate of the City of Cape Town 2011). A two-year prospective epidemiological study conducted by the South African Tuberculosis Vaccine Initiative (SATVI), involving 6363 adolescents in 11 high schools in Worcester, showed that the

incidence rate of smear positive TB in school-going adolescents was 3 per 1000 (Mahomed et al. 2013).

Mahomed et al. (2011) pointed out that the high incidence rate of Mtb infection and active TB disease among adolescents in high TB-burden countries indicates that clinical trials assessing vaccine-induced protection are critical in this age group. According to the work done by Mahomed et al. in high schools in the Worcester area, approximately 50% of adolescents are latently infected with TB (Mahomed et al. 2011). Information pertaining to the incidence of TB in adolescents globally and internationally could not be obtained in the literature.

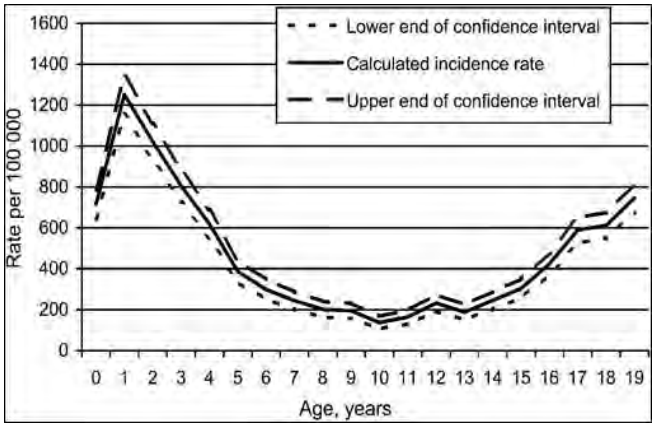

Figure 1. All tuberculosis incidence rate by age (years) in Cape Town, July 2002–June 2003 (n = 5039). Source: City Health Directorate of the City of Cape Town (notified TB cases) and Census 2001 (population estimates)

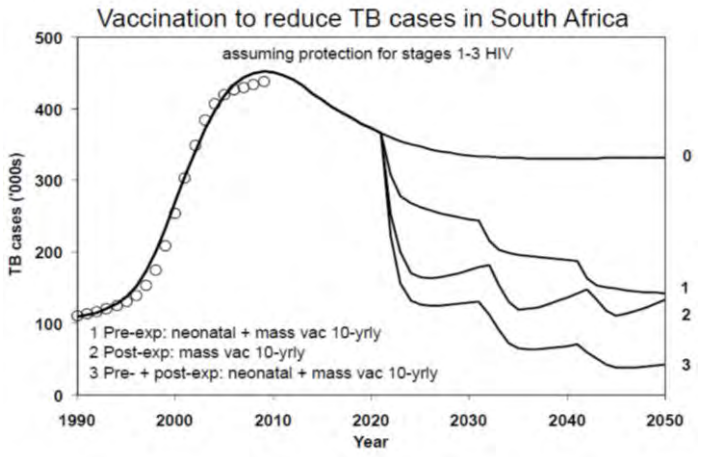

Figure 2: Impact of effective TB vaccine on TB cases in South Africa. Source: WHO

Modeling data by Christopher Dye on the impact of an effective TB vaccine for South Africa Figure 2 (Dye 2011), show results from modeling done at London School of Hygiene and Tropical Medicine and WHO. These suggest that a vaccine targeted on adolescents or on an adult population could have a greater impact on the global TB epidemic than a vaccine targeted on an infant population. (Knight et al. 2014). It is evident from the data cited above, and from the literature, that to stop TB transmission and reduce the impact of the TB globally, a new efficacious vaccine should be developed to work together with effective drugs to reduce the incidence of TB. For this reason, a vaccine that targets adolescents and young adults would have a greater impact on TB. (Dye 2000; Dye & Williams 2008; Abu-Raddad et al. 2009).

CLINICAL RESEARCH

Clinical research is a highly regulated component of healthcare science, establishing the safety and effectiveness of an intervention. The intervention can take the form of medication, devices, diagnostic products, treatment regimens and information sessions intended for human use. Clinical research is very different from medical practice. In clinical practice established treatments are used, while in clinical research evidence is collected to establish a treatment or intervention method that best suits the process (SA GCP 2006).

It is very important to ensure that study participants are aware of their rights and that the researchers have all the needed documentation from their local Research Ethics Committee (REC), Medicine Control Council (MCC), DoH or DoE. The documentation needed is dependent on the type of intervention and the population in which the research is conducted. These bodies make sure that the researchers are trained, educated and experienced to do the research that they intend to perform according to the set standards and guidelines. Each participant will sign a consent document explaining to them what the study involves and what their rights are. This must be in the participant's home language and signed and dated by the participant and the person that conducted the informed consent. A participant has the right to withdraw from clinical research at any point in the study (SA GCP Guidelines 2006).

Care must be taken when doing research in an adolescent population, as adolescents are considered a vulnerable group due to the various challenges to which they are exposed, as well as the social changes that influence their

lives (Galambos & Leadbeater 2000). Little is known about how adolescents experience participation in clinical trials (Read et al. 2009). However, adolescents have been included in vaccine trials done at SATVI, and an overall positive experience was reported. The adolescents indicated they were motivated to take part and continue with the study because they were able to help others, have free blood screening and receive healthcare (Abrams et al. 2011).

APPLIED THEATRE

In SA, applied theatre is an important platform to educate young people about health and environmental issues (Dalrymple 2006). At the Universities of Zululand and KwaZulu-Natal in SA, an organisation called DramAide (Drama for AIDS Education) has been using drama for social change and HIV Education since 1992. They use participatory methodologies that are based on Paulo Freire's principles (Dalrymple 2006), as well as participatory drama and methods of theatre education. Paulo Freire came to the realization that an educator's most important challenge is to understand, appreciate and respect the knowledge of people's lived experiences (Singhal 2004). Freire's idea of the dialogical emphasizes the role of "teacher as learner" and "learner as teacher", each learning from the other (Freire & Faundez 1989). Freire's writings inspired a fellow countryman, Augusto Boal, a Brazilian theatre director, who developed "Theatre of the Oppressed" (TO) during the 1960s and 1970s. It became an international movement to use theatre as a way of participatory social change (Singhal 2004) and as research. TO was based on Freire's principles of dialogue, interaction, problem-posing, reflection and conscientisation. Boal used these principles to stimulate the theatre audience to take control of the situation and be "spect-actors" (spectator becoming an actor) and not just spectators. The main purpose of Boal's theatre was to make the unequal equal, and the unjust, just (Singhal 2004).

Applied theatre, an umbrella term for various applications to socio-economic problems, is created for specific groups such as the elderly, school-going children or physically disabled. Some argue that it was originally developed in the 1950's by the United Kingdom-based Theatre in Education, which provided a free service to schools in England (Stuttaford et al. 2006). According to Stuttaford, applied theatre has various advantages for the dissemination of research findings. It embodies the experience of the research participants and presents research to the audience in an engaging

way to cultivate social understanding. Structured in a way to facilitate audience interaction, the performance allows for a greater understanding of the research participants' findings and allows insights into the lives of people marginalized due to health challenges (Stuttaford et al. 2006).

PURPOSE OF THE RESEARCH

The purpose of the research done for this masters project was to evaluate whether applied theatre can be used to inform adolescents about TB, clinical research and their rights and responsibilities as research participants, as well as sensitizing potential participants about a planned vaccine trial in adolescents in high schools in the Boland Overberg region, WC.

Various platforms were used to gather the articles that were used in the literature review; PubMed and EBSCOhost on the University of Cape Town database. Terms and phrases used in this search included but were not limited to: applied theatre, drama, educational theatre and diseases like HIV/AIDS (Acquired Immune Deficiency Syndrome), malaria and tuberculosis.

Gray *et al*. discussed the use of research-based theatre in understanding metastatic breast cancer from the patient's viewpoint. The project was conducted in Ontario, Canada and initially consisted only of data published in peer review articles related to knowledge gained from focus groups about the needs of people with metastatic breast cancer. From the focus groups of women with metastatic cancer, the researcher gained valuable insights into the life issues they were facing, which resulted in a resource guide for the patients. A drama production called *Handle with Care* was designed that incorporated the knowledge gained from both the research articles and focus group sources. Knowledge surveys were completed by 507 of the audience members who attended the drama production and the researchers concluded that the dramatization of research results and knowledge gained were very valuable in bringing insight into the lives of patients diagnosed with metastatic cancer (Gray *et al*. 2000).

Stuttaford et al. published a paper in 2006 on the use of applied theatre as a pilot project to disseminate and validate research information from the South African Stroke Prevention Initiative (SASPI). The project investigated the prevalence and social impact of cerebrovascular accidents (or "stroke") in six villages in the rural Bohlabelo District of north-east SA between March and October 2002. In this research, applied theatre assisted the researchers not only to validate the data from the study but also to educate the community about the impact of a stroke on the family and the greater community by using non-professional actors from the community in the dramatisation, together with the local audience as the extended family. The authors pointed out that further research is required to evaluate the impact applied theatre had in this setting (Stuttaford et al. 2006).

Ghosh et al. conducted a study in rural India using folk theatre (Kalajatha) to health education for bio- environmental control of malaria. Kalajatha is a

popular traditional form of folk theatre depicting the life process of the socio-cultural settings in India, which can be used as a medium of mass communication. This study was conducted to assess the feasibility and efficacy of using Kalajatha in a health education program and establishing inter-sectorial co-ordination and involvement of all potential partners in health education. The cast consisted of 30 local actors (15 male and 15 female) from different occupational backgrounds. The script was written by a local script writer based on various aspects of malaria signs and symptoms, treatment, health facilities, process of transmission, role of anopheles mosquitos, names of the malaria vectors, breeding grounds of malaria, control strategies and environmental management. There were two groups of 15 actors who performed in the evenings for the month of December 2001. Each group visited one village per evening and performed for two hours. Two months after the intervention the impact was assessed in five villages that had been exposed to the intervention and five that had not. In each village households were selected randomly to answer the question through a semi-structured interview process based on eight questions. All individuals present in the houses at the time were interviewed, except children under the age of eight. The exposed community significantly gained knowledge about malaria symptoms, transmission and control methods. They could associate anopheline breeding and recall the names of the larvivorous fish in the control of malaria vectors, but immediate behavioural changes, especially in general hygiene, were not observed. The year following this intervention, the community participated in a World Health Organisation (WHO) project releasing larvivorous fish for malaria control. This is a more effective method for malaria control in this silk-producing area than Dichloro Diphenyl Trichloroethane (DDT) spraying methods. The authors of the article concluded that the use of the medium of Kalajatha folk-theatre conveyed important messages on malaria control and prevention and that this method of health education should be intensified to reach all sectors to control malaria (Ghosh *et al*. 2006).

Joronen *et al*. conducted a systematic review in 2008 to determine the effect of school-based drama interventions for children and adolescents on health promotion. The nine studies that were included in this review were randomized controlled studies and non-randomized controlled trials. Five of the studies were on health behaviour, two on mental health and two on social health. The interventions in these studies included classroom drama in two of the studies

and actor- performed drama or theatre play in five of the studies. The review found that the drama intervention had a short- term knowledge increase, a positive attitude change in relation to healthy behaviour and a modest effect on smoking intentions. The authors of this systematic review indicated that there is a need for well-designed theory-based drama intervention studies for health promotion in children and families (Joronen *et al*. 2008).

Livingston *et al*. discuss theatre used to educate African-American women about breast cancer. A play called *Stealing the Clouds* told the story of a single mother diagnosed with breast cancer, her experience with chemotherapy, and her approach to dealing with her family. The play concentrated on the importance of having regular mammograms, and on early detection and healthy lifestyle choices. The play was seen by 800 African Americans and the impact of the play was evaluated by a pre-and post-test survey completed by 452 participants. The researchers found that the 75-minute play had a substantial impact on the knowledge of breast cancer awareness and screening. It was advised that future studies should be done including control groups for comparison purposes (Livingston *et al*. 2009).

Ünalan *et al*. explained how using theatre in the education process of medical students has facilitated student learning and empathy towards patients. The article discusses the experience of using applied theatre as an educational tool to describe and explain various clinical appearances of headaches at the Marmara University Medical Faculty in Istanbul, Turkey, between 2001 and 2008. This learning method gave the students practical experience rather than merely becoming passive receivers of information. The students felt that the role-play made it easier to understand the topic and the final exam results showed that 84% of the students who attended the theatrical lecture answered the essay type question regarding headache correctly, versus the 72% incorrect answers of students who did not attend the theatrical lecture (Ünalan *et al*. 2009).

Stuckey and Noble did a systematic review in 2010 on art, healing and public health. This review looked at the relationship between creative arts and health outcomes using music engagement, visual art therapy, movement-based creative expression and expressive writing. The reviewers wanted to determine how using creative expression in a formal and informal way could promote wellness and healing. Nineteen articles were included in this review;

three were on music engagement, seven on visual art therapy, four on movement-based creative expression and five on expressive writing. The articles reviewed showed that artistic engagement has a positive effect on health; it can decrease anxiety, stress and mood disturbances. The authors indicated that creative engagement contributes to many aspects of physiological and psychological conditions associated with healing, and that creative engagement did not contradict the medical view of holistic health (Stuckey & Nobel 2010).

Ayi *et al*. conducted a study using school children in Grades 3-5 by giving health education to improve malaria control. The study was conducted in the Dange-East district in Ghana between 2007 and 2008. Three schools and their communities were chosen for the study: one school was part of the intervention group and two schools acted as the control group. The teachers in the intervention school received four days' training on malaria biology, signs and symptoms, treatment and prevention. They in turn taught the children using their newly- gained information. With the teachers' guidance, the children developed a dramatization of the transmission and prevention methods of malaria. The children went out to the community and cleared possible mosquito breeding sites. They were encouraged to draw pictures according to their understanding of malaria prevention and control and to use these to educate peers and community members. The teachers composed a song in the local dialect on malaria called the 'pumi' (malaria) song to educate the children and community on malaria transmission and prevention. This song was aimed at correcting misperceptions that eating green mangoes or standing in the sun gives malaria. The teachers also developed slogans such as "Mosquito: malaria provider" which the children chanted in the community. After the interventions the misconception that malaria had multiple causes was significantly altered amongst children and adults in the community. The adults who treated bed nets with pesticides had notable success and parasite prevalence in school children decreased. This improvement was only seen in the intervention group. The authors indicated that engaging school children as health messengers had a substantial impact on improving knowledge of the cause and prevention of malaria in school children and community members and they indicated there was a decrease of malaria prevalence observed in the school children involved. (Ayi *et al*. 2010)

Cheadle *et al*. compared the knowledge gained and knowledge retained regarding healthy eating and active living behaviours of school children participating in Educational Theatre. Music, comedy and drama were used to engage the children on various topics; healthy eating, physical activity, conflict resolution, peer pressure, smoking, HIV/AIDS and dealing with grief and loss. The live theatre performance allowed the children to imagine themselves in the production, which created an emotional connection with the experiences the actors portrayed on the stage. Two thousand nine hundred and fifteen (2,915) third and fourth grade children form 47 schools were included in the study. The messages from the performance focused on the importance of playing hard for 60 minutes every day, eating a variety of food, drinking water when thirsty and cutting back on screen time with computers, video games and television. The children's knowledge was tested on the four healthy behaviours before the production, directly afterwards and after a three- week delay. Their knowledge went up from 17% for the pre-test to 63% for the post-test directly after the production and 54% three weeks after the production. The authors of this article suggested that more Educational Theatre Programs should be used to educate school children (Cheadle *et al*. 2012).

Jaganath *et al*. conducted a study at the University of Malawi for HIV and AIDS education using participatory performance. During 2008 the Chancellor College-UCLA HIV and AIDS performance project took place. The play was constructed using 14 students and six people living with HIV & AIDS (PLWHA) members. The story line was developed according to the Process and Collaboration for Empowerment and Discussion (PACED) method. This is an arts- based approach to HIV and AIDS messaging that places artists and people living with HIV and AIDS in a process focused on community participation, trust building and structural and cultural barriers to HIV prevention. Through the PACED method a performance was created: *This is My Story,* that that was performed at the University of Malawi. The performance was about a young girl's challenge in college with her unfaithful boyfriend, and her lecturer who wants to offer better marks for sexual favours, and she is diagnosed with HIV. In the final scene each of the PLWHA cast tells his or her story about HIV. An anonymous evaluation was done one year after the performance among the students, PLWHA participants and audience to determine knowledge retention of; (i) trust in a relationship and how it affects women, (ii) equality for PLWHA and (iii) life after HIV and AIDS. All of the PLWHA and 90.9% of student participants reported a greater sense of

empowerment. The audience members (82.1%) discussed the performance with friends and family (Jaganath *et al*. 2014).

Theatre has been used in various fields to educate, inform and change behaviours with very positive effects. Evidence could not be found in the literature that applied theatre has been used as a method of intervention with a pre- and post-test knowledge survey to evaluate if the intervention had an impact on the TB and clinical research knowledge of the research population.

CHAPTER 3 METHODOLOGY

3.1 STUDY AIM

This study aimed to determine if applied theatre could be used as a medium to inform adolescents about TB, clinical research, the rights and responsibilities of a research participant, as well as sensitizing a potential research population about a planned clinical vaccine study.

3.2 STUDY OBJECTIVE

The objective of this study was to determine whether the medium of applied theatre could improve knowledge about TB and clinical research in a population of SA adolescents living in a high TB- burden, semi-rural setting.

3.3 STUDY DESIGN

A quantitative pre- and post-test study design with a multiple choice knowledge survey was used to evaluate the effectiveness of applied theatre as a method to educate adolescents about TB, clinical research and the rights and responsibilities of research participants. This study design was chosen because it could demonstrate the effect of a specific intervention on the research population in their normal setting.

In 2010 a comic strip *Carina's Choice* was developed by the SATVI Community Advisory Board (CAB) through a STOP TB Partnership grant. The comic strip depicted a young mother's decision to enroll her baby as a participant in a TB vaccine trial and the questions asked by her family and the community (SATVI 2010).

In 2013 the comic strip was made into a drama production by drama students from the WSS's drama class and students from the Drama Department of The University of Cape Town (UCT) and drama students. Skits was written by the students using the content of the Comic strips ensured that it was on the level of the audience, taking the local culture and dialect into account.

Each artist was also responsible for some of their own lines and they had to discuss the production and content with their family and friends to determine if the messaging is relevant and understandable. Each student was also encouraged to learn more about TB for a better understanding of the disease

and their responsibility in the fight against TB. The play, *Carina's Choice*, was performed by actors from the WSS drama class. The story played itself out in an adolescent- friendly manner in public transport, the local clinic and in the participant's household, using singing, dancing and rap in the local dialect, consisting of Afrikaans, with some English words and phrases (SATVI 2014).

3.4 RECRUITMENT

Recruitment of the adolescent to take part in the pre- and post-test knowledge survey was done through notifying the parents and guardians about the drama production in advance by means of a letter explaining the production and the knowledge survey. The information letter that functioned as the consent document was translated into the home language of the adolescents, namely English, Afrikaans or Xhosa.

3.5 CONSENT & ASSENT

Individual consent and assent were not obtained in this study, but parents and guardians were able to refuse participation of their children in the knowledge survey through a reply slip to the school. There were no specific inclusion and exclusion criteria for this study; the adolescents' parents could simply "opt out" of the study by completing the reply slip. The adolescent was under no obligation to complete the pre- or post-test knowledge survey and recruitment was done in a class and school set-up. If the adolescent attended school on the day of the drama production and wanted to take part in the research, he or she completed the pre- test before the drama production.

3.6 MEASURING TOOLS

The measuring tool used in this study to evaluate the intervention was a knowledge survey based on a validated survey consisting of questions used in three different studies namely, Marinac (Marinac et al. 1998) involving adults between 21 and 40 years of age in Kansas City Metropole, Cramm (Cramm et al. 2010) based on 1020 households with a median age of 38 years in Grahamstown in South Africa, and Wang (Wang et al. 2008) including people aged between 12 and 65 years in the Yangzhong Country in China (Marinac et al. 1998; Cramm et al. 2010; Stuttaford et al. 2006).

The pre and post-test knowledge survey that was used in the study that the master's project was based on was compiled by Amber Abrams using the abovementioned knowledge surveys as a baseline. The knowledge survey was translated into the home language of the adolescents namely English, Afrikaans or Xhosa. It was a paper based test completed before attending the play as a pre-test to test adolescents' basic knowledge of TB and clinical research. Answering the knowledge survey was completely voluntary and an adolescent could opt not to take part even though the parents/guardian had consented. Approximately one week after the production, participants completed the same knowledge survey as a post-test.

The 24-question knowledge survey was completed anonymously. The only demographic information collected was age and gender. Questions 1-4 were used to determine whether the adolescents had heard about TB previously and had been involved in TB research. Questions 5-9, 18, 19 were forced choice questions investigating the adolescents' knowledge of TB. Question 10-17 were true and false questions regarding TB. Questions 21 & 22 covered clinical research knowledge. Questions 20, 23 and 24 were descriptive with no right or wrong answers and was not used in this analysis due the limited knowledge of qualitative research and the results of these questions will form part of the original study.

3.7 STUDY POPULATION

The project was presented in eight high schools in the towns of Worcester, Rawsonville and Robertson in the Cape Winelands East region, WC, SA, reaching more than 8000 adolescents. This is a semi-rural area with a population of 350 000 and eleven high schools The unemployment rate varies between 9.4% and 18%, with an average literacy rate of 66.6% in 2007 (Regional Development Profile Cape Winelands District, 2012). Afrikaans is the home language of approximately 87% of all high school learners in the area.

Three of the eight high schools were chosen for this analysis: Vusisizwe Senior Secondary (VSS), WSS and Worcester Gymnasium (GYM). The three schools' data will be pooled with the other five schools which formed part of the original project; "Drama Set the Stage".

All South African public schools are categorised into five groups, called quintiles, largely for purposes of the allocation of financial resources.

Quintile 1 is the 'poorest' quintile and quintile 5 is the 'least poor'. The three schools were selected for this project based on their demographic profile and school rating within the DoE as well as the language medium of classes. These rankings are determined nationally according to the poverty of the community around the school, as well as on certain infrastructural factors. Schools in quintile 1, 2 and 3 have been declared no-fee schools, while schools in quintiles 4 and 5 are fee-paying schools. (DoE 2013).

The VSS catchment area is a settlement with formal and informal housing, outside the town of Worcester and, home to mainly Xhosa-speaking people. VSS is a Xhosa home language no-fee school with a school rating of Quintile 1 (Q1). The WSS catchment area is primarily a coloured, Afrikaans-speaking community and is also a no-fee school with a school rating of Quintile 2 (Q2). The GYM's catchment area is the middle income population of Worcester, and the only dual medium and most racially diverse high school in Worcester. It is a fee-paying school with a Quintile 5 (Q5) rating.

For this master's project the analyses focused on knowledge surveys administered in three of the schools that took part in the study. The three schools included participants from all three major ethnic groups (Black, White and Coloured) but no statistical information is available on the ethnic breakdown of the adolescents because the knowledge survey did not ask the adolescents to identify their ethnicity.

3.8 SAMPLE SIZE

There were 4150 adolescents registered at the three schools at the time of the intervention. A total of 1465 pre-test and 1742 post-test knowledge surveys were completed.

Schools, Quintiles rating Teaching and language	Number of adolescents registered in school	Number of Pre-test completed in school	Number of Post-test completed in school
VSS Q1 Xhosa	1593	336 (21.09%)	658 (41.30%)
WSS Q2 Afrikaans	1562	661 (42.32%)	794 (50.83%)
GYM Q5 Afrikaans & English	995	468 (47.04%)	290 (29.15%)

Table 1: Number of leaners and pre-and post-test completed

Table 1 gives a breakdown of the number of adolescents per school and the number of pre- and post-test completed per school.

3.9 VARIABLES

The independent variables in this study were the age, gender and quintile rating. The dependent variables studied are knowledge of TB and knowledge of Clinical Research.

3.10 VALIDITY

The knowledge survey was drawn from two surveys that were validated but it was not tested in the study population due to time limitations. The play was conducted in Afrikaans in an area where 80% of the population speak the language. To conduct this research in another population the script of the play would need to be changed and the local dialect brought in.

3.11 RELIABILITY

The reliability of the knowledge survey was piloted on a small adolescent population and ambiguous questions were changed. The knowledge survey would be reproducible in another setting if the language was change. The intervention would need a script change to be able to use it in any other setting than a majority of Afrikaans speaking adolescents.

3.12 DATA ANALYSIS

The pre-test knowledge level, as well as the post-test knowledge level, was calculated as proportions. The 95% Confidence Interval was calculated to determine the difference between the two population proportions to indicate if there is a statistically significant knowledge difference between the two proportions. Analysis was done using STATA 11. If an individual did not answer all of the questions on the knowledge survey or did not follow the directive of the question, for example “choose one” and they chose more than one, the knowledge survey was omitted from the final analysis. This can be seen as a very stringent criteria but the adolescents had ample time to complete the tests and the research did not want the fact that incomplete questionnaires could skew the results.

The sample size for both pre- and post-test knowledge surveys available after data cleaning was 1290 (562 pre-and 728 post-test).

CHAPTER 4 RESULTS

Modelling done by Harling et al. indicated that individual- and household-level risk factors and high levels of community income inequality were independently associated with increased prevalence of tuberculosis (Harling et al. 2008). Hence using the schools quintile ratings to represent knowledge increase from pre- to post-test had relevance. The tables' show most of the questions asked pertaining to the knowledge of TB and clinical research as well as age, gender and the number of pre-and post-test completed per school also how many of these could be used after data cleaning was completed. When interpreting the tables a colour differentiation was done to make the reading and interpretation of the tables easier. If there was a knowledge increase from pre- to post-test the result of the post-test is written in green font. When there was a knowledge decrease from pre- to post-test the post-test result is written in blue font. When there was a significant knowledge increase from pre- to post-test the P-value is highlighted in green and for a significant knowledge reduction the P-value is highlighted in blue.

Breakdown of the age distribution between the different schools is shown in table 2. The highest represented age group ranged between 14 and 16 years. The lowest represented age was for the 18-year-old adolescents.

Age of adolescents' in study	Q1	Q2	Q5
12 Years Old	0%	0%	0.25%
13 Years Old	14.83%	5.77%	4.7%
14 Years Old	33.01%	17.52%	20.54%
15 Years Old	19.86%	22.01%	27.48%
16 Years Old	12.68%	24.15%	23.76%
17 Years Old	11.72%	19.02%	15.84%
18 Years Old	7.89%	11.54%	7.43%

Table 2: Age distribution of adolescents that took part in study

Table 3 gives the gender distribution of the adolescents that took part in the study identified by school as well as the total number of male and females registered at the school at the time of the intervention. The average gender distribution for the males and females across the three schools is also shown in the table.

Quintiles rating	Pre-test Knowledge Survey		Post-test Knowledge Survey		Gender Distribution per School	
	Male	Female	Male	Female	Male	Female
Q1	38 (40%)	57 (60%)	121 (37.46%)	202 (62.54%)	762 (47.83%)	831 (52.17%)
Q2	65 (34.76%)	122 (65.24%)	176 (62.63%)	105 (37.37%)	663 (42.44%)	899 (57.56%)
Q5	108 (38.57%)	172 (61.43%)	45 (36.29%)	79 (63.71%)	392 (49.40%)	603 (60.60%)
Average % per gender	38%	62%	45.46%	54.54%	46.56%	56.78%

Table 3: Gender distribution: Pre- and post-test used in relation to schools' gender distribution

Table 4 gives the breakdown of the adolescents registered at the schools at the time of the intervention as well as the number of questionnaires completed at the two testing times. Q1 school had 1593 pupils registered of whom 336 (21.05%) completed the pre-test and 658 (41.31%) the post-test. Of these only 95 (28.27%) pre- and 323 (49.09%) post-test could be used after data cleaning. Q2 school had 1562 pupils registered at the time of the intervention, 661 (41.32%) adolescents completed the pre-test and 794 (49.63%) the post-test, of which 187 (28.29%) pre- and 281 (50.83%) post-test could be used after data cleaning. In the Q5 school 468 (47.04%) adolescents completed the pre-test and 290 (29.14%) the post-test knowledge surveys of which 280 (59.83%) and 124 (42.76%) could be used respectively. Of the total 1465 pre-tests and of 1742 post-tests that were completed only 1290 knowledge surveys in total could be used after data cleaning: 562 (43.57%) pre-test and 728 (56.43%) post-test.

Schools, Teaching language and Quintiles rating	Adolescents' registered in school at time of intervention	Pre-test Knowledge Survey		Post-test Knowledge Survey	
		Completed	Usable	Completed	Usable
VSS Q1 Xhosa	1593	336 (21.05%)	95 (28.27%)	658 (41.31%)	323 (49.09%)
WSS Q2 Afrikaans	1562	661 (42.32%)	187 (28.29%)	794 (50.83%)	281 (35.39%)
GYM Q5 Afrikaans & English	995	468 (47.04%)	280 (59.83%)	290 (29.14%)	124 (42.76%)

Table 4: Number of completed and usable pre-and post-test knowledge surveys

Table 5 gives a breakdown of the knowledge level that a bacterium causes TB. The Q5 school scored highest in their pre- and post-test response at 83.57% & 77.42%. Even though their knowledge reduced slightly it was not a significant knowledge reduction (P=0.140). Only the Q2 school had a slight but not significant (P=0.686) knowledge increase. Of the total study population, 4.56% of the adolescents had had TB previously and 39.15% had been involved in TB research. A high number of the adolescents 97.70% (average between two testing times) had heard about TB and 78.39% (average between two testing times) indicated that they heard about TB at school.

Knowledge of the cause of TB		Q1			Q2			Q5			Schools Combined		
		Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value
Heard about TB	Yes	95.79%	97.83%	0.274	97.86%	97.15%	0.635	98.57%	97.58%	0.481	97.86%	97.53%	0.690
	School	55.79%	61.61%	0.308	84.49%	84.70%	0.952	87.14%	92.74%	0.099	80.96%	75.82%	0.027
Cause of TB	Bacteria	25.26%	25.08%	0.971	41.18%	43.06%	0.686	83.57%	77.42%	0.140	59.61%	40.93%	0.000
	Cold/Flue	24.21%	17.65%	0.153	1.60%	2.85%	0.385	2.50%	3.23%	0.679	5.87%	9.48%	0.017
	Food Shortage	1.05%	2.48%	0.401	0.53%	0.36%	0.771	0%	0%	0.000	0.36%	1.24%	0.088
	Smoking	22.11%	53.25%	0.000	50.80%	49.47%	0.777	11.43%	12.10%	0.777	26.33%	44.78%	0.847
	Climate	0%	0%	0.000	1.07%	0.71%	0.680	0.71%	4.03%	0.018	0.71%	0.96%	0.629
	Sunlight	0%	0%	0.000	0%	0.36%	0.414	0%	0.81%	0.414	0%	0.27%	0.214
	Weakness	26.32%	1.24%	0.000	4.28%	2.85%	0.404	1.43%	2.42%	0.481	6.58%	2.06%	0.000
	Hard work	1.05%	0.31%	0.356	0.53%	0.36%	0.771	0.36%	0%	0.505	0.53%	0.27%	0.458

Knowledge increase: pre- to post-test | Knowledge decrease: pre- to post-test | Significant knowledge increase | Significant knowledge decrease

Table 5: Knowledge of the cause of TB

Table 6 gives a breakdown of the knowledge level of the signs and symptoms of TB. The Q5 school had a knowledge increase for six of the questions, of

which there was a significant knowledge increase from pre- to post-test for night sweats (P=0.031) and weakness (P=0.014). The Q2 school had a knowledge increase for four of the questions but none was significant. The Q1 school had a knowledge reduction in seven of the questions of which pain in chest was significant (P=0.023). For the overall results of the schools combined there was a significant knowledge reduction in four of the questions; haemoptysis (P=0.049), increased coughing (P=0.032), weight loss (P=0.013) and weakness (P=0.001).

Signs and Symptoms of TB	Q1			Q2			Q5			Schools Combined		
	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value
Haemoptysis	71.58%	73.07%	0.775	70.59%	73.31%	0.52	87.14%	79.84%	0.059	79%	74.31%	0.049
Increased coughing	51.58%	51.08%	0.932	65.78%	69.40%	0.411	72.86%	68.50%	0.376	66.90%	61.13%	0.032
Night sweat	57.89%	53.25%	0.424	72.19%	64.77%	0.092	65%	75.81%	0.031	66.19%	61.54%	0.085
Weight loss	42.11%	39.63%	0.665	54.01%	55.16%	0.807	63.93%	65.32%	0.787	56.94%	50%	0.013
Tired	29.47%	27.86%	0.759	71.66%	61.57%	0.024	41.43%	50%	0.109	49.47%	44.64%	0.085
Pain in chest	50.53%	37.46%	0.023	43.85%	44.48%	0.892	43.57%	44.35%	0.884	44.84%	41.35%	0.209
Loss of Appetite	32.63%	33.44%	0.884	43.32%	38.79%	0.329	41.79%	43.55%	0.741	40.75%	37.23%	0.198
Weakness	10.53%	7.74%	0.389	49.73%	45.55%	0.375	43.21%	56.54%	0.014	39.86%	30.63%	0.001
Knowledge increase: pre- to post-test			Knowledge decrease: pre- to post-test			Significant knowledge increase			Significant knowledge decrease			

Table 6: Knowledge of Signs and Symptoms of Tuberculosis

According to Table 7 one can see that most adolescents knew that TB is contagious and spread by air when coughing.

Mode of transmission of TB	Q1			Q2			Q5			Schools Combined		
	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value
Air when coughing	80%	78.02%	0.680	83.42%	80.43%	0.412	83.57%	79.84%	0.363	82.92%	79.26%	0.098
Through blood	5.26%	16.10%	0.007	14.44%	14.42%	0.951	15.36%	16.94%	0.686	13.35%	15.52%	0.272
Shaking hands	2.11%	2.48%	0.835	1.60%	2.49%	0.516	1.43%	3.23%	0.232	1.60%	2.61%	0.218
Sharing food	2.11%	3.10%	0.611	2.14%	4.27%	0.214	2.50%	6.45%	0.053	2.31%	4.12%	0.073
Sexually transmitted	1.05%	4.33%	0.131	8.02%	11.03%	0.284	10.36%	10.48%	0.969	8.01%	7.97%	0.979
Born with it	2.11%	2.17%	0.971	2.67%	3.56%	0.594	5%	2.32%	0.425	3.74%	2.88%	0.393
Don't know	7.37%	9.29%	0.563	2.67%	2.49%	0.903	1.07%	2.42%	0.302	2.67%	5.49%	0.013
Knowledge increase: pre- to post-test			Knowledge decrease: pre- to post-test			Significant knowledge increase			Significant knowledge decrease			

Table 7: Knowledge of mode of transmission of TB

In Table 8 the results for mode of prevention (covering your mouth when coughing/sneezing) is shown. It is very reassuring to see that the adolescents'

knowledge in the pre-test ranged between 91.07% and 91.58% between the schools.

Mode of prevention of TB	Q1			Q2			Q5			Schools Combined		
	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value
By covering mouth when cough/sneeze	91.58%	89.47%	0.549	91.44%	90.39%	0.699	91.07%	87.10%	0.222	91.28%	89.42%	0.265
Knowledge increase: pre- to post-test		Knowledge decrease: pre- to post-test			Significant knowledge increase			Significant knowledge decrease				

Table 8: Knowledge of mode of prevention of TB

Figure 3 gives a breakdown for the question whether TB can be cured. There was a significant knowledge increase (P=0.022) for the Q1 school from pre- to post-test and a non-significant (1.09%) decrease in knowledge for Q5.

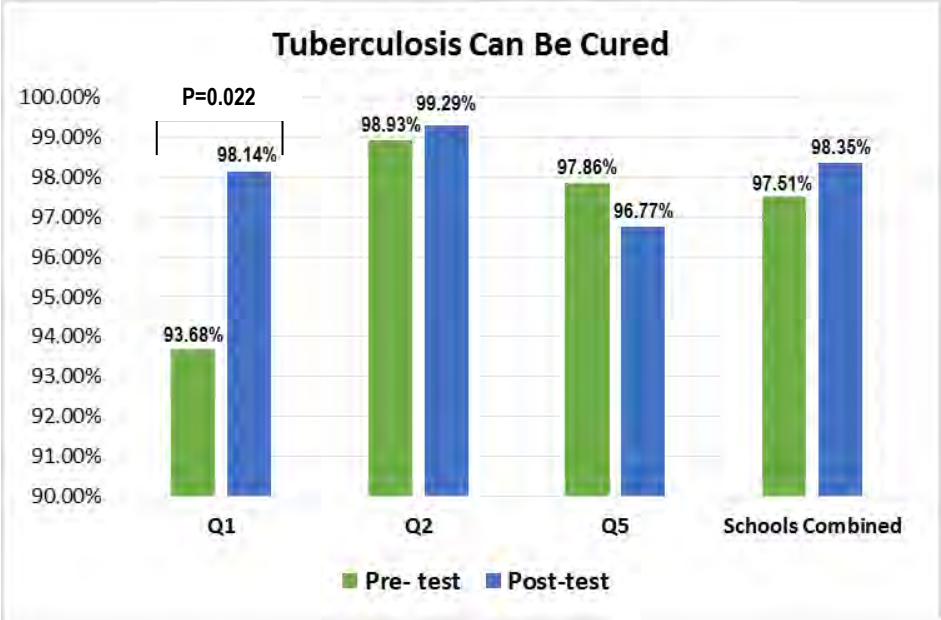

Figure 3: Knowledge that TB can be cured

Table 9 shows the knowledge breakdown for the question regarding the type of treatment to cure TB. The pre-test knowledge ranged between 94.74% and from the doctor to treat TB. For the Q2 School the knowledge reduction was significant (P=0.018) that traditional medicines are used to cure TB.

Knowledge of the cure of TB	Q1			Q2			Q5			Schools Combined		
	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value
Medicine from the Doctor	94.74%	94.12%	0.820	94.65%	92.53%	0.365	95%	90.32%	0.077	94.84%	92.86%	0.146
Traditional Medicine	2.11%	1.24%	0.532	4.28%	10.32%	0.018	6.43%	5.65%	0.763	4.98%	5.49%	0.683
Food	3.16%	1.55%	0.314	2.14%	2.49%	0.805	0.71%	2.42%	0.153	1.60%	2.06%	0.545
Rest	2.11%	0.62%	0.191	2.14%	2.49%	0.805	1.79%	2.42%	0.673	1.96%	1.65%	0.678
Muthi	2.11%	0.93%	0.354	0.53%	0%	0.220	0.71%	1.61%	0400	0.89%	0.69%	0.680
Don't know	2.11%	2.48%	0.835	0.53%	0.36%	0.771	1.43%	1.61%	0.888	1.25%	1.51%	0.687

Knowledge increase: pre- to post-test | Knowledge decrease: pre- to post-test | Significant knowledge increase | Significant knowledge decrease

Table 9: Knowledge of the cure of TB

Table 10 gives a breakdown for general TB questions that were answered true or false. Q1 and 2 schools had a knowledge increase in respectively five and six of the eight questions and the Q5 school for three of the questions. In the Q1 school there was a significant knowledge increase (P=0.003) that there is a cure for XDR-TB but a significant knowledge reduction (P=0.021) that all people with TB develop HIV/AIDS. For the combined schools there was a significant knowledge increase for two questions; (P=0.009) TB can easily be cured these days if you take your treatment and (P=0.008) there is treatment for XDR-TB.

General TB question True or False		Q1			Q2			Q5			Schools Combined		
		Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value
TB is a disease of Africa?	True	40%	37.77%	0.694	54.55%	54.09%	0.923	43.93%	50%	0.259	46.80%	46.15%	0.818
	False	60%	62.23%		45.45%	45.91%		56.07%	50%		53.20%	53.85%	
Only people living in poverty get infected with TB	True	7.37%	3.72%	0.133	6.42%	4.27%	0.302	4.29%	6.45%	0.355	5.52%	4.40%	0.355
	False	92.63%	96.28%		93.58%	95.73%		95.71%	93.55%		94.48%	95.60%	
Only people who are HIV positive get TB	True	5.26%	3.41%	0.407	6.42%	8.54%	0.398	4.64%	6.45%	0.450	5.34%	5.91%	0.661
	False	94.74%	96.59%		93.58%	91.46%		95.36%	93.55%		94.66%	94.09%	
Anyone can get infected with TB	True	97.89%	96.90%	0.611	95.19%	96.44%	0.501	98.57%	97.58%	0.481	97.33%	96.84%	0.606
	False	2.11%	3.10%		4.81%	3.56%		1.43%	2.42%		2.67%	3.16%	
TB can easily be cured these days if you take your treatment	True	96.84%	97.21%	0.849	94.65%	97.51%	0.106	91.07%	91.94%	0.776	93.24%	96.43%	0.009
	False	3.16%	2.79%		5.35%	2.49%		8.93%	8.06%		6.76%	3.57%	
If you have MDR TB it take months to be cured	True	82.11%	79.26%	0.543	79.68%	75.44%	0.285	80.71%	69.35%	0.012	80.60%	76.10%	0.052
	False	17.89%	20.74%		20.32%	24.56%		19.29%	30.65%		19.40%	23.90%	
There is no cure at present for XDR -TB	True	41.05%	25.39%	0.003	23.53%	18.86%	0.222	30.71%	29.03%	0.734	30.07%	23.49%	0.008
	False	58.95%	74.61%		76.47%	81.14%		69.29%	70.97%		69.93%	76.51%	
All people with TB develop HIV/AIDS	True	2.11%	9.29%	0.021	21.39%	16.37%	0.170	10%	6.45%	0.248	12.46%	11.54%	0.614
	False	97.89%	90.71%		78.61%	83.63%		90%	93.55%		87.54%	88.46%	

Knowledge increase: pre- to post-test | Knowledge decrease: pre- to post-test | Significant knowledge increase | Significant knowledge decrease

Table 10: Knowledge of General TB questions

Clinical Research Knowledge was tested with two questions; 1) “Through what platform can the community interest be represented?” and 2) “What does clinical research testing involve?” Table 11 gives a breakdown of adolescents’ knowledge in relation to what platform is responsible for representing their interest in the community.

Clinical Research Knowledge	Q1			Q2			Q5			Schools Combined		
	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value
Previously took part in TB research	26.32%	24.46%	NA	56.15%	56.16%	NA	31.79%	41.94%	NA	38.97%	39.29%	NA
Advisory Committee meetings	31.58%	32.82%	0.821	21.39%	17.79%	0.334	22.14%	26.61%	0.329	23.49%	25.96%	0.308
Political parties	9.47%	12.69%	0.395	6.95%	6.05%	0.696	8.21%	6.45%	0.539	8.01%	9.07%	0.501
Religious groups/leaders	11.58%	5.88%	0.059	11.76%	13.52%	0.577	8.21%	11.29%	0.323	9.96%	9.75%	0.899
Don't know	29.47%	33.44%	0.469	12.83%	20.64%	0.030	28.93%	33.06%	0.404	23.67%	28.43%	0.054
Knowledge increase: pre- to post-test				Knowledge decrease: pre- to post-test			Significant knowledge increase			Significant knowledge decrease		

Table 11: Knowledge of Community Interest representation in Clinical Research

Figure 4 indicates the clinical research knowledge of the combined schools. There was a significant knowledge reduction for the schools' combined data from pre- to post test results for the question asking what clinical research testing involves. More adolescents (5.59%) indicated that doctors are tested (P=0.014) and 15.81% fewer chose vaccines (P=0.000). More adolescents (9.51%) also chose "don't know" (P=0.000) in their post-test knowledge surveys.

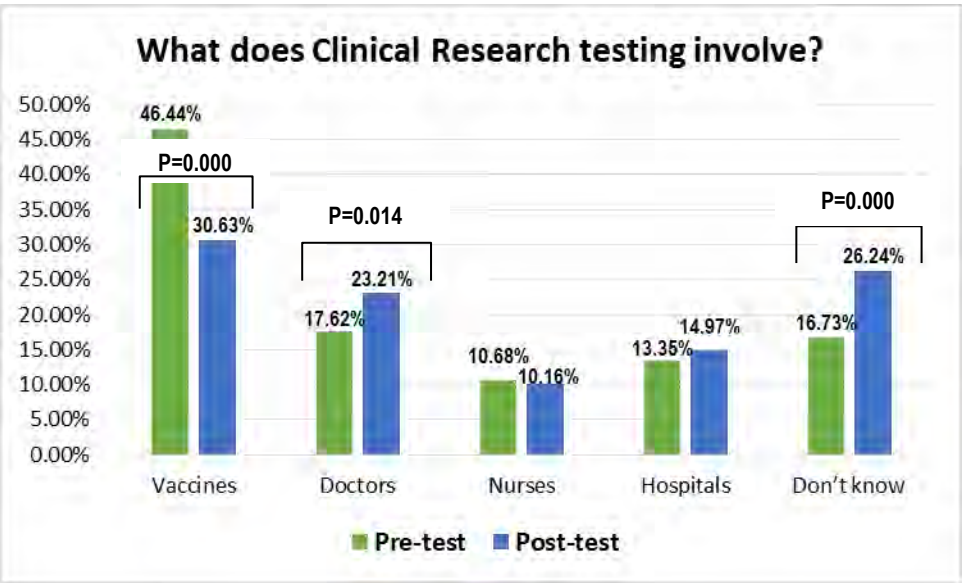

Figure 4: Knowledge of what Clinical Research testing involve for Schools Combined

Table 12 gives a breakdown on how the different schools answered the question pertaining to what factors are tested in clinical research.

Clinical Research Knowledge	Q1			Q2			Q5			Schools Combined		
	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value	Pre-test	Post-test	P-value
Previously took part in TB research	26.32%	24.46%	NA	56.15%	56.16%	NA	31.79%	41.94%	NA	38.97%	39.29%	NA
Vaccines	26.32%	22.60%	0.452	31.02%	28.47%	0.554	63.57%	56.45%	0.175	46.44%	30.63%	0.000
Doctors	22.11%	30.03%	0.131	23.53%	18.15%	0.156	12.14%	16.94%	0.195	17.62%	23.21%	0.014
Nurses	7.37%	7.74%	0.905	18.72%	14.23%	0.195	6.43%	7.26%	0.758	10.68%	10.16%	0.765
Hospitals	9.47%	11.46%	0.587	20.86%	22.42%	0.668	9.64%	7.26%	0.438	13.35%	14.97%	0.407
Don't Know	34.74%	31.89%	0.602	11.76%	23.84%	0.001	13.93%	16.94%	0.433	16.73%	26.24%	0.000
Knowledge increase: pre- to post-test				Knowledge decrease: pre- to post-test			Significant knowledge increase			Significant knowledge decrease		

Table 12: Knowledge of what Clinical Research testing involves.

The above mentioned results will be discussed in detail in the following chapter.

CHAPTER 5 DISCUSSION

Firstly, the demographic information is discussed followed by the level of quality seen in the completion of the knowledge survey as well as the level of participation of the study population. Basic TB and clinical research knowledge and themes are discussed for the schools combined and the significant knowledge differences are discussed per quintile rating.

The primary objective of this study was to determine whether the medium of applied theatre could improve knowledge about TB and clinical research in a population of SA adolescents living in a high TB burden, semi-rural setting.

The highest represented age group for the study ranged between 14 and 16 years. The lowest representation was for the 18- year- old adolescents. The low representation of the 18- year- old adolescents can be due to the school principals allowing access to the schools to conduct the research only on condition that the research should not disrupt the Grade 12's (final year) school program. The Grade 12 school year is shorter than the other grades with a very full school curriculum and can be associated with generally lower numbers in poorer communities.

In the two testing times (pre- and post-test) there were 24% and 9.08% more female adolescents respectively who took part in the study. The average gender distributions of the adolescents that completed the knowledge survey compare well with the average gender distributions for the schools. At the time of the intervention there were 10.22% more females registered at the schools.
From the data in Table 4 one can identify the level as well as the quality of participation in the knowledge survey. The Q1 school's level of participation and quality was very low for the pre-test but increased by 20.26% for level and 20.82% for the quality of the questionnaires. This is a very interesting finding. The school is situated within a predominantly Xhosa- speaking area and the play was conducted in Afrikaans with some English words. Feedback received from the drama group after the intervention at this school indicated that the performers felt that the adolescents were not interested in the production and that this was probably due to language barriers (Tameris, 2013). The data, however, paints a completely different picture. This school's level of participation and quality of the completion of the questionnaires

increased the most of the three schools. Q5 school's level of participation reduced by 17.90% from pre- to post-test and the quality of their questionnaires reduced by 17.90%. This school had the lowest level of post-test participation but the highest percentage of usable questionnaires after data cleaning for both tests. Their decrease in level and quality of participation can possibly be attributed to the fact that this population of adolescents is not as exposed to TB in the communities that they reside in, and that the burden of disease is not felt in this population.

When looking at the combined data of the total study population we see that 4.56% of the adolescents have had TB previously and 39.15% have been involved in TB research. More than 97% of the adolescents that took part in this study had heard about TB (Table 5) and more than 75% indicated that they have heard about TB at school (Table 5). This is in line with the school curriculum for Life Orientation. More than 79% knew the mode of transmission (Table 7) and more than 87% the mode of prevention (Table 8). Reassuringly, more than 90% of adolescents will use medicine from a doctor to treat their TB (Table 9). There was a significant knowledge reduction for the combined schools' data for four of the eight signs and symptoms of TB (Table 6) and the proportion of adolescents that provided the answer 'Don't know' when asked about the mode of TB transmission went significantly up (P=0.013) (Table 7). There was a significant knowledge increase (P=0.009) that TB can easily be cured and that there is treatment for XDR-TB (P=0.008) (Table 10). From the above mentioned data it is evident that the adolescents know a lot about TB.

When one looks at each school on an individual basis, in the Q1 school only 25% of the adolescents knew in the pre- and post-test that a bacterium causes TB and significant proportion (P=0.000) of the adolescents in this school indicated in the post-test that smoking is a cause of TB (Table 5). There is a large body of evidence that support that smoking increases the risk of TB (The Union; 2014). This school had a significant knowledge increase (P=0.000) that weakness is not a cause of TB. Most adolescents knew the mode of transmission and prevention but a significant knowledge reduction (P=0.007) was seen in this school for mode of transmission. More than 10% of the adolescents chose 'through blood' as the mode of transmission in the post-test (Table 7). It is possible that the section of the play that showed how the vaccine works in a person's body might have been confused with how TB is transmitted, as well as learners having problems with language comprehension. There was a significant knowledge increase (P=0.003) that

there is treatment for XDR-TB and a significant knowledge reduction (P=0.021) that all people living with TB will develop HIV/AIDS (Table 10). There were no significant knowledge differences for the clinical research questions for this school.

For the Q2 school, more that 40% knew that TB is caused by a bacterium (Table 5). There was a significant knowledge reduction (P=0.018) from pre- to post-test results for this school that traditional medicines are used to cure TB (Table 9). More than 56% of the adolescents indicated that they had taken part in TB research (Table 11) but they had very limited clinical research knowledge and there was a significant knowledge reduction (P=0.001) of adolescents choosing “don’t know” for the question regarding what clinical research testing involves (Table 12).

In the Q5 school more than 77% knew that TB is caused by a bacterium (Table 5). There was a significant knowledge increase for two of the answers for the signs and symptoms of TB (Table 6); night sweats (P=0.031 and weakness (P0.014) and no significant knowledge reduction for this school. This school is the only dual language medium school and classes are given in Afrikaans and English from Grade 10 on an equal basis.

When one looks at the overall picture over the three schools one can see that the Q5 school fared the best, with a knowledge increase for three questions’, Q1 school had a knowledge increase for two questions and a knowledge reduction for four questions. The Q2 school had no knowledge improvement but a knowledge reduction for two of the questions. The intervention reflected a slight improvement of the adolescents’ TB knowledge but did not have a impact on their clinical research knowledge for any of the schools that took part in this study.

CHAPTER 6 LIMITATIONS

There were no individual identifiers on the knowledge surveys and it was impossible to compare pre- and post-test results from an individual to determine knowledge improvement. The surveys could only be done within the limitations of the school environment and it was not possible to determine if the same adolescents took part in both or either test. If individual consent were obtained from the adolescents and an administered knowledge survey completed, one would know that results were valid and not perhaps reflecting adolescent indifference to the process. Having a control group in this study would have added value to the results to see if the intervention did have an impact on the knowledge increase or if other factors could be the reason for the post-test knowledge increase.

It would have been valuable to have the ethnicity and home language of the adolescents in each of the schools. With this information one would have been able to evaluate what impact the language of the intervention had on answering the knowledge survey. The Xhosa-speaking adolescents watching the intervention in Afrikaans and having to complete a Xhosa knowledge survey with terminology that they might not have been exposed to previously may have been challenging. This holds true for the English home language adolescents as well.

CHAPTER 7 RECOMMENDATIONS

Using applied theatre to sensitize a rural adolescent population to TB-related clinical research was a novel approach to educate and convey sensitive information to potential study participants.

For future projects of this nature a control school could be used in which learners do not see the theatre production. There could also be a more controlled and structured process to complete the knowledge surveys. One flaw in this knowledge survey document was that there was no area to indicate if it was a pre- or post-test paper. Having the adolescent's name or some form of identifier could deter them from insincerity, i.e. not taking the process seriously. Where possible, the play could also be performed in the home language of the school learners. The researcher ideally should take responsibility for ensuring the reliable completion of the knowledge surveys and not depend on the teachers, school and secretary to ensure that administration is done satisfactorily. Teachers are overburdened and whatever research is conducted in the schools should be clearly seen as leading to a tangible benefit and not appear as additional work for school staff.

What also appears obvious from the results is that the DoE could review the Life Orientation curriculum and make the TB education component more interactive and "fun". TB is now the leading cause of death from infectious diseases, and our children can be the change makers if they get proper education regarding this disease. TB could also be included in the science curriculum as HIV has been. Currently it is only discussed in Life Orientation classes and this is not sufficient.

SATVI should concentrate on ways to improve knowledge within their research population, making sure that their study participants know that the CAB represents their interests in the community. The work that CAB does is a valuable support to preventative research, with the testing of a new TB vaccine is vitally important in the fight against TB.

CHAPTER 8 CONCLUSION

Through theatre SATVI raised awareness and established strong partnerships with the DoE, school principals, teachers and adolescents as well as indirectly with their parents. It created a platform to engage with the adolescents as well as sensitising them to a planned clinical trial. This was a novel approach to educate and convey sensitive information to potential study participants. This was the first time that a project of such nature had been conducted in this community.

A video was made of the play with subtitles in English and Xhosa, and is available to be used in waiting rooms of clinics and at schools for educational purposes, as well as to inform possible research participants.

CHAPTER 9 APPENDICES

Appendix 9.1 – English Consent

_ _ / _ _ _ / 2013

Dear Sir / Madam

The South African Tuberculosis Vaccine Initiative (SATVI) together with the staff and pupils of Worcester Senior Secondary School have produced a play "Carina's Choice" which deals with issues surrounding TB and clinical research. Sometime before and after the performance the pupils in the audience will be asked to complete a short, anonymous survey to see if their knowledge about these topics changed after seeing the play.

This play will be performed at your child's school in the next week. If you do not want your child to complete the questionnaire please fill in the section below and return to the school tomorrow.

Thank you

Dr Michele Tameris
Principal Investigator

- -

I, _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ , parent/ guardian of _ _ _ _ _ _ _ _ _ _ _ _ _ _ _, in section _ _ _ _ _ _ do not wish him/ her to take part in the knowledge survey associated with the play "Carina's Choice".

Consent to knowledge survey, Version 1.0, 13 August 2012. (English)

Appendix 9.2 – Afrikaans Consent

_ _ _/ _ _ _/ 2013

Geagte Meneer/Dame

Die Suid-Afrikaanse Tuberkulose-vaksien-inisiatief (SATVI) saam met die personeel en leerders van Worcester Senior Sekondêre Skool het ’n dramaproduksie, “Carina’sChoice”, op die planke gebring wat oor kwessies omtrent TB en kliniese navorsing gaan.Voor en na die vertoning sal die leerders in die gehoor gevra word om ’n kort anonieme opname te voltooi om te sien of hul kennis oor hierdie onderwerpe verander het nadat hulle die drama gesien het.

Hierdie drama sal volgende week by u kind se skool opgevoer word.Indien u nie wil hê dat u kind die vraelys moet voltooi nie, vul asseblief die afdeling hieronder in en stuur dit môre terug skool toe.

Dankie

Dr. Michele Tameris
Hoofnavorser

- -

Ek, _ _ _ _ _ _ _ _ _ _ _ _ _ _ , ouer/voog van _ _ _ _ _ _ _ _ _ _ _ _ _, in Graad _ _ _ _ _ _wil nie hê dat hy/sy aan die kennisopname geassosieer met die drama “Carina’sChoice” moet deelneem nie.

Appendix 9.3 – Xhosa Consent

___/___/2013

Mnumzana/Nkosazana ethandekayo

I-South African Tuberculosis Vaccine Initiative (iSATVI) kunye nabasebenzi nabantwana besikolo baseWorcester Senior Secondary School bavelise umdlalo i "Carina's Choice" ojongana nemiba ejikeleze iTB novavanyo lophando. Ngamanye amaxesha phambi okanye emva kokudlala umdlalo abantwana besikolo ababukeleyo bayakucelwa baphendule imibuzo ophando emfutshane, engachazi gama ukuze kojongwe ulwazi lwabo malunga nezihloko lutshintshile na emva kokubukela umdlalo.

Lo mdlalo uzakudlalwa kwisikolo somntwana wakho kwiveki ezayo. Ukuba awufuni umntwana wakho azalise uluhlu lwemibuzo nceda zalisa icandelo elingezantsi ze ubuyisele esikolweni ngomso.

Enkosi.

Gq. Michele Tameris
UMphandi oyiNtloko

- -

Mna, _ _ _ _ _ _ _ _ _ _ _ _ _ _ , mzali/mgcini womntwana ongu _ _ _ _ _ _ _ _ _ _ _ _ _ _, kwicandelo _ _ _ _ _ _ andinqweneli ukuba athathe inxaxheba kuvavanyo lolwazi olunxulumene nomdlalo i "Carina's Choice".

Consent to Knowledge Survey, Version 1.0, 13 August 2012. (English)

Appendix 9.4 - English Questionnaire

Knowledge Survey Questionnaire

Part I. Socio- demographic characteristics of the respondents

Sex (circle one) : Male Female **Age: _____**

Part II. TB Knowledge

1. **Have you heard of tuberculosis (also known as TB)? Yes No**
2. **Where did you get information/hear about TB? (circle as many as you like)**

Family	Friend	Doctor	Clinic	School	media	Other:_____

3. Have you had TB? Yes No Don't know
4. Have you been involved in TB research? Yes No
5. What causes TB? (circle one)

Bacteria/ germ	cold/flu	shortage of food	smoking	climate	sun light	weakness	smoking	hard work

any other_____

6. What are symptoms of TB? (circle as many as you think)

anger	night sweats	blood when coughing	loss of appetite	weight gain	weight loss	rash
tired	pain in chest	stomach cramps	increased coughing	swollen hands	numb feet	weakness

7. Is TB contagious (can you get it from another person)? (circle one) Yes No

If yes, how does the disease transfer from one person to another? (circle one)

Through blood	Air when coughing	Shaking Hands	Sharing food	Sexually transmitted	Born with it	Don't know

other _____

8. How can you stop TB transmission (can you stop getting it or giving it to someone)?

avoid sharing cups	cover mouth when cough/ sneeze	avoid sharing clothes	avoid sharing food	Do not have sex	avoid body contact	Don't know

other_____

9. Can you treat TB? Yes / No If yes, do you know how?

Traditional medicine	Medicines from a doctor	food	rest	muthi	Don't know

other _____

True or False Answers (Circle one)

10. TB is a disease of Africa T F

11. Only people who live in poverty get infected with TB T F

12. Only people who are HIV positive get TB T F

13. Anyone can get infected with TB T F

14. TB can easily be cured these days if you take your treatment T F

15.If you have multi-drug resistant TB, it takes many months to be cured T F

16.There is no cure at present for extremely drug resistant TB T F

17. All people with TB develop HIV/AIDS T F

18. The people who most often get TB are?

children under 5	children 5-15	adults	old people (over 60)	male	female	all

_____

other _____

19. If you thought you had TB, what would you do?

consult a traditional healer	consult a medical doctor or clinic	consult a religious leader	do nothing	Don't know

20. In your community, where can someone go to be treated for TB?

_____

21. **Community interests can be represented in the clinical trial process through**

Political parties	Religious groups/leaders	Advisory committee meetings	Community advisory boards	Don't know

22 . Clinical research involves test ing new

doctors	nurses	vaccines	hospitals	Don't know

23. If you could ask a doctor or healer any question about TB, what would your question be?

_____

24. Is there anything else you want to tell me about TB in your community?

Appendix 9.5 - Afrikaans Questionnaire

Meningsopnamevraelys oor kennis

Deel I. Sosio-demografiese eienskappe van die respondente

Geslag (omkring een): Manlik Vroulik Ouderdom: _____

Deel II. Kennis oor TB

1. Het jy al ooit van TB gehoor (ook bekend as tuberkulose)? Ja Nee
2. Waar het jy inligting oor TB gekry / van TB gehoor? (omkring soveel moontlikhede as wat jy wil)

Gesin	Vriend/in	Dokter	Kliniek	Skool	Media	Ander:_____

3. Het jy al ooit TB gehad? Ja Nee Weet nie
4. Was jy al ooit by navorsing oor TB betrokke? Ja Nee
5. Waardeur word TB veroorsaak? (omkring een)

Bakterieë / kieme	verkoue / griep	'n tekort aan kos	rook	klimaat	sonlig	'n gevoel van swakheid	rook	harde werk

Enige ander: _____

6. Wat is die simptome van TB? (omkring soveel as waaraan jy kan dink)

woede	nagsweet	bloed wanneer jy hoes	gebrek aan eetlus	tel gewig op	gewigsverlies	uitslag
moegheid	borspyn	maagkrampe	hoes meer	opgeswelde hande	'n dooie gevoel in die voete	'n gevoel van swakheid

7. Is TB aansteeklik (kan jy dit by 'n ander persoon kry)? (omkring een) Ja Nee

Indien ja, hoe word die siekte van een persoon na ’n ander oorgedra? (omkring een)

Deur bloed	Deur die lug wanneer iemand hoes	Deur iemand met die hand te groet	Deur kos te deel	Word seksueel oorgedra	Word daarmee gebore	Weet nie

Ander: _____

8. Hoe kan die oordrag van TB gestop word (hoe kan jy keer dat jy TB kry of dit vir iemand anders gee)?

Moenie koppies met ander mense deel nie	Sit jou hand oor jou mond wanneer jy hoes / nies	Moenie klere met ander mense deel nie	Moenie jou kos met ander mense deel nie	Moenie seksuele omgang hê nie	Vermy liggaamlike kontak	Weet nie

Ander: _____

9. Kan TB behandel word? Ja / Nee ndien ja, weet jy hoe dit behandel kan word?

Tradisionele medisyne	medisyne wat jy by ’n dokter kry	kos	rus	moeti	Weet nie

Ander: _____ **Waar-**

of Onwaar-antwoorde (Omkring een)

10. TB is ’n siekte van Afrika W O

11. Slegs mense wat in armoede leef word met TB geïnfekteer W O

12. Slegs mense wat MIV positief is kry TB W O

13. Enigeen kan met TB geïnfekteer word W O

14. TB kan deesdae maklik genees word indien jy jou behandeling neem W O

15. As jy multi-weerstandige TB (MDR-TB) het, kan dit maande lank neem W O om genees te word

16. Daar is op die oomblik geen geneesmiddel vir uiters weerstandige TB W O (XDR-TB) nie

17. Alle mense met TB ontwikkel MIV/Vigs W O

18. Die mense wat die gereeldste TB kry is...

kinders jonger as 5	kinders tussen 5-15	volwassenes	ou mense (ouer as 60)	manlik	vroulik	almal

_____

Ander: _____

19. As jy dink dat jy dalk TB het, wat sou jy doen?

Gaan spreek ’n tradisionele geneser	Gaan spreek ’n mediese dokter of kliniek	Gaan spreek ’n godsdienstige leier	Doen niks nie	Weet nie

20. Waarheen kan iemand in jou gemeenskap gaan om vir TB behandel te word?

_____

21. Gemeenskapsbelange kan tydens die kliniese navorsingstudieproses verteenwoordig word deur...

politieke partye	godsdienstige groepe / leiers	vergaderings van advieskomitees	gemeenskapsadviesrade	Weet nie

22. Kliniese navorsing gaan oor die toets van nuwe...

dokters	verpleegsters	vaksiene	hospitale	Weet nie

23. As jy vir ’n dokter of geneser enige vraag oor TB kon vra, wat sou jou vraag wees?

_____

24. Is daar enigiets anders wat jy vir my wil vertel oor TB in jou gemeenskap?

_____

Appendix 9.6 - Xhosa Questionnaire

Iphepha lemibuzo malunga noPhando loLwazi

Icandelo 1. Iingcombolo malunga nemeko yezentlalo yabo baphendulayo

Isini (biyela esinye): Indoda Owasetyhini Ubudala: _____

Icandelo II. ULwazi ngeTB

1. Ukhe weva ngeSifo sePhepha (esikwaziwa njengeTB)? Ewe Hayi

2. Uzifumene phi iinkcukacha/uve phi ngeTB? (biyela ezininzi kangangoko uthanda)

Ngosapho	Ngomhlobo	Ngogqirha	Ekliniki	Esikolweni	Ngoonondaba	Kwenye: _____

3. Ukhe wanayo iTB? Ewe Hayi Andazi

4. Ukhe wabandakanyeka kuphando lweTB? Ewe Hayi

5. Yintoni ebangela iTB? (biyela ibenye)

Ziintsholongwane	yingqele/ ngumkhuhlane	kukungabikho kokutya okwaneleyo	yimozulu	lilanga	bubuthathaka	kukutshaya	kukusebenza nzima

Nokuba sesiphi na esingesinye: _____

6. Zeziphi iimpawu zeTB? (biyela zibeninzi kangangoko ucinga)

Ngumsindo	kukubila ebusuku	ukukhupha igazi xa ukhohlela	Kukungabi namdla wokutya	kukutyeba	kukwehla komzimba	irhashalala
kukudinwa	ingqaqambo yesifuba	iinkantsi esuswini	lukhohlokhohlo olukhulayo	zizandla ezidumbileyo	iinyawo ezindindisholo	bubuthathaka

7. Ingaba iTB iyosulela (ungayifumana komnye umntu)? (biyela ibenye) Ewe Hayi

Ukuba impendulo ngu-ewe, isifo esi sisuka njani emntwini siye komnye? (biyela ibenye)

Ngegazi	Ngomoya xa	Ngokubambana	Ukwabelana	Usulelo lokwabelana	Ngokuzalwa	Andazi

	ukhohlela	ngezandla (ukubulisana)	ngokutya	ngesondo	unayo	

Enye: _____

8. Ungalunqanda njani udluliselo lweTB (ungakunqanda njani ukuyifumana okanye ukuyosulela omnye umntu)?

ngokuphepha ukwabelana ngeekomityi	ngokugquma umlomo xa ukhohlela / uthimla	ngokuphepha ukwabelana ngempahla	ngokuphepha ukwabelana ngokutya	musa ukwabelana ngesondo	ngokuphepha ukudibana ngomzimba	Andazi

Enye: _____

9. Ungayinyanga iTB? Ewe / Hayi Ukuba impendulo ngu-ewe, uyayazi ukuba njani?

Ngamayeza esintu	ngamayeza kagqirha	ngokutya	ngokuphumla	ngo-muthi	Andazi

Ngenye: _____

Iimpendulo eziyiNyani okanye ezingeyoNyani (biyela ibenye)

10. I-TB sisifo sase-Afrika Yinyani Asiyonyani

11. Ngabantu abasokolayo kuphela abosulelwa yiTB Yinyani Asiyonyani

12. Ngabantu abaneHIV kuphela abafumana iTB Yinyani Asiyonyani

13. Nabani na angosuleleka yiTB Yinyani Asiyonyani

14. I-TB inganyangeka lula kule mihla ukuba utya amayeza akho Yinyani Asiyonyani

Yinyani Asiyonyani

15. Ukuba uneTB engeva mayeza, kuthatha iinyanga ezininzi ukunyangeka

16. Okwangoku alikabikho ichiza elinyanga iTB engeva mayeza Yinyani Asiyonyani

17. Bonke abantu abaneTB babaneHIV/AIDS Yinyani Asiyonyani

18. Abona bantu bafumana iTB amaxesha amaninzi nga...

ngabantwana abangaphantsi kweminyaka e-5	ngabantwana abaneminyaka e-5 ukuya kweli-15	ngabantu abadala	ngabantu abadala (abangaphezu kweminyaka engama-60)	ngamadoda	ngabasetyhini	bonke

Abanye: _____

19. Ukuba ubunokucinga ukuba uneTB, ungenza ntoni?

ndingaya egqirheni	ndingaya kugqirha okanye ekliniki	ndingaya kumfundisi	akhonto ndingayenza	Andazi

20. Kwindawo ohlala kuyo, angayaphi umntu xa efuna ukunyangelwa iTB?

21. Imidla yabantu bokuhlala ingamelwa kwinkqubo yovavanyo lophando nga...

maqela ezopolitiko	maqela enkonzo / eenkokheli	ngeentlanganiso zekomiti ecebisayo	ngeebhodi ezicebisayo zokuhlala	Andazi

22. Uvavanyo lophando lubandakanya ukuvavanya...

oogqirha abatsha	oomongikazi abatsha	ugonyo olutsha	izibhedlele ezitsha	Andazi

23. Ukuba ubunokubuza ugqirha okanye umntu onyangayo nawuphina umbuzo ngeTB, umbuzo wakho uza kuthini?

_____

24. Ingaba ikhona na enye into ofuna ukundixelela yona ngeTB kwindawo ohlala kuyo?

_____

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