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Nurturing the Whole Body: The Benefits of Supplementing Tuberculosis Chemotherapy with Traditional Chinese Medical Practices

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Abstract

Although modern medicine has found a cure for Tuberculosis (TB), it remains a worldwide health threat. Due to poor adherence to TB chemotherapya multi-drug resistant strain of the TB bacteria (MDR-TB) has been created.It has been found that poor adherence is caused by many factors, two of which include the high cost of treatment and the many uncomfortable side effects. Through a month of research based in Kunming, China including interviews, observations and surveys,this project hoped to compare Western biomedicine and Traditional Chinese Medicine (TCM) to determine the potential benefits TCM holds for TB patients. TCM improves a TB patient's physical and emotional well being, therefore holding the potential to improve their adherence to TB drugs, reduce relapse rates, reduce costs and slow down the creation of both the TB and MDR-TB epidemic.The Chinese medical system deeply separates TCM and Western medical practice and therefore underutilizes theses many benefits.Improved education is the key for future treatment success in China. Providing training for TCM doctors to better recognize the symptoms of TB, and for Western-trained Chinese doctors to understand the benefits of herbal or acupuncture treatments, could benefit TB treatment in China and worldwide.

Public Health, Health Sciences: Education, Traditional Healing

Key Words: Tuberculosis, Traditional Chinese Medicine, Adherence, China

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[1] Names shortened to protect privacy

translating accented Chinese to Mandarin, and helped me to ask patients questions I had not prepared in writing. On this note I would also like to thank all of my survey participants, TB staff and patients, who donated their time and thoughts to this project.

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[2] Name changed to protect privacy

Introduction

Tuberculosis (TB) is a global public health problem that, according to the World Health Organization, causes over two million deaths a year (*Actions for Life*, 2013) TB is caused by the bacteria *Mycobacterium tuberculosis*which most commonly infects the lungs, causing coughing (of blood or sputum), fever, and significant weight loss. The infection can be fatal if left untreated (Basic TB Facts, 2012.) China has the second highest rate of TB prevalence in the world and a 2005 WHO study estimated TB infects 100 out of every 100,000 Chinese (Center for Disease Control, 2008.) TB hits hardest in low-income areas, and despite China's immense economic growth, much of the population still lives in poverty putting them at great risk for TB (Suwannakeeree&Picheansathian, 2009, 1 and B. Xua et al., 2004, 140.)

TB is no longer only a disease of the poor. The emergence of Multi-Drug Resistant TB (MDR-TB) in the mid 1980s has made it intoa worldwide problem. Before the mid 1980s the TB epidemic was declining but due to many factors, including the development of MDR-TB, the threat has come back (Center for Substance Abuse Treatment, 1995.) MDR-TB is a form of the TB bacterium that is resistant to the two strongest TB medications, isoniazid and rifampin (Drug Resistant TB, 2012.)The misuse or premature stopping of first line drugs (poor adherence) during a patient's TB treatment creates this resistant organism in the patient, and allows the resistant form to spread to others around them(Drug Resistant TB, 2012.)

Poor adherence is a patient's individual choice to not follow or complete thefull antibiotic regimen required to completely kill the TB bacteria (Suwannakeeree & Picheansathian, 2009, 1) This prolongs sickness, increases the risk of transmission

and relapse, and leads to the creation of MDR-TB, all of which put patient at a greater risk of dying (Suwannakeeree & Picheansathian, 2009, 2.) This has prompted many studies around the world, and within China, on the medical and social factors that cause a TB patient to not complete his or her treatment (Nackers et al., 2012, Thiam et al., 2007.)

Further studies have looked at the best strategies for encouraging adherence to stop the development of MDR-TB, and curb the epidemic of this curable disease (Suwannakeeree & Picheansathian, 2009.) A 2004 study in Jiansu province (Eastern China) on the factors that influence the choice to seek TB treatment found financial difficulties, such as the cost of treatment, getting to the designated TB clinics and their inability to work, to be one of the biggest barriers to successful TB treatment (Xu, B. 2004, 146.) Another study, researched in Yunnan using 24 MDR-TB patients, found that 100% (18) of the patients who had undergone treatment lasting over one month felt that the side effects from the second-line drugs would be a major factor in their successful completion of the antibiotics. Fourteen of these same patients (77%) also felt that economic factors will affect their successful adherence (Shi, Qing et al., 2013.) Improving adherence to TB medication is crucial to controlling the epidemic, as well as understanding the patient's challenges during treatment and developing strategies to overcome these challenges.

China has one other unique challenge in encouraging TB testing and improving adherence to TB chemotherapy among its citizens. The Chinese have been practicing advanced medical practice forthousands of years, but until recently the medical system was almost exclusively staffed by traditional medicine doctors who look at illness, symptoms and treatment very differently from modern bio-medical doctors (Western medicine.) There is no Traditional Chinese Medicine (TCM) cure for TB, as the biomedical drugs are the only known way to kill the TB bacteria, but it

can provide many palliative and immune boosting benefits that can supplement TBchemotherapy treatment in China. Previous literature on TCM and TB treatment include M.J. Ho's study of New York City TCM doctor's perception of TB and Qin, Liu et al.'s review of the benefits of traditional liver treatments during TB treatment. Neither has looked at the wide range of benefits TCM can provide to the biomedical patient experience or how this might improve patient adherence. In this paperI hope to explore and demonstrate some potential benefits of supplementing TB chemotherapy with various forms TCM.

Traditional Chinese Medical theory has developed in China over the past 5000 years (Dr. Wen, 9/28/2013.) Originally it was developed from observing nature and the patterns of wild animals, but has since evolved into a sophisticated medical practice that is fundamentally different from Western biomedicine (Dr. Wen, 9/28/2013.) TCM theory relies on the idea of maintaining balance among five different, but constantly interacting, elements defined as fire, earth, metal, water, and wood. Each element has many related definitions, from organs in the body to emotions in the heart (Dr. Wen, 9/28/2013.) In contrast, Western medicine has evolved to look for the single root of the problem, treating the sick body like a machine with one malfunctioning part, and the doctor like the mechanic who must locate and fix the problem (Fong, 2013. Para. 6.)While comparing Western and Chinese medical practices, Judith Farquhar also notes biomedicine's heavy reliance on laboratory tests to narrow down potential causes, while TCM puts a strong emphasis on a clinicians ability to combine four broad and highly subjective examinations (*sizhen*[3]) into common symptoms and diagnoses (Farquhar, 68.)My research revealed that these two methods of diagnosing and treating the human body

[3]*Sizhen*: Four examination strategies used by TCM doctors to discover symptoms and begin diagnosing the patient. They are looking, listening/smelling, asking, and palpitating (pulse) (Farquhar, 62).

are not in competition, but still remain mutually misunderstood due to different approaches at each step of the healing process.

I came to China three months ago interested in understanding the differences between TCM and Western biomedicine. I found the study of TB, and a Chinese TB patient's experience, to be the perfect platform to base this research on. Since TB can only be cured by biomedicine I was curious to discover how the typical Chinese TB patient's treatment differs from those of American (or other non-Chinese) patients, given China's rich history of TCM.I also hoped to find unique ways in which TCM and Western medicine have combined to provide the best possible treatment for Chinese patients. As expected, understanding the fundamentals of Chinese Traditional Medicine was nearly impossible duringonly one month of research. Fortunately, studying TBprevention and treatment provided a much deeper understanding of the Chinese medical system, health insurance, and how western medicine and TCM have evolved into two very separate entities in modern Chinese health care.

An important facet of Traditional Chinese Medicine is the doctor's role as both physical doctor and emotional healer (Dr. Wen, 9/28/2013.) In China, Western-style psychiatric care is very rare, with a little over one psychiatrist per 100,000 people, and fewer than two psychiatric nurses per 100,000 people (Jin, L. et al., 2011, Para. 16.)I believe the international CAP-TB (Control and Prevention of Tuberculosis) initiative, funded by US-AID and implemented in Kunming by Family Health International 360 (FHI-360), is attempting to bringthis traditional role of supporter and emotional counselor back into the highly uniform biomedical TB treatment. This will hopefully improve the patient's experience, and encourage full adherence.

CAP-TB was implemented in Kunming about a year agoand targets four major areas of improving TB care in China. The four pieces are, prevention and education, diagnosis, treatment initiation, and treatment success (Li Ling, CAP-TB Presentation Slide 3, 2013.) During the span of my research I worked closely with the FHI-360 Kunming staff, and sat in on multi-day trainings for TB health care providers. These trainings were aimed at improving communication between staff and patients, and explaining the importance of a patient support team in improved treatment success. Much like the TCM doctors historical role as both physician and psychiatrist, CAP-TB is bringing back the idea thatbasic medical education for patients, and a supportive health provider attitude, can have a large impact on theTB patient's success.

Education plays an important role in battling any large public health problem, and the TB epidemic in China is no exception. Many rural village doctors have less than two years of medical education and do not fully understand TB symptoms, or the referral process for potential patients to the free TB testing and treatment centers (Xu, B. 2004, 141.) This is also true of many rural and urban TCM doctors who are not required to receive any educationon infectious disease or the chemistry behind TB chemotherapy treatment (Dr. Wen, 12/3/2013.) Patient education is also limited, especially in rural areas, and many factors inhibit potential TB patients from seeking care (B. Xu et al., 2004, 142.)

Through my limited study of a TB patient's experience in China I believe education will play a major role in truly conquering the disease. Interactive and entertaining community outreach can help to increase overall knowledge about TB, ways to keep oneself safe, and the importance of visiting designated testing centers promptly. Continuing to educate newly diagnosed patients about the fundamentals of fighting the TB bacteria, and the importance of completing the full course of

medication, will also be crucial to lowering treatment costs and halting the growth of MDR-TB worldwide. Finally, education for both TCM and Western medical doctors, and a greater understanding of how each methodcan benefit TB treatment, would improve the patient's overall experience and provide many potentialmedical benefits.

Methods

My study of the TB epidemic in Kunming, China began in September 2013 when I was introduced to Li Ling, director of the Kunming branch of FHI-360. She introduced me to the CAP-TB project, it's goals for improving TB care in China, and the many activities the organization was involved in. In November 2013 I began a brief internship at FHI-360 that gave me incredible access to TB health care workers, patients, and data that I would not have found on my own. Having FHI-360 based in Kunming was a large part of why I chose to base my study in this city, the provincial capital of Yunnan. Their support and close connections to the TB health community provided more than enough information therefore, I never felt I needed to travel outside the city for my research.

Working at FHI-360 gave me access to research sites including Kunming No. 3 hospital and the TCC (a TB hospital run by the Yunnan CDC.) Kunming No. 3 hospital is an infectious disease hospital that has an entire floor devoted to TB care. The TCC has multiple floors for TB patient care, with approximately 300 inpatients and over 6000 outpatients under their care (Ms. G and Ms. Y, 2013.) Both hospitals provided both qualitative (observation, interviews) and quantitative (surveys) information about a TB patient's experience in China.

While working at FHI-360 I created two surveys, one for TB patients and the other for members of the TB support team, made up of health care providers,peer counselors and Kunming Center for Disease Control (CDC) staff (Appendix A-D.)The staff survey was developed to better understand the support team's opinion regarding the use of TCM during treatment, and gaining specific details on how they use their role as supporters to keep patients from interrupting their treatment. The

patient surveys were developed in order to learn more about a patient's use of TCM during their treatment, and its possible connection to improving adherence. Both were written in English first, then generously translated by Xinru Zhao, a program assistant at FHI-360. Six members of the TB support team (five attending an FHI-360 training and one a peer counselor at the TCC) and nine TCC patients completed the survey.

My research also included formal interviews with FHI-360 director Li Ling, TCM doctor Zhenzhe Wen (温大夫),a Chinese herbalist(lesson translated by Ms. Kate)and TCC staff members Ms. G and Ms. Y. These were supplemented by informal interviews with TCC TB patients while collecting their surveys, No. 3 hospital TB patients while observing an information session there, and staff at both places. Lastly, much of my research came from participant observation during my internship, attending CAP-TB meetings and trainings, and walking through TB hospital/care centers.

Results and Data:
A Tuberculosis Patient's Experience in China

Current Tuberculosis Treatment Program in China

The Chinese rural health care system is based on a three-tier model that was developed during the tumultuous late 1960s (Barbadoro, 10.) As Barbadoro explains, the development of "Barefoot doctors", doctors trained with basic paramedic skills and taught how to use traditional herbal medicine, were Chairman Mao's answer to the growing care cap between rural and urban healthcare. Barbadoro continues to explain that more medical serious cases visit junior doctors at township hospitals or senior doctors at large county hospitals (Barbadoro, 10.) Today, Biao Xu explains that village health workers (VHW) have replaced "barefoot doctors" as the first tier in this system. They have a similar education level, with two years or less of medical training, and treat only simple complaints such as fever or pain, but can refer patients to larger institutions (Xu, Diwan & Bogg, 2007, 397.) Recent changes in rural health insurance has improved access to this care, with check-ups covered up to 45%, emergency care and hospital stays covered up to 90% and stays at the CDC infectious disease hospitals (county level) covered up to 60% (Barbadoro, 15.)The development of special, county level TB treatment centers has integrated TB care into the three-tier model so that patients can receive quality care at reduced or no cost(Xu, Diwan & Bogg, 2007, 397.)

The Chinese government has set up comprehensive protocol for TB referral allowing patients to receive reduced care and government agencies to monitor the TB epidemic (Xu, Diwan & Bogg, 2007, 397.) For example, Xu, Diwan and Bogg explain that a rural patient, complaining of a cough, may first visit their local village health worker or township level hospital to get basic medical care before being

referred to a TB testing center. There is a significant price difference between these two options, with a visit the VHW costing between 30-40 RMB and a hospital visit averaging around 100 RMB (Xu, B. et al., 2004, 145.) Given the hospitals background in Western medicine, I would guess the hospital staff is more likely to notice TB symptoms than VHW's.If the patient has experienced his or her cough for more than two weeks they are considered potential TB candidates and should be referred, by a VHW or physician, to a designated TB testing center (Xu, Diwan & Bogg, 2007, 396.) In counties with subsidized TB control centers, managed by the Chinese Center for Disease Control,tests and the resulting treatment costs arefree or reduced (Xu, Biao 2007, 397), but in counties without designated TB clinics, TB treatment can cost over 3000 RMB at the local or county hospital (Xu, B. et al., 2004, 144.)

Once a patient receives a positive TB diagnosis, they immediately start treatment with Western chemotherapy. If a patient is strong enough to complete treatment at home doctors encourage outpatient care since staying at the hospital can expose their weakened immune system to illness, and put others at risk of contracting TB (Li Ling, 12/3/2013.) If a patient is weak they may stay in the hospital anywhere from one week to one month depending on their situation. An MDR-TBpatient is required to complete two weeks of inpatient care, and then may choose to continue treatment at home (Li Ling, 12/3/2013.)

Based on my observations and research I see bothadvantages and disadvantages to inpatient treatment. Of course, the longer a patient stays under direct hospital care, the more the treatment costs, which in many cases can deter patients from paying for their medication once they return home.On the other hand, the longer

a patient stays at the hospital,the more support and care they receive from staff resulting in almost 100% chance they will take their medication every day.

My visits to both the TCC and Kunming No. 3 Hospital provided a glimpse into the experience of a Chinese TB patient undergoing inpatient care.The TCC is an eight-story building, tiled inside and out giving it a sterile feel. The first thing I noticed when I entered the patients' rooms was the lack of personal character. There were no stuffed animals watching over the patients on the side table, or encouraging posters on the wall. While these details are certainly not found in every American hospital, it is common to see gifts from family and friends by the bed, or inspirational quotes hung on the walls. The rooms, each with four beds covered in identical brown fleece blankets, were also very cold. Indoor heating is almost non-existent in Kunming, a city known for its pleasant temperate climate, but in late November temperatures drop quite low. I was surprised to see windows open in all the rooms but I know that ventilation is important to protecting hospital staff from contracting the TB bacteria. Despite the cold, the patients seemed comfortable enough with thick pajamas on. Many of the patients I spoke with were resting or staring up at the ceiling. Younger patients were playing on cell phones or looking over magazines. I wasn't able to stay long enough to get a sense of the interaction between the patients, but patients seemed close enough with their roommates to wake them up to answer my questions.

Kunming No. 3 hospital had a very similar set up, but only had one floor designated to TB care. I noticed that sterilization was incredibly important here as well. One had to wear masks everywhere except the office (also true for TCC), where the door and doorframe had been covered in a plastic sheet. I had a small cold the day I visited and in order to blow my nose I was rushed to an open window and told to

sneeze outwards. While this could seem paranoid, there is no denying that TB is an incredibly infectious disease, and both staff and visitors put themselves at risk every time they enter the ward. The precaution is also to protect the patients, who while in the hospital, are at a much higher risk of contracting other diseases. Both of my site visits revealed that TB care has a simple, no-frills attitude, which is likely an effort to keep costs as low as possible for patients. Both sites were implementing patient education and support meetings (led by FHI-360 trained nurses) which I believe will help patients connect to doctors and other patients, and increase their feelings of warm, caring support that is available to them.

The Kunming TB hospitals are not only for the care of urban residents, but can also help a patient who has had difficulty getting well at their local clinic. If a rural patient has undergone first line TB chemotherapy at a local hospital and sees no improvement, or they are having trouble completing treatment for economic or other reasons, their doctors may choose to refer them to a specialized TB treatment center outside of the county, like the TCC in Kunming (Ms. G and Ms. Y, 2013.) Not only does this allow the patient to get some monetary relief, it also enables trained TB professionals to offer greater support and monitor treatment more carefully in order to limit the creation or spread of potential MDR-TB cases.

TCM and Biomedical Treatment in China's Healthcare System

At the designated TB treatment centers TB is treated exclusively with biomedical chemotherapy. As I learned from attending the FHI-360 TB staff trainings, it is very important to educate new TB patients about the bacteria, and how Western medicine is the only way to completely rid oneself of the disease. While there are rare examples of TB cases being cured without chemical help, the average

human immune system cannot fight the disease on its own (Dr. Wen, 12/3/2013.) I started this project thinking that TB care in China would be a combination of the Western chemotherapy and TCM supplements, but I discovered the Chinese healthcare system is too deeply divided to facilitate this cooperation. Dr. Wen explained that Chinese medical students choose which school they want to study medicine at and are trained differently from the very beginning. TCM doctors get little training in Western concepts of chemistry or infectious disease, and Western trained doctors have little knowledge about TCM, except what they pick up from their community or patients (Dr. Wen, 12/3/2013.)

Dr. Wen was able to explain this split clearly to me one morning in Kunming, over a steaming cup of green tea. Wen was initially trained in Western medicine (anesthesiology) after the Cultural Revolution, but decided to go back to school part-time to learn about TCM, since his patients were always asking him questions about both. He now has the unique ability to diagnose patients using both methods, but says that there is so little overlap between the two that he can hardly manage it. He explained, "Combining TCM and Western medicine during diagnosis and treatment is like wearing two watches with different times, and trying to decide which one is correct." While there are many ways that TB treatment can be improved by TCM, it is rarely done since both types of doctors are rarely educated in the benefit or importance of the other (Dr. Wen, 12/3/13.)

Recognized Problems Within the Chinese TB Treatment System

While the structure of the Chinese medical system and TB care is very well laid out, the actual implementation of the plan faces many challenges. While TB tests and treatment were covered by insurance as of 2003, a 2005 WHO study found that

the estimated detection rate remains under 50% (Xu, Diwan, & Bogg, 2007, 396.) Economic reasons, such as the significant cost of hospital stays and treatment, even if partially subsidized, is believed to contribute to this low detection rate (Xu, B. et al., 2004, 146 and Xu, Diwan, & Bogg, 2007, 401.)

Another problem within the TB treatment system is the lack of patient support among both the healthcare providers and the patient's home community. For example, the CDC has put in place monitoring and support protocols to visit current TB patients at their home once they are discharged from hospital care, but these visits are often replaced with less effective phone calls (Li Ling, 12/3/2013.) Such visits are recommended as part of the WHO's Direct Observation of Therapy Strategy (DOTS),encouraging patient adherence by keeping track of the treatment process and providing emotional support during the long and often trying experience can be very successful (The five elements of DOTS, 2013.)

Education, and the lack of sound TB knowledge among many different Chinese populations, is another challenge in effectively detecting and treating the disease. First, B. Xu et al. found that many rural patients don't know that free or subsidized TB care exists, and are therefore hesitant to get tested, because their local health provider does not understand the referral process. It is also believed that some health-care providers wish to keep the patient's money within their underfunded clinic and do not provide proper information on the patient's options (Xu, B et al., 2004, 147.) Also, many rural patients who move to the city don't wish to visit doctors because they do not understand the urban health insurance system or where to seek subsidized care (Dr. Wen, 12/2013.)

The second population affected by lack of TB education is the many urban and rural citizenswho don't understand the importance of getting tested early to protect

their family and friends from also becoming infected by TB. CAP-TB and FHI-360 hope to combat this issue by putting on entertaining and interactive community education performances in locations where they can target high-risk populations (migrant workers, people with diabetes or HIV, and the elderly.) I attended one such performance in September 2013 and was impressed by the large crowd of all ages who gathered in a small park to watch Thai-style dancers (entertainment), learn about TB prevention (education), and where to go if one exhibits symptoms. I believe this combination of entertainment and education effectively reaches multiple age groups, and provides visuals for improved memory recall when that person feels sick.

The third population who lacks important TB knowledge is the rural and urban TCM doctor. Since TCM doctors are trained to look for very different categories of symptoms, it may never occur to them to refer their patients to TB testing centers (Dr. Wen, 12/3/2013.) As a 2008 U.S. Center for Disease Control report found, TCM doctors believe TB is caused by the lungs having insufficient qi[4] and yin, and see the bacterial infection as an evil spirit (xie) (Ho, 2006 in Center for Disease Control, 2008.)

Dr. Wen further clarified this diagnosis strategy to me in a somewhat regretful tone. He told me a TCM doctor might observe TB symptoms such as significant weight loss, night-sweats, and afternoon fever and diagnose themseparately because each symptom is easily fixed. They would understand the patient as having an excess of fire element and treat this by restoring the body's balance through herbs,red

[4] Qi is a TCM concept that can be defined many ways, but Judith Farquhar suggests qi is "the minimal essential substance that flows through the body…" a definition found in many modern textbooks (Farquhar, 34.)

andorange food[5], and foods that contain water elements. Wen believed that TCM doctors do not see the importance of taking Western TB medication, and until they are better educated in Western symptoms and disease they will continue to only prescribe what they know (Dr. Wen, 12/3/2013.)

Lastly, Western doctors also lack an understanding of how herbal medicines, and TCM treatments like acupuncture, can be beneficial towards a TB patient, especially after chemotherapy is completed and the patient is in recovery stage (Dr. Wen, 12/3/2013.) Chemotherapy treatment can build up a lot of toxins in the patient's body, butDr. Wen eagerly explained to me that there are very helpful TCM treatments that can promote the body's natural cleansing process, flushing out these toxins faster. TCM could also help reduce the amount of Chemotherapy needed by strengthening the immune system, andallowing the body to contribute more of its natural bacteria fighting ability during treatment.Western doctors are not trained to know such remedies exist, but a brief introductory course explaining basic remedies in a format they understand, and the addition of a TCM doctor to the patient support team, could both help facilitate a better patient experience.

Tuberculosis and Traditional Chinese Medicine

While Western medicine is the only treatment for TB,the many potential benefits of supplementing chemotherapy with TCM are being underutilized. One TB staff member wrote, when asked whether a combination of TCM and Western medicine makes a good treatment,"Western medicine is a better treatment for TB. TCM can only serve as palliative care" (11/28/2013.) While it is true that TCM

[5] Dr. Wen proposed his own theory on the biomedicine behind this treatment, suggesting they might help because they contain lots of Vitamin A (Dr. Wen, 12/3/2013.)

cannot kill the TB bacteria, its palliative care ability should not be underrated. Side effects from TB chemotherapy, especially from the second line drugs used to fight MDR-TB, can be very uncomfortable and are thought to be one of the biggest challenges in maintaining adherence to the drug therapy (Shi, Qing et al., 2013.) TCM can provide relief with many remedies for common TB medication side effects such as vomiting, loss of appetite, insomnia, headache, and loss of memory (Dr. Wen, 12/3/2013.)

Another way TCM can help a patient during TB treatment is to promote the flow of blood and qi throughout the body using herbal remedies such as gingko and ginseng, or acupuncture (Dr. Wen, 12/3/2013.)According to the Chinese herbalist Mr. Lao, who gave me a lesson on herbal remedies for TB, promoting blood movement is the first thing that should be done to help a TB patient, before any other symptoms or side effects are treated. He suggested the use of 炙没药(roasted Myrrh) and 炙延胡索(roasted tuber) to eliminate blood stasis, then adding the following to help eliminate the clots or growths formed by the TB bacteria the lung: 海藻(seaweed), 生牡蛎(oyster shells), 生龙骨(seashell fossil fragments), 炙鳖甲(mountain turtle shells, roasted), 炙龟板(turtle shell, plastron) (Mr. Lao, 11/15/2013.) The herbalist also mentioned many remedies that can help with TB symptoms such as cough or fever, but made sure to stress that unlike Western medicine, TCM must be tailored to each patient and their unique disposition. In other words, there is no one treatment for TB. Mr. Lao, like many others, made sure to stress that all of these herbal remedies are only useful in easing the different symptoms or side effects of TB, and do not have the ability to kill the bacteria and cure the patient.

Using his unique position as both a Western and TCM trained healthcare provider, Dr. Wen also explained to me how TCM would help restore the body after a

patient completes chemotherapy and is in the recovery phase. Herbal supplements like tea tree oil and flaxseed oil both help patients who are dry from running a high fever, and very thin from not eating. Dr. Wen proposed that since they contain good fats they help bring very weak bodies back to their former strength. Another interesting, but little researched TCM treatment is the herb golden seal, which is known to actually contain some antibiotic properties and could possibly strengthen the chemical antibiotics without adding to their negative side effects (Dr. Wen, 12/3/2013.)

Both the Chinese herbalist and Dr. Wen also stressed the importance of adjustment and caution when mixing the two forms of medicine. As Dr. Wen explained, "We don't know what will happen when we combine the two, so it is best to wait 3-4 hours after taking Western drugs to drink TCM tea" (Dr. Wen, 12/3/2013.) It is also important to constantly re-evaluate and adjust the TCM treatment based on the patient's current state and their natural disposition (Mr. Lao, 11/15/2013.)

Survey Results

Given the many benefits to supplementing current Western TB treatment with TCM, it is surprising to hear so few TB patients actually utilize it. Based on my small survey of TB support team members, half believed that only 0-20% of their patients used TCM during treatment. Out of the nine patients at the TCC who participated in my patient survey, none had used TCM while undergoing TB treatment. Many of the patients explained they never felt the need to supplement their treatment since they had not experienced bad side effects, or if they had, they used Western medication to treat them. One patient explained it very clearly to me by asking, "Why would I take TCM? I'm already taking medicine!" Other patients expressed a preference for

Western medicine, explaining it was more convenient, worked faster (he felt better quicker), and one even told me that TCM made his stomach feel bad. These results, though unexpected, show that the use of TCM during TB treatment is far from common for many reasons. I will continue a discussion of these results in the next section.

Besides the low number of patients who use TCM during TB treatment, the surveys also revealed that members of the TB support team had mixed feelings about the use of TCM. Half of the respondents felt it was beneficial as long as proper chemotherapy treatment was also maintained, and one highlighted TCM's ability to regulate the body and strengthen the immune system. The other half believed using only Western medicine was the most effective treatment, explaining that it was the only treatment that could kill the TB bacteria. One TCC doctor, who had been treating TB patients for 16 years, explained that he had no problem with his patients taking TCM, but since the hospital is run by bio-medically trained doctors they would never prescribe or suggest TCM treatment. These results show a contradiction between patients' and healthcare providers' views of TCM use during TB treatment.

Analysis and Discussion

Underutilization of TCM in TB Treatment

It was surprising to see somewhatcontradictory results between my patient surveys, whichreported no TCM use, and TB staff surveys, which showed some support or understanding of the benefits of TCM. I would have expected that if the TB support team recognized the potential benefit of TCM during treatment they would encourage patients to utilize it. After completing and translating both surveys, I discussed my findings with both Li Ling and Dr. Wen. They helped medetermine three potential reasons why I got these responses.

The first possible factor in receiving contradictory responses was the location of my research. I conducted my patient interviews at the TCC, a hospital run by the Yunnan CDC, who use a strictly Western model to treat TB. Once the patients return home to finish treatment they may be more willing to visit their local TCM doctor for help. Second, since I only interviewed inpatients they were all at the beginning of their treatment, anywhere from a few days to three weeks, and therefore may not have experienced bad side effects yet. Third, Li Ling pointed out that the patients may have misunderstood my question and thought I was asking them if they had used TCM during their stay at the TCC, when in fact I was more interested in finding out thelikelihood of using TCM at any point during theirTB treatment.

Psychological Support During TB Treatment

Even though my survey results show little use of TCM during TB treatment, my interviews provided a wealth of information on the potential benefits. Besides the

physical benefits discussed in my the previous section, it is also important to mention the TCM tradition of the doctor as holistic counselor, not strictly a physical healer.

Historically TCM patient care includes a discussion of emotional issues that may be affecting the body physically (Dr. Wen, 9/2013.) Over the past 50 years, China has developed a Western medical practice independent from the rich psychological history of Traditional Chinese Medicine. It is my understanding, through various informal conversations, that as Western medical practice grew in popularity, TCM medicine was utilized separately creating no need for a Western psychiatric discipline to set root in China. As Arthur Kleinman notes from his research in Taiwan (a notably different but comparable culture to mainland China), Western style psychiatric clinics are only used for very serious cases of mental illness and traditional healing fills the gaps for the smaller problems (Kleinman, 16.)As exhibited by the international efforts of CAP-TB and the WHO's TB treatment guidelines, TB treatment adherence is greatly improved when the patient is provided emotional support by both medical professionals and their community. In China, where Western medical practice incorporates little emotional support, I believe the FHI-360 support team trainings are both trying to raise China's TB care to international standards and drawing on historical TCM practices to improve patient care.

When asked about her hopes for the CAP-TB project, Li Ling mentioned this issue of emotional support, or lack of it, in TB care. It was her wish that counseling would become commonplace in TB treatment. She explained to me, "they [hospital staff] have to remember that treatment lasts longer than one week. Most of the treatment is done in the community and the patient needs support there…nobody checks in with the patient, [or if they do] only to criticize them when they stop taking

their medication, but they need to be asked why they stopped" (Li Ling, 12/3/2013.) When TCM doctors practice medicine they are continuously checking in with the patient during treatment, and making adjustments as needed. This philosophy could be seen as time consuming to Western medical doctors, who think it is best to treat every patient with the same proven strategy, but I believe the benefit of improving the patient's emotional well-being will helpincrease a patient's willingness to finish treatment, and positively effect TB adherence.

There have been many international studies done on the issue of adherence within TBtreatment, and Chinese studies researching the overall experience of Chinese TB patients (Suwannakeeree&Picheansathian, 2009, Nackers et al., 2012, B. Xu et al., 2004.) These studies have found that TB patients face many challenges while trying to complete their treatment, from poor education on symptoms to economic barriers.(B. Xu, et al., 2004.) While these provide excellent insight into the social phenomena that increase one's risk for contracting or re-contracting TB, there has been little research on alternative medicine (TCM) treatments being a valuable supplement to TB care. TB is an excellent example of Western medicine saving lives, but also negatively impacting the patient's quality of life for an extended period of time. While TCM cannot cure a patient's TB, its herbal remedies can provide relief from prolonged discomfort, and its tradition of including psychological support withinmedical treatment can help patients from becoming discouraged during this time. Through my research I have found many possible benefits of supplementing TB care with TCM therapies and it surprises me that it is so underutilized in China.

There is no denying that the introduction of Western medicine has improved China's healthcare system, especially in the areas of emergency care and antibiotics. Unfortunately, by completely separating TCM from Western caremany potential

benefits to patients are being passed over. Supplementing TB treatment with TCM could improve patients' experience during treatment, and limit the creation of MDR-TB by improving patient adherence while taking first line drugs. Although further research is necessary, it also has the potential to strengthen the immune system to the point where the second line drugs would no longer be necessary (Dr. Wen, 12/3/2013.) Supplementing TB treatment with TCM immune therapy could also make the first line drugs more effective, reducing the cost of TB treatment, decreasing side effects, and creating less MDR-TB strands.

Conclusion

Many TCM therapies, including herbal remedies and acupuncture, are beneficial to patients undergoing TB treatment, but very few doctors or patients utilize these benefits. I believe further education is needed, both in TCM and Western medical schools, to promote the use of these supplemental therapies and fully integrate them into a TB patient's treatment experience. While I understand there is an extreme fundamental divide between TCM and biomedicine, I don't think a TCM doctor is incapable of learning how to recognize the symptoms of TB, or a Western doctor is incapable of understanding the benefits of immune-supporting herbal therapies. By incorporating a little of both schools of thought into Chinese medical education, I believe China could set an example for improving TB care around the world.

Of course, for TB care to become a combination of TCM and biomedical treatments would not be easy. Through my research I have learned that the two disciplines differ on every step of the process, from diagnosis, to treatment, to recovery, and neither will be convinced the other is effective without further clinical data. My first recommendation for further study would be to offer a training course to TCM doctors in recognizing the symptoms of TB, and the appropriate protocol for referral to TB testing centers. The study could then measure what effect these trainings have on the TB diagnosis rate instudy participants' communities.

Another helpful area of study would be to introduce TCM doctors into special TB clinics and infectious disease hospitals. The TCM doctor could be available to both inpatients and outpatients for counseling, herbal remedies. During the recovery phase, a TCM doctor could also perform acupuncture to flush out toxins. The study

could compare the overall treatment time, adherence, and patient well being at a hospital with and without TCM in order to measure the success of combining the two.

A third, more general study,comparing TB patients who individually supplement their treatment with TCM, and those who use only the chemotherapy to be cured, would be beneficial in gathering quantitative data on this issue. If TCM was found to be beneficial, it could be used to convince staff at the CDC or TB hospitals to incorporate TCM into their hospital treatment regiment. This would provide data on the potential for improved efficiency (patient feels better more quickly), improved adherence, and reduced cost that could come from using TCM.

Although modern medicine has found a cure for tuberculosis, this has not stopped it from becoming a global public health threat. TB treatment is not easy, and strong patient support is a necessary accompaniment to the chemotherapy in order to eliminate the bacteria once and for all. Supplementing chemotherapy with Traditional Chinese Medical practices will offer a new form of support that has yet to be fully utilizedby China or the rest of the world. Through further research we could ease patient discomfort and significantly improve TB treatment from now on.

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Appendix A:

Survey for TB Support Team (Chinese)

有效的结核病治疗：西药和中药

结核咨询员问卷

日期：　　年龄：　　性别：　　职业：

1. 在您的病人中，同时服用西药合并中药治疗的病人比例？

   □0 - 20%　□20 - 40%　□40 - 60%　□60 - 80%　□80 - 100%

2. 您认为最有效的结核病治疗是服用？

   □仅西药□西药合并中药

   为什么，请注明：

   _____

3. 你是否曾经过劝说或鼓励病人服用、或继续服用结核病药物的经历？

   □是的□不是

   如果是的，请详述您是如何劝说、鼓励病人的。

   _____

   _____

   _____

Appendix B:

Survey for TB Support Team (English)

Effective TB Treatment: Western and Chinese Medicine
Counselor Survey

Date: Age: Gender: Position:

1. About how many of your patients use both Western (Bio) medicine and Chinese medicine? (supplement their treatment)
   ☐0 – 20% ☐20 – 40% ☐40 – 60% ☐60 – 80% ☐80 – 100%

2. What do you think is the best (most effective) TB treatment?
   ☐Only Western (Bio) medicine ☐Western (Bio) and Chinese medicine

   Why?

3. Have you ever experienced having to convince/encourage a patient that they need to take, or continue, their TB medication?
   ☐Yes ☐No

   If you answered "Yes", please explain how you helped the patient:

   _____

   _____

   _____

Appendix C: Survey for TB Patients (Chinese)

有效的结核病治疗：西药和中药

结核病患者问卷调查

日期：年龄：性别：

1. 您正在接受结核病治疗吗？ ☐是的（ 个月） ☐没有
2. 您现在在哪里接受肺结核治疗？☐TCC ☐昆明市第三人民医院☐其它，请注明———
3. 这是您第一次接受治疗的地方吗？☐是 ☐不是，我还去了 ————
4. 您现在在服用中药吗？☐是 ☐不是（跳至问题#10）

5. 当您开始吃中药时，是否就中断了西药的服用？
   ☐是的，我曾停药天☐没有
6. 您为什么服用中药？

☐我出现了严重的服药副反应☐西药治疗没效果
☐我更相信中药 ☐中药便宜 ☐其它

7. 被诊断出结核后，您服用哪些中药?

8. 中药治疗效果好吗？☐是☐不是
9. 您会向正在接受结核病治疗的朋友和家人推荐中医治疗吗？
   ☐会 ☐不会

10. 您是否中断过结核药物的服用？

☐没有，我每天都坚持服药 ☐是的，我曾停药天

11. 如果您曾停过药，停药的最主要原因是什么：

☐我从未停过药 ☐我没钱买药 ☐我感觉好了（没有结核症状）
☐我出现了严重的服药副反应 ☐我觉得结核药物没效果
☐其它，请注明————————

Appendix D: Survey for TB Patients (English)

Effective TB Treatment: Western and Chinese Medicine
Patient Survey

Date: Age: Gender:

1. Are you currently being treated for TB? ☐Yes (For Months) ☐No
2. Where are you being treated for your TB? ☐ TCC ☐No. 3 Hospital

5. Did you stop TB treatment when you started TCM?
   ☐Yes, for ___ days ☐No
6. Why did you begin to take Chinese herbal medicine?
   ☐Bad side effects ☐TB treatment was not making me feel better
   ☐Trusted TCM more ☐It was cheaper ☐Other:

7. What TCM treatments have you had since getting diagnosed with TB?

8. Did TCM treatment make you feel better? ☐Yes ☐No
9. Would you recommend visiting a TCM doctor to friends or family who are undergoing TCM treatment?
   ☐Yes ☐ No

   ☐Other
3. Was this the first place you received treatment? ☐Yes ☐No. I went to_____
4. Do you currently take Chinese herbal medicine? ☐ Yes ☐No (Skip to #10)

10. Have you ever stopped taking your TB medication?
    ☐ No, I have taken my medication every day ☐Yes, I stopped for ____ days

11. If you stopped taking your TB medication, what was your number one reason for stopping?
    ☐I never stopped
    ☐I didn't have the money to pay for the medication
    ☐I did not feel sick anymore (no TB symptoms)
    ☐The side effects from my medication were very bad/I felt sick
    ☐I did not feel the TB medication was helping me
    ☐Other (please explain)

Future ISP Study

Given the limited amount of time available for Independent Study Projects (ISP) it would not be possible to do some of the larger research projects previously suggested. A good option for future ISP study would be to further explore the role of TCM doctors in the Chinese community. One could look at how the role has changed throughout modern China's tumultuous political history, and what the future of the discipline looks like. Another potential ISP topic would be to look deeper into a TB patient's social experience during treatment. During my research I learned that fear of contracting TB when socializing with a TB patient is very strong, even among health care professionals, creating a harmful feeling of isolation, potentially triggering depression, and negatively effecting a patient's treatment. A third interesting ISP topic that I came across during my research was the role of the NGO in Chinese society. I learned that there are many complicated restrictions and rules that the government has placed on NGOs. This includes a ban on community-based, grassroots fundraising (in order to protect citizens from getting scammed) which limits the potential for local NGOs to form. Looking further into the history, strategy, and function of NGOs in China would allow foreigners, and Chinese alike, to gain a better understanding of how best to help citizens with donated money.