Improving the Process of Latent Tuberculosis Education for New Americans

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Jessica H. Tjong, DNP(c), RN, BS

University of Vermont Graduate College of Nursing

Mary Val Palumbo, DNP, APRN, GNP-BC & Erin Leighton, DNP, APRN, FNP-C

Site Mentor: Laura Catoe, DNP, APRN

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Abstract

Purpose: Non-Native English speakers face significant barriers to medical education and are disproportionately affected by healthcare inequities. The Vermont Department of Health reports that about 35% of refugees test positive for tuberculosis. Poor understanding of Latent Tuberculosis Infection (LTBI) and treatment can lead to a misunderstanding of the diagnosis. There is a deficit in the necessary materials required to provide LTBI education to those whose native language is not English.

Objectives: The aim of this quality improvement project was to (1) increase patient knowledge of LTBI, (2) Increase the proportion of adults whose healthcare provider checked their understanding and, (3) assess provider likeability of the developed materials.

Methods: New Americans completing their domestic health screen at an academic medical center in the northeast and tested positive for LTBI were invited to participate in the project. Two fully graphic educational materials were created about LTBI and common LTBI medication therapies. A teach back survey was created for the provider to administer to patients and assess patient knowledge through the method of teach back.

Results: Between June 2022 to the end of December 2022, a total of 25 New Americans were recruited. 40% tested positive for LTBI, 50% started medication, and 60% attended their 1-month follow up appointment. Compared to the previous year where 35.4% tested positive for LTBI, 88% started medication therapy and 58.8% attended their 1-month follow up visit.

Conclusion: Providing graphic medical educational materials for non-native English speakers who tested positive for LTBI increased knowledge about LTBI but did not affect medication therapy initiation.

Introduction

Problem Description

Tuberculosis (TB) is an airborne disease caused by *Mycobacterium tuberculosis (M. tuberculosis)*. According to the World Health Organization, TB is the world's top infectious killer, and despite TB being a preventable and curable disease, about 1.5 million people die from it every year (WHO, n.d.). There are two types of illnesses an individual infected with *M. tuberculosis* can contract. The first is called Active TB or TB Disease and is referred to when an individual has symptoms such as a bad cough lasting greater than three weeks, chest pain, hemoptysis, weakness, fatigue, and fever. The second is called Latent TB or Latent TB Infection (LTBI) and has a much different presentation than Active TB. Individuals who contract LTBI are asymptomatic and often do not know they have been infected (CDC, 2016). LTBI is unique in that individuals with this diagnosis do not feel sick and they cannot spread *M. tuberculosis* to others. However, they will have a positive Tuberculin skin test (TST) or positive QuantiFERON blood work (CDC, 2020). There is a 5-10% lifetime risk of LTBI infections transforming to Active TB if not treated appropriately. Rates are even higher if individuals have co-occurring immunodeficiencies (Kunin et al., 2022). LTBI development into Active TB has serious adverse public health implications and therefore must be taken seriously (VDH, 2016). Strikingly, identification and follow up with appropriate treatment can reduce the risk of developing active TB by 90% (Menzies, 2021).

Vermont is one of the many locations in which the US Committee for Refugees and Immigrants (USCRI) is located. USCRI is a nation-wide organization that strives "to protect the rights and address the needs of persons in forced or voluntary migration worldwide and support their transition to a dignified life" (USCRI, 2022). As refugees commonly arrive from parts of the world where TB is endemic, it is not unusual to identify LTBI in some of these individuals.

According to the Vermont Department of health, “refugees are routinely tested for TB as part of the comprehensive health screenings they complete both immediately prior to and upon entry to the US” (VDH, 2016). In Vermont, 29% of TB cases can be attributed to foreign-born individuals and about 35% of refugees test positive for TB (VDH, 2016). Little data is available about statewide rates of LTBI versus Active TB cases in Vermont and this may be due to its vague presentation.

LTBI infections are highly responsive to treatment which can significantly reduce risk of transition into Active TB. Therefore, diagnosis and follow-up care are important. There are many treatment options for LTBI, and all require single or multi-antibiotic regimen for extensive periods of time (Menzies, 2021). An academic medical center in the northeast area that provides care for New Americans arriving in Vermont faces barriers to LTBI education and subsequent adherence to treatment. These barriers can be categorized into two sub-topics: cultural perception of LTBI and individual health literacy levels. Currently, LTBI treatment initiation and completion is reliant on several assumptions; 1) the individual knows what LTBI is 2) the individual understands the implications of LTBI and 3) the individual has an adequate level of health literacy in order to understand their personal treatment plan. Different cultures have varying perceptions of LTBI, and assessment of these perceptions are important in the process of LTBI education and subsequent treatment. Additionally, New Americans who re-locate to the US have varying levels of health understanding as well as English comprehension.

Health literacy is “the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions” (Santana et al., 2021, p. S259). For patients to adequately participate in LTBI care, providers must be able to assess ideal learning styles for each individual patient and communicate LTBI education in that manner. An academic center in the northeast has identified that educational materials provided in a manner that non-native English speakers or people who are illiterate, are severely lacking. This has resulted in the inability for patients to actively participate in their own care and misunderstanding of their diagnosis. Currently, this clinic relies on over the phone or independent in person translational services. These methods can be unreliable and do not confirm patient understanding of the material. Studies show that up to 80% of medical information given at an office visit is forgotten immediately and up to 50% of the information is recalled incorrectly (AHRQ, n.d.). Confounded by the fact many New Americans may not speak English as their native language, it is no wonder LTBI is commonly misunderstood.

Available Knowledge

New Americans and individuals of racial and ethnic minority backgrounds face significant barriers when it comes to achieving adequate healthcare. Some of these barriers are due to social, behavioral, and psychological problems that are not properly addressed in the Western medical model. As a result, this population is disproportionately affected by healthcare inequities (Hu, Juarez, Yeboah, & Castillo, 2014). In countries where TB is endemic and treatment options are not readily available, TB is highly stigmatized and discrimination is apparent toward those who are diagnosed (Gerrish, Naisby, & Ismail, 2012). Sensitivity around diagnosis of LTBI in New Americans is imperative to the future understanding of LTBI and appropriate treatment. Increasing the understanding of LTBI may be an effective means of enhancing TB prevention. Patients with a good understanding of LTBI and those who received information in their native language were more likely to initiate a discussion of treatment (Gustavson, Narita, & Gardner Toren, 2022).

LTBI is responsive to treatment and appropriate medication adherence can significantly prevent the development of Active TB. However, the attitudes towards TB and the populations at risk can influence the success of interventions surrounding education of LTBI. A study looking at the meaning and consequences of TB among Somali people in the United Kingdom stated that "the discrimination associated with TB in developing countries is well documented" (Gerrish et al., 2012, p. 2655). Stigma surround TB results in shaming, social isolation, and avoidance behavior. These actions can result in a delay of diagnosis and treatment which can affect the development of LTBI into Active TB. Additionally, it is well studied that LTBI is not communicable and cannot be transmitted to others (VDH, 2016). Proper education and understanding about LTBI and its transmission status is crucial.

Educational handouts on various conditions and medications proved to be an effective means of increasing health literacy in Latino migrant dairy farm workers (Stimson, 2019). It may be appropriate in this situation to extrapolate that information for New Americans and LTBI education. The introduction of graphic medicine for education is not a new concept, especially for young people. The field of public health has utilized the method of graphic education to enhance patient knowledge of substance abuse, HIV, diabetes, and mental illness. This method of education has shown promise especially for those with verbal communication challenges (Green & Myers, 2010). Comics are a graphic medium that have found promise in the field of health education. Rakower and Hallyburton (2022), report that one of the ways in which comics are so effective in health education is because the image focused nature is engaging and instills confidence in understanding for people with varying levels of literacy or prior knowledge of the topic.

The health literacy and plain language movement began in the 1950s during a push to make bureaucratic publications within the federal government more understandable to the general public. From then, the Department of Health and Human Services (DHHS) began to recognize the importance of plain language materials, and published health literacy objectives for Healthy People 2010 (Brach, 2017). Presently, there stands to be no uniform approach for the most effective way to improve written materials. This can be accredited to the large variability within learners. There have been large efforts to make written material more understandable, but there will always remain a subset of the population where the materials are incomprehensible (Brach, 2017). This suggests that using the method of teach-back is critical for assessing patient understanding.

Rationale & Conceptual Framework

In 1966, Avedis Donabedian, an immigrant, non-practicing physician, published an article titled "Evaluating the Quality of Medical Care". To his surprise, his paper was the most frequently cited article for the next 50 years and became an influential piece in the field of theory and practice of quality assurance (Ayanian & Markel, 2016). Donabedian's framework for health care quality describes a synergy between structure, process, and outcome measures. He believed that these three measures together would result in a desired health outcome for both the patient and provider.

To further break down Donabedian's framework, structure is defined as the setting where care occurs. Structure also includes the space, money, and personnel of the organization (Donabedian, 1988) . Coupling this concept with the current process of LTBI education, the structure can be defined as the academic medical center in the northeast, the site mentor, the nurses who are involved in LTBI follow-up care and the translators who partake in these appointments. Secondly, the process is the way in which a system works to deliver the desired outcome. In other words, “what is actually done in giving and receiving care” (Donabedian, 1988, p. 1745). Currently, LTBI education is exclusively provided through verbal communication between the provider and patient. This is problematic because different learning styles are not offered in order to optimize patient-centered care. Additionally, over the phone translation services are unreliable, and for patient’s whose native language is not English, this poses a serious threat to the understanding of LTBI. A study looking at learning styles between immigrant students states “the standardization of measures regarding academic performance and cognitive ability became a practice that underestimates the skills of minorities” (Figueiredo, Brandao, & Nunes, 2019, p. 2). One can inference that different teaching styles are required to accommodate different strengths of each patient receiving LTBI care. Additionally, examining the effect of cultural intervention on adherence to LTBI therapy found that incorporation of cultural intervention for Latino immigrant clients was useful in enhancing medication adherence within other ethnic groups (Ailinger, Martyn, Lasus, & Lima Garcia, 2010). Tackling different learning styles during the process stage of Donabedian’s framework may impact treatment adherence.

Lastly, Donabedian’s framework describes outcome as the effect the care has on the health status of the patient and population (Donabedian, 1988). Outcome measures are the result of the improvement work and determines whether the achieved aim(s) has been met. Donabedian “emphasized the need for valid measures of structure and process that could be linked to outcomes and for reliable measure of quality that were readily reproducible” (Ayanian & Markel, 2016, p. 206). Outcome measures for this project are inspired by the Healthy People 2030 goal of “increasing the proportion of adults whose health care provider checked their understanding” (UDHHS, n.d.). Further outcome measures this project are a) an increase in understanding of

LTBI as evidenced by correct answers on teach-back survey questions, b) an increase in the proportion of adults whose healthcare provider checked their understanding, and c) an increase in compliance with monthly check-ins after the intervention. Donabedian believed that structure, process, and outcome work together to influence each other and that deficits in one component will lead to deficits in other components of the framework. To sum, there is a deficit in the necessary resources required to provide care to individuals with LTBI, whose native language is not English. This results in a service deficit during LTBI appointments and an unintended outcome of poor understanding of LTBI.

Specific Aims

Aims of this QI project are as follows.

1. Develop 2 LTBI educational materials that reference the difference between LTBI and Active TB, and common medication therapies with associated side effects using the Canva graphic design platform.
2. Develop a teach-back survey to assess patient understanding of LTBI.
3. Increase patient knowledge of latent TB evidenced by number of correct answers on teach-back surveys.
4. Increase in the proportion of adults whose healthcare provider checked their understanding.
5. Increase in compliance with monthly in-person check ins, after treatment has been initiated.
6. Completion of a 12-month retrospective chart review to determine the number of new Americans completing domestic health screens at the project site and determine the proportion who test positive for LTBI.

Methods

Context

The academic medical center in which the project is taking place consists of board-certified physicians, nurse practitioners, nurses, medical assistants, clinical research coordinators, and specialist infection control practitioners. Patients initiated on the LTBI treatment protocol are given a 30-day supply of medication and are expected to follow up every month. During these visits, the team investigates whether patients are following prescribed treatment and barriers as to why they may not be. This is the opportunity to discuss any side effects the patient may be experiencing, and any unanticipated barriers to compliance. New American providers see their patients for the first time during their arrival domestic health screen visits. Diagnostic requirements for LTBI infection are a) the patient is asymptomatic, b) has a positive QuantiFERON test and c) negative chest XRAY. At which point, the provider will initiate LTBI treatment. Success of this project will provide a new learning method for patients in an academic medical center in the northeast.

Intervention(s)

Currently, this clinic does not have physical educational materials for their patients about LTBI. From previous knowledge, research has shown providing educational materials in different formats facilitates learning and patients with a good understanding of LTBI are more likely to initiate treatment (Gerrish et al., 2012). The pre-test survey consisted of one question, “have you ever heard of latent tuberculosis?”. This was followed by the distribution of two graphic educational materials (see Appendix A) paired with verbal education by the provider, and a teach-back survey. The teach-back survey was beta tested in the summer of 2022 and edited before implementation. The teach-back survey was be added to the end of the provider note in which LTBI was diagnosed and discussed. The teach-back survey was formatted into a smart phrase on the electronic health record for ease of use and standardization. Availability of the questions through a smart phrase ensures future providers utilizing this technique are asking the same questions every time, in addition to standardizing the work. Patient answers were matched to analyze progress between the pre-test and post-test and were de-identified to protect confidentiality. Post-test questions to patients are as follows:

1. Can you spread Latent TB to other people?
2. Do you have TB bacteria in your blood?
3. If you do not take your medication, can this turn into active TB?
4. How long will you take your medication for?
5. When will you come back to the office for a checkup?

Study of the Intervention(s)

To study the impact of the intervention, a quality improvement (QI) design was utilized. As stated by Moran et al, 2020, p.233, "QI uses data-based methods to improve clinical or healthcare systems processes and outcomes". The DMAIC process was used to guide the project. DMAIC stands for define, measure, analyze, improve, and control, and evaluated improvement in this project (Moran, Burson, & Conrad, 2020).

Measures

IRB determination has been completed and a retrospective chart review was conducted to review the following data points.

- The number of patient's receiving domestic health screens who were diagnosed with LTBI from June 2021-December 2021.
- The number of patient's receiving domestic health screens who were diagnosed with LTBI from June 2022-December 2022.

- The number of patients who have completed a domestic health screen in a 12-month period (June 2021-December 2021 and June 2022- December 2022) that have been initiated on the LTBI protocol.
- The number of patients receiving domestic health screens in the who require translation services within the inquired time frames.
- Percentage of adherence with 1 month follow up appointments.
- Languages and countries about each New American visit during the inquired time period.

Measures of success were determined through 1) at least 75% correct answers on teach-back survey questions and 2) greater than 75% of patients follow through with their 1 month follow up appointment.

Additional measures outside of the chart review included 3 qualitative interviews with 1 USCRI medical social worker and 2 medical providers to determine 1) likability of the educational materials and teach-back survey, 2) sustainability of the intervention, 3) clinical accuracy of the graphic materials and 4) barriers to distribution. See appendix B.

Analysis

Achievement of the specific aims determined whether implementation of the graphic educational materials about LTBI and LTBI medication side effects were successful. The achievement of project aims, expectations, goals and objectives were measured. Stakeholder support of the project goal was evaluated specifically, in addition to degree of alignment with the organization’s goals of health literacy and patient education.

Three provider surveys were completed to determine sustainability and practicality of the educational materials and teach-back survey questions. Results were analyzed individually and then cross analyzed for common themes and barriers to generalizability of the intervention.

Ethical Considerations

This project involves direct patient education from the site provider about LTBI and medication associated adverse effects. There were no concerns regarding patient's rights, welfare, consent, or confidentiality. Patients were allowed to keep the educational material provided for personal use without cost. Educational materials were vetted by three separate medical providers for clinical accuracy. Employees involved had no conflicts of interest noted. Patient data collection remained anonymous to ensure confidentiality. Approval from the academic institution's International Review Board (IRB) stated this research does not require IRB review and approval, as the proposed activity does not meet the regulatory definition of research under 45 CFR 46.102(d). Secondary approval from the from the organization's Director of Nursing Outcomes and Practice/Director of Nursing Education was obtained after review of the project plan, manager approval, compliance coverage and appropriate organization leader.

Results

From June 2021-December 2021, 48 New American domestic health screens were completed at the project site. Of these visits, patients spoke 9 different languages, came from 8 different countries of origin and 7 different refugee camps (see figure 1, 2, & 3). Of these visits, 35.4% tested positive for LTBI. Among the positive cases, 88% started medication therapy. Of those who started medication, 65% started Rifampin therapy, 3 18% started INH therapy, and 5.8% started Rifapentine 150mg (900mg) & INH 300mg (900mg), also known as Direct Observation Therapy (DOT). Among those started on any medication therapy, 58.8% attended their 1 month follow up visit.

In the following year, from June 2022-December 2022, a total of 25 New Americans completed their domestic health screens at the project site. Among this set, 40% tested positive for LTBI. At this time, LTBI graphic materials and teach back survey questions were implemented. Of those who tested positive, 50% started medication; 80% were started on rifampin therapy, 20% were started on INH therapy, and none began DOT. Of those started on medication, 60% attended their 1 month follow up.

September 2022-December 2022 was the designated implementation phase of the developed materials and teach-back survey. During this time period, four patients completing their New American domestic health screen visit at the project site tested positive for LTBI. Each of the 4 patients answered “no” to the post test question asking whether they had ever heard of LTBI. The developed materials were then distributed in conjunction with a translator and verbal education. This was followed by the 5 teach-back survey questions. Each of the 4 patients answered these teach-back questions correctly and scored 100%.

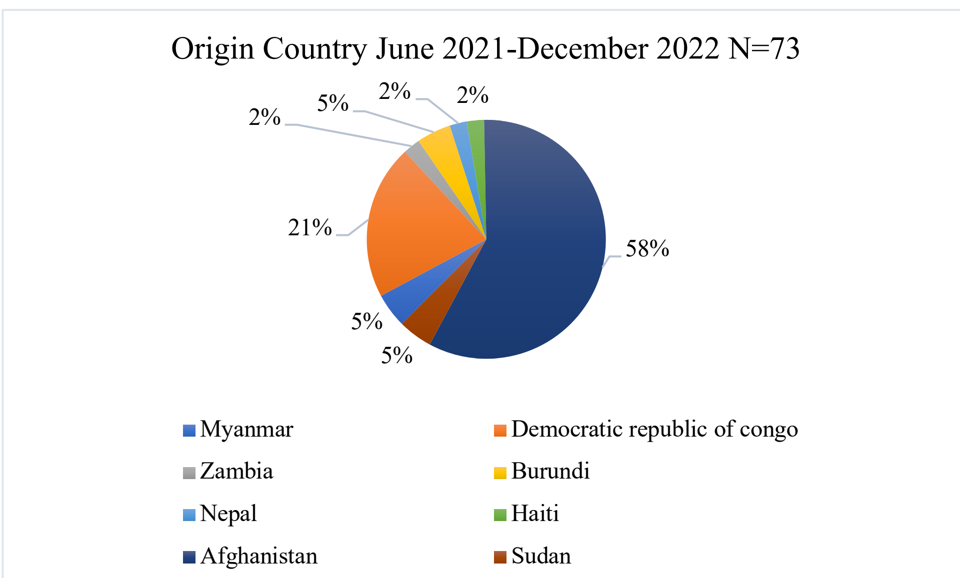


Figure 1: Total distribution of countries of origin for New American patients completing their domestic health screen at an academic medical center in the northeast during the collection time period.

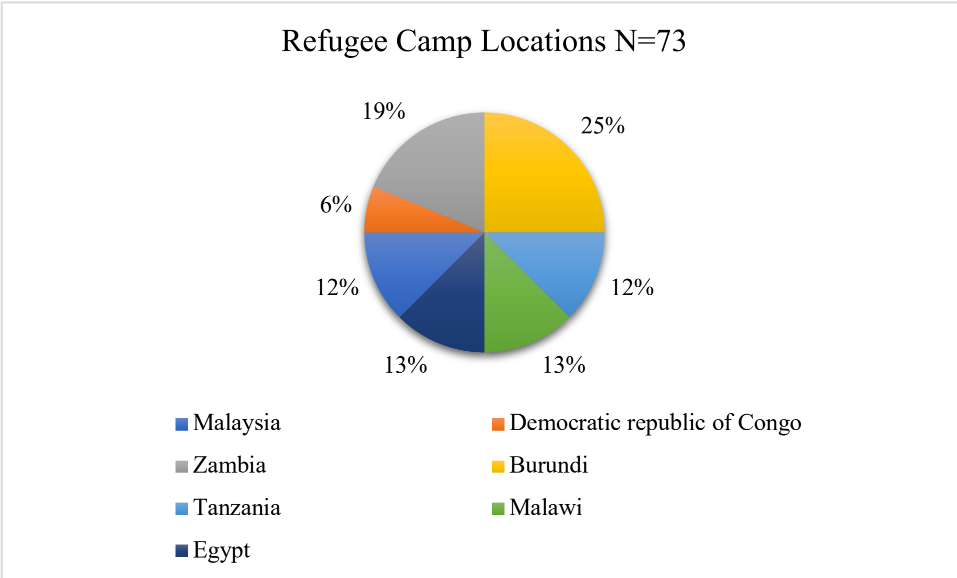


Figure 2: Total distribution of Refugee camp locations for New American patients completing their domestic health screen at an academic medical center in the northeast during the collection time period.

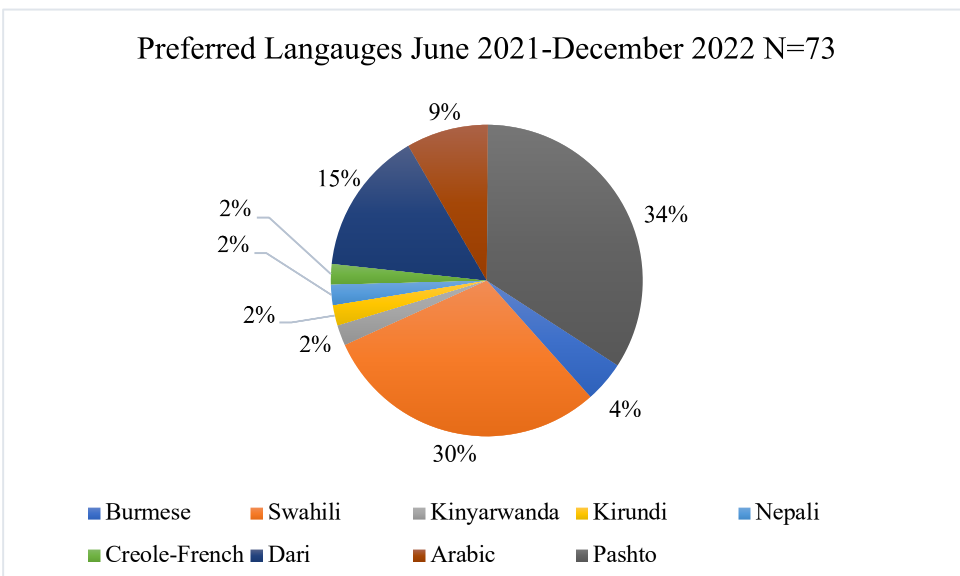


Figure 3: Total distribution of preferred languages for New American patients completing their domestic health screen at an academic medical center in the northeast during the collection time period.

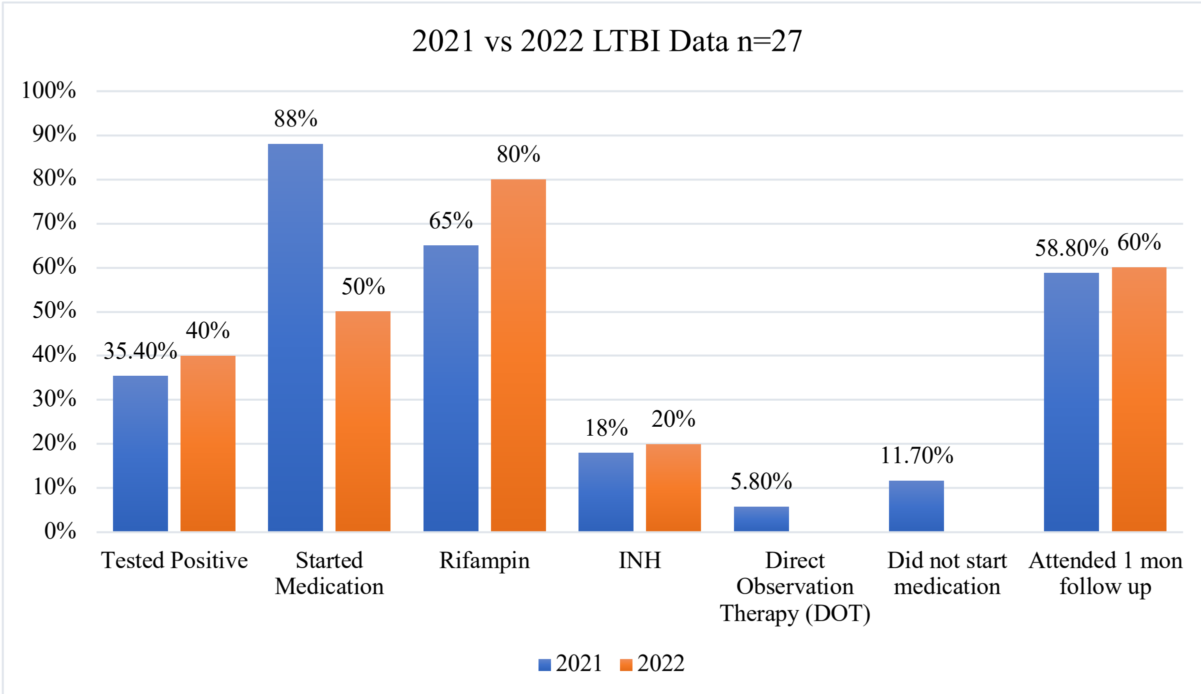


Figure 4: Comparative representation of LTBI data in the 2021 and 2022 data collection time period.

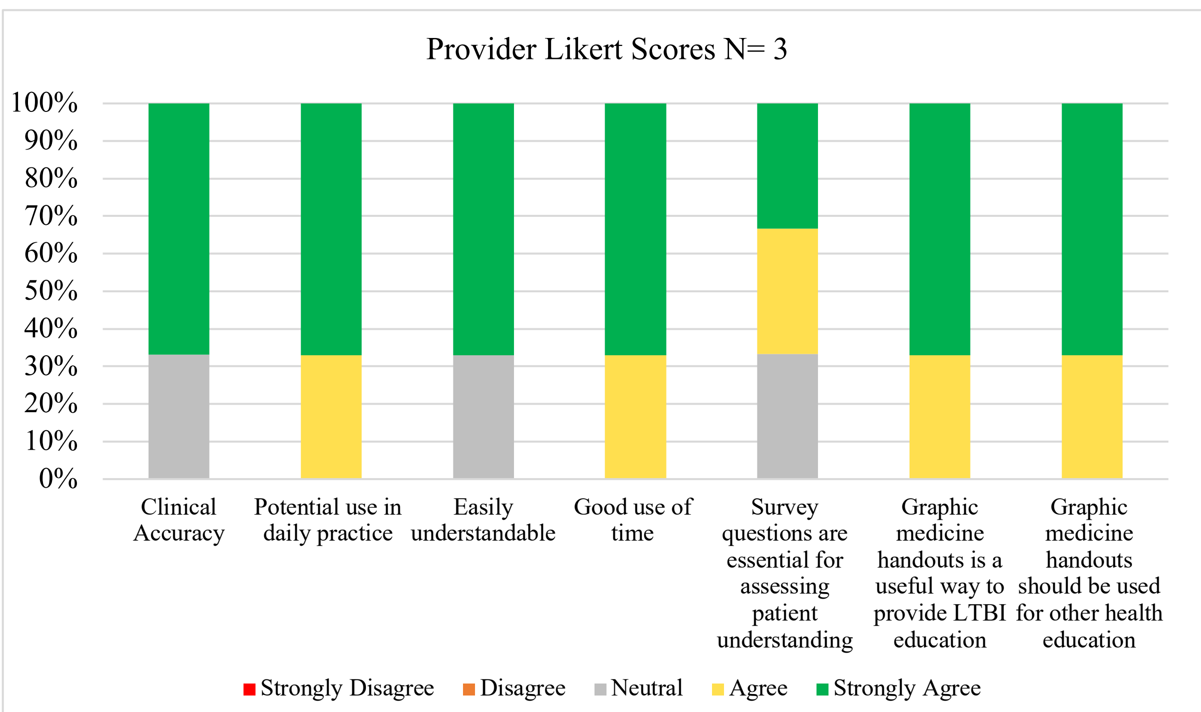


Figure 5: Distribution of provider Likert scale survey. Three medical providers were interviewed to determine likability of the educational materials and teach-back survey questions.

Discussion

Summary

Major findings of this project demonstrate that New Americans completing their domestic health screens at an academic medical center in the northeast come from all parts of the world and require medical information be translated during provider visits. This emphasizes the need for alternative medical educational materials that consider non-native English speakers. The developed graphic LTBI educational materials have shown to be an engaging method of educating non-native English speakers on their diagnosis and medication treatment plan. The use of LTBI graphic educational materials increased patient knowledge of their diagnosis, evidenced by participants scoring greater than 75% on the teach back survey questions. Additionally, the site provider reported active patient-provider engagement during the education process. This was an aspect of the patient-provider relationship that was reportedly lacking prior to the use of the developed materials.

One of the most meaningful findings of this project was that use of graphic materials during the LTBI education process allowed for patients to actively participate in their own medical decision making. Prior to the intervention, there was no standardized method of assessing whether patients understood their LTBI diagnosis. With the implementation of standardized teach back questions, there became a qualitative method of assessing patient's understanding. This supports the Healthy People 2030 goal of "increasing the proportion of adult's whose healthcare provider checked their understanding". The creation of the "LTBI Survey" smart phrase in the EHR allowed for further standardization of teach back and easy replicability. Additionally, a majority of surveyed providers felt that graphic medicine handouts were a useful tool to provide LTBI education, that the materials were a good use of time, easily understandable and had the potential to be used in daily practice.

Limitations

The findings from this project cannot yet be generalized to other diagnoses or practices. Working with this population is highly rewarding, however comes with much variability. The first being that the political climate dictates relative influx of New Americans to the state, which highly impacts the distribution of LTBI materials and number of participants. Additionally, within this population, their time spent in Vermont can be transient depending on their individual goals. It is possible individuals will want to move to a different practice or state during their LTBI treatment. In this case, patients can appear to have not followed up with the clinic, when in reality they are seeing a different provider. This may be why the 2022 data appears to not have significantly improved medication therapy initiation and follow up appointments compared to the 2021 data. This underscores the importance of New Americans understanding their LTBI diagnosis, regardless of whether they move practices. Lastly, family planning is an important discussion in the treatment of LTBI as most treatment options are contraindicated with pregnancy and breastfeeding. The choice to start treatment or not is heavily affected by the individual's current position in the process of family planning.

As medicine is constantly changing, terminology, symptomology and what is known about LTBI may change in the future. The developed materials were designed with what was presently known to be clinically true in regard to LTBI. If and when information surrounding LTBI changes, the materials are meant to be edited to reflect the most current guidelines.

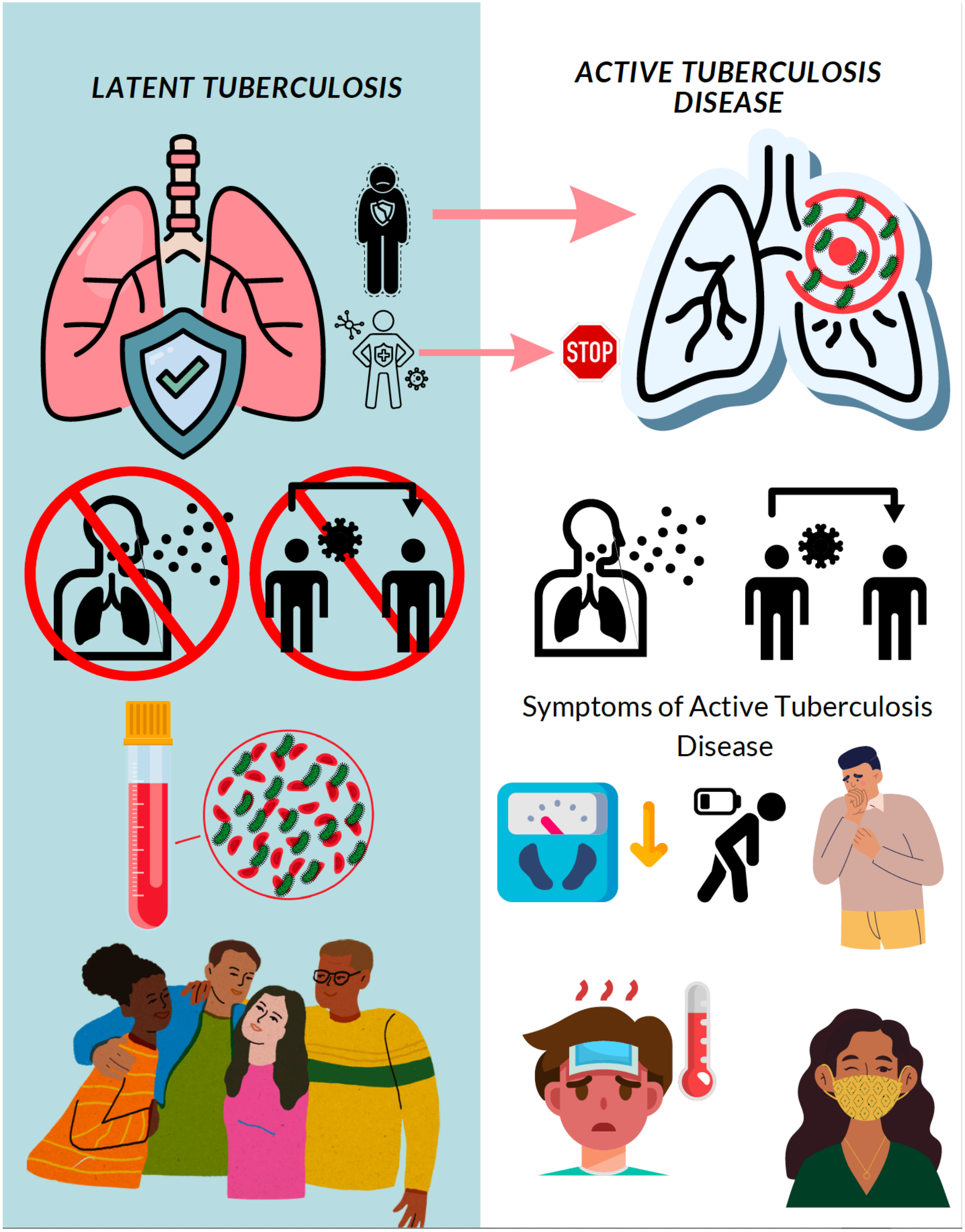
Conclusion

The core of this project was to support self-advocacy for New-American patients by creating a standardized method for LTBI teaching targeted at those whose native language is not English. In order for patients to make informed decisions about their medical care, appropriate health education materials must be provided to all patients based on literacy level. The creation of graphic materials to help providers explain LTBI and assess patient understanding was useful for clinical practice, however, did not increase initiation of medication therapy and attendance of 1-month follow up. Importantly, the LTBI graphic materials and implementation of the teach-back survey did not add subjective time to the visit as was expected. In fact, the graphic was used by the provider to supplement teaching that already occurs in domestic health screen visits.

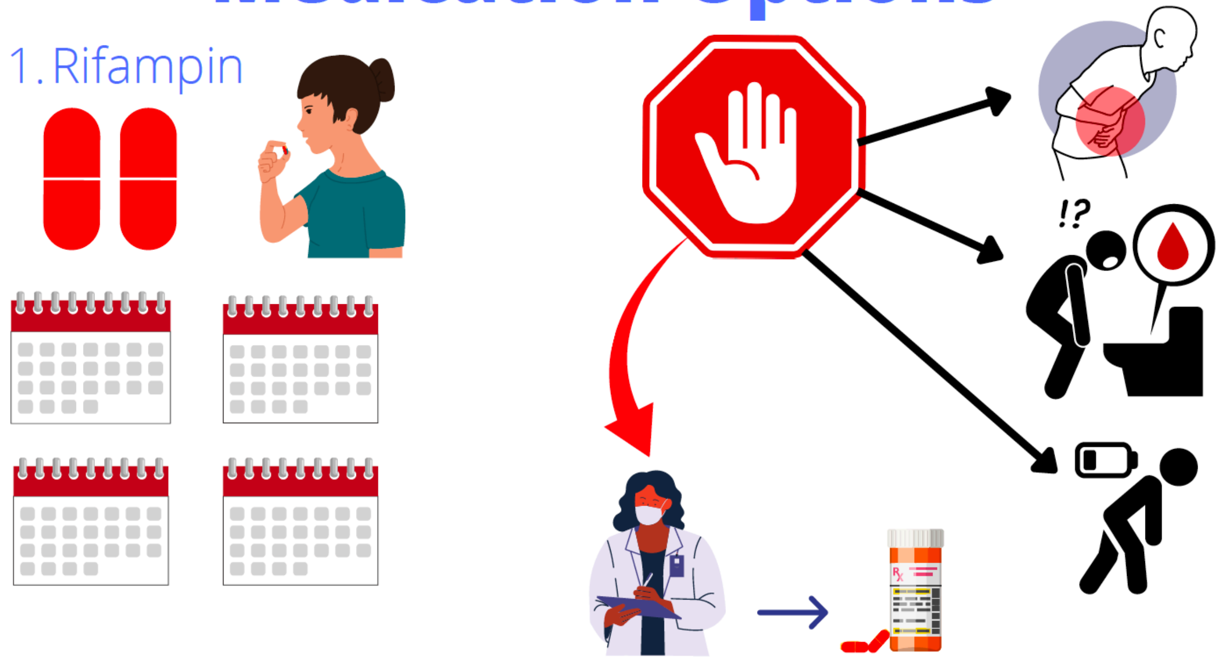
Recommendations include refining the developed graphic materials to reflect guidelines, should they change in the future. Addition of a graphic designer or professional artist to the project team in order to portray symptomology and medication side effects may benefit the usability and comprehension of the materials. One of the biggest complications with the current graphics is that they cannot be stand-alone patient education materials. Rather, they must be paired with the verbal teaching of a health care professional in order to ensure clinical accuracy. Advancements in the materials can focus on guaranteeing the graphics are understandable for individuals who do not have paired verbal teaching. Settings in which this may be true is a waiting room, health fair, or school.

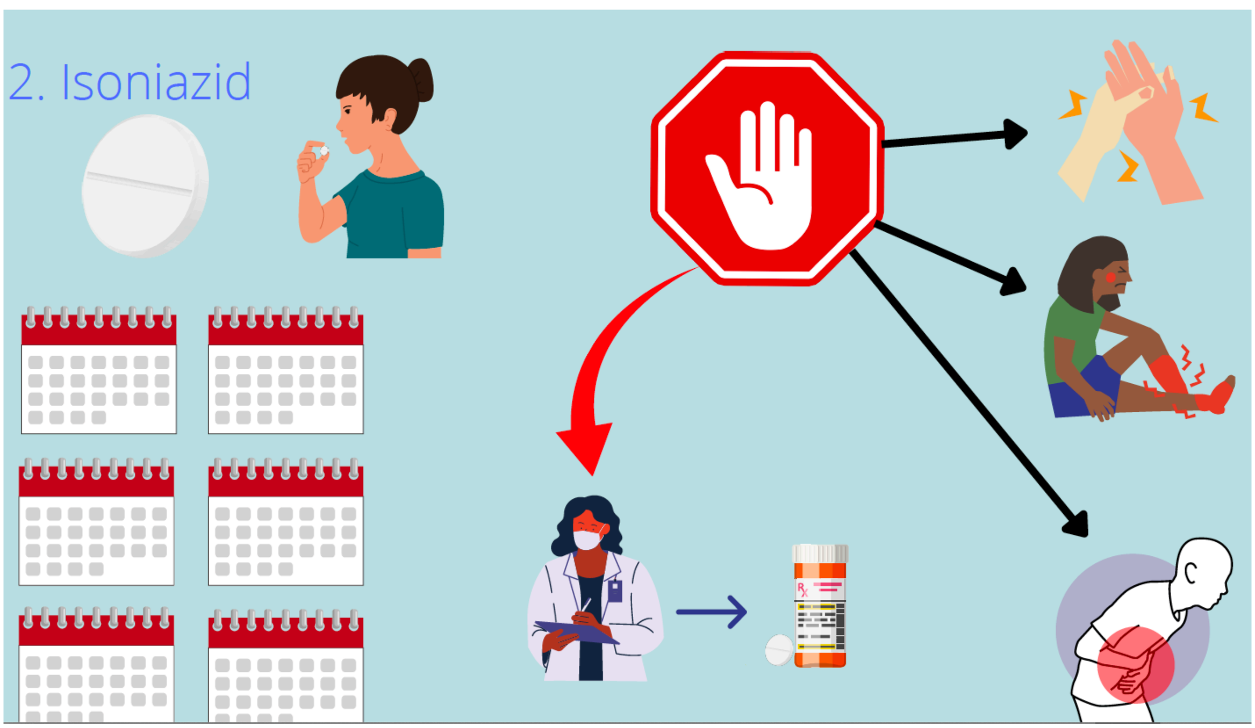
As the field of graphic medicine continues to grow, it proves to be a promising method of plain language health education. Creation of materials in the same format can be created for other common primary care illnesses and preventative medicine education. Future studies may consider including English as a second language (ESL) patients as they may face similar language barriers to New Americans. As the population of those seeking healthcare continue to diversify, it is of utmost importance patients are empowered and provided with the tools needed to succeed. This can begin with health education that matches the patients' health literacy and comprehension level.

Appendix A


LATENT TUBERCULOSIS
ACTIVE TUBERCULOSIS DISEASE
STOP
Symptoms of Active Tuberculosis Disease

Latent Tuberculosis Medication Options





Appendix B

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
The information on the two educational materials is clinically accurate.					
I will incorporate these educational materials into my daily practice.					
The two educational materials are essential in helping New Americans understand their LTBI diagnosis.					
Utilizing these two materials in the education of LTBI for New Americans is a beneficial use of my time.					
Teach back questions that are asked after the distribution of the two handouts are essential for knowing whether my patients have a basic understanding of LTBI.					
The use of graphic educational handouts is a useful tool to relay health educational materials for future patients.					
I could see future health topics utilize the method of graphic education in order to help patients understand other health related illnesses.					

Appendix C

Clinical Question: In New Americans arriving in Vermont, how does providing LTBI education materials in the form of graphics and teach back compared to no materials, affect medication adherence and understanding of LTBI by December 2022.

Keywords: tuberculosis, patient education, refugee, immigrants, "new Americans".

Author, YEAR	**Purpose**	**Conceptual Framework**	**Sample Characteristics & Setting**	**Interventions**	**Data Analysis**	**Main Findings**	**Level of Evidence ****
Kunin et al., 2022	Improve screening and management of LTBI infection using a primary care model.	Demand for specialist infectious disease services exceeds capacity to provide effective management for LTBI pt in primary care. Authors wanted to pilot LTBI Tx in primary care clinics for refugee-focused primary health clinics	Monash Health Refugee Health and Wellbeing (MHRHW) and a universal primary care clinic Refugee focused—asylum seekers and refugees between ages of 18-50yo.	Once pt's were selected for the study (they had tested positive on QuantiFERON, Mantoux and had a normal CXR), they were assigned to either MHRHW or Universal primary care clinic.	6-month treatment completion rate was higher at MHRHW compared to the universal primary care clinic.	reasons that pt at universal primary care clinic did not complete treatment was—adverse drug reactions, did not collect meds, personal opt out and relocation. Provider perspectives on barriers: follow up was difficult, no shows—clinicians expressed these could be mitigated through routine pt education like "teach back".	Level 3. C Prospective cohort

Author, YEAR	Purpose	Conceptual Framework	Sample Characteristics & Setting	Interventions	Data Analysis	Main Findings	Level of Evidence **
						Provider perspectives on enablers: culturally competent care .	
Ailinger, R., et al., 2010	Examine the effect of cultural intervention on adherence to LTBI therapy among Latino immigrants.	Based off healthy people 2010 that "90% of those treated for LTBI will complete their treatment in order to reduce the case rate of TB". Latinos account for 15.1% of the US population and 29% of active TB cases—Adherence to LTBI therapy is imperative in decreasing rates of active TB.	<u>Setting</u>: public health chest clinic in an urban county of Virginia with over a 20% Latino population. <u>Intervention group:</u> convenience sample of 86 Latino immigrants who came to the public health clinic to start LTBI therapy. <u>Comparison group:</u> historical sample of records of Latino immigrants who had be treated with LTBI in the past year.	cultural intervention with the experimental group. Randomization was not possible because experimental group data was compared to historical data records of the client.	Adherence was measured by the number of pills reported by the clients. Total number of pills for 8 months was recorded and compared to the historical groups. Data was analyzed using SPSS software. Descriptive statistics were used to examine demographic characteristics and number of doses taken by	Intervention group took a greater number of pills than the comparison group; difference was statistically significant p=0.28. Culture is important among this population, and it was included in the design of this study. There was a statistically significant difference in adherence to LTBI therapy with the cultural intervention group and comparison group.	Level 2.c Quasi-experimental prospectively controlled study

Author, YEAR	Purpose	Conceptual Framework	Sample Characteristics & Setting	Interventions	Data Analysis	Main Findings	Level of Evidence **
					each group.	Educational materials written at the 6th grade level which included pictures of Latino families were given to clients—pictures were useful for families with low health literacy. Incorporation of cultural intervention in educational materials for Latino immigrant clients with LTBI was promising—useful in enhancing medication adherence within other ethnic groups.	
Gerrish, K., Naisby, A., & Ismail, M. (2012)	Determine the socio-cultural meaning and consequences of	In countries where treatment for TB is not readily available, TB is highly	Somali community members in Sheffield, UK. Comprised of people with	4 phases of data collection 1.In-depth interviews with community leaders.	1.The research team familiarized themselves with the data by	Participants had misconceptions about TB spread and its prognosis.	Level 4.c

Author, YEAR	Purpose	Conceptual Framework	Sample Characteristics & Setting	Interventions	Data Analysis	Main Findings	Level of Evidence **
	TB among Somali people living in the UK.	stigmatized and results in social isolation. Little is understood about how the Somali community understands TB or how stigma is articulated and experienced post-migration.	various migration histories and economic statuses.	2.Semi structured interview with community 3.Semi-structured interviews with TB patients in the community 4. Focus group discussions.	reading transcripts 2.thematic framework was developed 3.Individual transcripts coded by thematic framework 4. coded data was organized into major themes 5.Data was mapped.	TB is a stigmatizing disease. The meaning of TB was shaped by their knowledge and beliefs about the disease—influenced their thoughts about treatment. Once TB was contracted, little understanding about infection after treatment. Somalis with TB felt stigmatized and feared discrimination which likely influenced who they disclosed their condition to. Limitations: this study was done outside of the US—	

Author, YEAR	Purpose	Conceptual Framework	Sample Characteristics & Setting	Interventions	Data Analysis	Main Findings	Level of Evidence **
						United Kingdom.	
Hovell, M., Sipan, C., Blumberg, E., Hofstetter, C., Slymen, D., Friedman, L., . . . Vera, A. (2003).	Determine the efficacy of coaching Latino adolescents with LTBI to adhere to isoniazid treatment.	There is limited data available on adherence interventions that target adolescents with LTBI. 286 Latino adolescents were randomly assigned to 3 different intervention groups	12-19yo Latino adolescents who were interested in having INH treatment from a community clinic.	1) usual medical care, 2) usual care in combo with adherence coaching 3) usual care in combo with self-esteem counseling.	No significant baseline differences among demographic differences suggesting random assignment was successful.	Theoretically based coaching increased adolescents' cumulative medication use more than control condition. Coaching group achieved the greatest rate of treatment completion. Suggests that maybe follow up and appropriate encouragement to complete medication treatment may be beneficial for LTBI medication regimen.	Level 1.c Randomized control trial
Nyamathi, A., Nahid, P., Berg, J., Burrage, J.,	Determine efficacy of nurse case-managed intervention with incentives	Comprehensive health seeking and coping paradigm. Focus is on the implementa	Homeless subsamples with a variety of behavioral determinants that the literature	Both for intervention and control groups, homeless adults were required to	Frequencies on characteristics and behaviors of participants in	Nurse case-management with incentive is a good foundation for	Level 2.c Prospective site-randomized

Author, YEAR	Purpose	Conceptual Framework	Sample Characteristics & Setting	Interventions	Data Analysis	Main Findings	Level of Evidence **
Christiani, A., Aqtash, S., . . . Leake, B. (2008)	and tracking would improve adherence to LTBI treatment.	tion of strategies r/t coping, communication, promotion and health seeking behavior.	has identified as predictive for non-adherence. (injection drug use, daily drug and alcohol use, ethnicity, gender, physical and mental health problems).	come to clinic 2x per week for 6mon to receive direct observation of treatment. $5 given for each dose. Intervention group also attended 8 educational and skills training modules.	experimental and control groups were compared. 12 models for dependent variable was LTBI treatment completion was included as a predictor	increasing adherence. Nurse interventions with education,, tracking, and incentives effectively increased adherence to 6mon. Intervention group had better LTBI treatment adherence than did the control program. These results show that the intervention of nurse case management can improve LTBI treatment completion in underserved populations.	

***Please cite the level of evidence grading schema you used (Munn, Lockwood & Moola, 2015)*

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