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The Effectiveness of a Multifocal Training to Improve the Treatment of Chromoblastomycosis in Rural Madagascar

Aaron Santmyire, DNP, FNP-BC

Abstract: Madagascar has the highest number of cases of chromoblastomycosis in the world, but the areas of highest incidence have limited affordable access and knowledge of first line medications to treat this long-term fungal infection of the skin and subcutaneous tissue. The impact of a multifocal training targeting medical doctors who live in the area of the country with the highest prevalence of this disease has not been clearly reported. The purpose of this project was to determine the effect of a multifocal training on chromoblastomycosis for Malagasy medical doctors in the SAVA (Sambava, Andapa, Vohemar, and Antalaha) province of Madagascar (in the country’s northeast) about diagnosis, staging, patient education poster, and treatment options of chromoblastomycosis versus common treatment practices to increase participant's knowledge and utilization of current treatment recommendations for chromoblastomycosis. Medical doctors in the SAVA province of Madagascar enrolled in the multifocal trainings.

Key words: Chromoblastomycosis, Madagascar, skin and soft tissue infections.

Caring for patients who have chromoblastomycosis can be challenging and frustrating in the developed world where multiple treatment options are available and affordable.1,2 The challenge of caring for those who are suffering with this disease can be exponentially greater in the developing world, where most of the world’s infections occur, because research and evidence support treatment options that are unavailable, unaffordable, or unknown. The prevalence of chromoblastomycosis in Madagascar has been well documented. Evidence and local practitioner experience suggest that medical doctors do not know of or barriers are preventing them from following recommendations in the treatment of this disease.1 The goal of this project was for medical doctors to move beyond knowledge of chromoblastomycosis and recognize how early diagnosis, treatment recommendations, staging/scoring instrument, and a patient education tool would facilitate application knowledge.

Even though chromoblastomycosis is not often physically fatal, it can be fatal to the patient’s social and community life. Family and community life are of utmost importance in Malagasy culture, and conditions that limit participation and lead to exclusion from the community can be as devastating as physical death itself. Patients commonly
say that the most important reason or driving force behind them seeking treatment is so that they can participate in community and family life once again. It is paramount that Malagasy health care providers know the most effective method of treatment of chromoblastomycosis to achieve resolution of infection, prevent adverse health outcomes, decrease disfigurement, prevent marginalization of those infected, and practice financial stewardship.3 The purpose of this paper is to describe the implementation and evaluation of a practice change concerning the treatment of chromoblastomycosis in the SAVA province in northeast Madagascar. Implications and recommendations for practitioners working in the developing world are presented.

Background. Chromoblastomycosis is a chronic infection of the cutaneous and subcutaneous tissue, and most commonly occurs in tropical and sub-tropical climates.3 Chromoblastomycosis infection often corresponds to occupations that have increased contact with soil such as rice planting and forest clearing. Patients are frequently male, and describe being stuck by a piece of wood or plant material in an extremity. The patient subsequently develops infection at that site of the puncture wound.

Although infection starts after entry of one of the causative organisms, infection characteristically follows a slow progression.4 The most common anatomical area of infection is in the lower extremities as a result of not wearing shoes or foot protection. However, cases have been reported in the buttocks, arms, hands, trunk, and face. Queiroz–Telles et al. describe that during the early stages of development, the initial lesion is usually pink in color, palpable, smooth, solitary, and unilateral.3 Slowly over time, the lesion develops a scaly surface, can begin to spread, and present clinically in several different distributions and patterns. Intense pruritus at the site of infection is common.

Systematic review. Computerized literature searches of the National Guideline Clearinghouse, CINAHL, PUBMED, the Cochrane Library, Google Scholar, and Wiley Science full-text databases were performed using the keywords chromoblastomycosis, terbinafine, skin infections, mycosis, and treatment. A search strategy was developed for each database using similar keywords, and the searches were conducted using various combinations of the identified keywords. No limits were placed on the publication date or type of article. The search was limited to full text articles available on the Health InterNetwork Access to Research (HINARI) system that were either in English or French languages. These searches produced 126 hits.

A three-step process was used to identify articles to retain or exclude. A total of nine articles were included in this review: one systematic review, one randomized controlled trial (RCT), and seven expert opinion papers.1,3,4–10 Although it weakened the overall strength of the systematic review, expert opinion papers were included because lack of clinical practice guidelines, systematic reviews, and/or RCT. A single reviewer critically appraised the quality of each article included in the review.

The findings of this systematic review supported the conclusion that there are two medications that are recommended in the treatment of chromoblastomycosis and that physical treatment options can be used as monotherapy or in combination with oral medications.2,3,6,11,12 Application of these findings for treatment of patients in Madagascar, where a large percentage of the world’s infections occur, is difficult as one of the medications is not available, and the physical treatment methods are either unavailable,
unaffordable, or impractical. The findings from this systematic review demonstrated that further research must be done to find treatment methods that are both effective and available in the parts of the world where the majority of infections occur.

**Epidemiology.** A major barrier to measuring incidence and prevalence is that the majority of the world’s cases occur in Madagascar, which does not officially report or record the number of cases diagnosed each year. In the literature, Esterre et al. highlighted that there have been 1,300 cases in Madagascar in 40 years. This author conducted a survey from November 2013–November 2014 at the Adventist Hospital in Andapa, Madagascar where he and his Malagasy colleague conduct a monthly dermatology clinic. During the year, 2,654 patients were treated for various dermatological conditions, and 38 were biopsy-confirmed cases of chromoblastomycosis.

**Project objectives.** The specific outcomes to be achieved and evaluated as part of this project were doctor knowledge and subsequent use of treatment recommendations for diagnosis, staging/scoring, treatment, and patient education of chromoblastomycosis following a multifocal training as evidenced by improvement of scores from pretest to posttest, no loss of knowledge at three-month follow-up, and self-report of utilization of the recommendations in treatment of chromoblastomycosis.

1. By completion of the multifocal training, doctors would improve their knowledge of chromoblastomycosis as demonstrated by improved scores on the pretest to posttest.
   Specifically doctors would be able to:
   a. list diagnostic features of chromoblastomycosis including initial lesion characteristics and the five different types/forms;
   b. list the medications that are no longer considered in treatment of chromoblastomycosis;
   c. list medications that can be used to treat chromoblastomycosis specifically in the SAVA province of Madagascar;
   d. use the scoring/staging system developed by Castro to guide treatment.
2. Doctors would self-report using the treatment guidelines and staging system on the three-month follow up evaluation.
3. Knowledge gained from the multifocal training would not be decreased at three-month follow-up as evidenced by maintenance of first posttest scores.

**Methods**

**Theoretical framework.** Roger’s theory of Diffusion of Innovation was used to guide this multifocal training project in SAVA province of Madagascar. This author had used this theoretical framework in his past work on skin and soft tissue infections, and chose it to use it again because of its proven validity cross-culturally. The project had as its practice question: What is the effect of a multifocal training on chromoblastomycosis that educates medical doctors in SAVA province of Madagascar about diagnosis, staging/scoring, and patient education of the treatment of chromoblastomycosis versus
common treatment practices to increase participant’s knowledge and utilization of current treatment recommendations for chromoblastomycosis?

**Goal.** The purpose of this project was to assess the effectiveness of a multifocal training to improve the treatment of chromoblastomycosis in the SAVA province, Madagascar. Doctors were provided with a multifocal training, staging tool, and patient education poster (innovation). The training, staging tool, and patient education poster were used to encourage (persuasion) doctors to begin to use treatment recommendations and provide resources for them to do so. After the completion of the multifocal trainings, doctors who attended the training made the decision to use the treatment recommendations and to educate their community. Implementation of the innovation occurred when the doctors applied the innovation. Confirmation occurred when the three-month follow-up was analyzed.

**Population description.** The population of interest was limited to medical doctors living and working in the SAVA province of northeast Madagascar. There are no available census data available on the number of households in this region. However, there are statistical data available for Madagascar. In 2012, there were 22,293,900 people living in Madagascar. In 2012, the per capita income spending on health care was $40 USD. Health care spending accounted for 2.6% of the gross domestic product (GDP).

In the SAVA province of Madagascar, there are over 51 doctors registered with the national order of doctors. These medical professionals vary in educational background, experience, working conditions, and ethnicity. For the purpose of this project, medical doctors were targeted, as they are the common sources of treating and prescribing medications in Madagascar. The target population speaks French, but the general population living in this region of Madagascar speaks a variety of the macrolanguage Malagasy (an Austronesian language). This was important for any printed patient educational materials. The multifocal trainings were conducted in French, but translation into the local variety of Malagasy was available if needed.

**Setting for project.** Madagascar is an island located off the east coast of Africa. It is the world's fourth largest island, and boasts some of the most unique and diverse plant and wildlife in the world. Madagascar is geographically divided into six provinces and one of these provinces is the SAVA province. A large percentage of the Malagasy population lives below the international poverty line, and therefore faces strong barriers to health care. The overall health care situation in Madagascar is poor, and there is an extremely small presence of trained health personnel in rural areas, evidenced by the closing of rural clinics because of lack of personnel.

Local Indigenous traditional healers sometimes discourage the use of Western health care. Often in Madagascar, these witch doctors use fear, intimidation, and manipulation to control and profit from those who are sick in the community (R. Sakafira, personal communication). They treat the patients until the patient and their family resources are exhausted, and it is at that time that the patient is commonly presents in the local hospital. Their condition is often far advanced and at times little can be done to help treat their physical illness in its late stages (R. Sakafira, personal communication).

**Project development.** After working in the SAVA province for over one year, conducting a systematic review, deducing that there was need for the project, we decided that an expert committee was of paramount importance for the success of the project.
The committee would be needed to provide cultural understanding, insight, community influence, and the commitment to participation by local doctors needed for the success of the project. A team formed that included a four Malagasy medical doctors, one who is the medical director of the Adventist hospital, one who is the National Director of the Leprosy program, one who has experience in treating dermatological conditions, and the other who has experience in treating chromoblastomycosis.

With recognition that this project had several obstacles that could increase the cost of the multifocal trainings, this author contacted the American Academy of Dermatology (AAD) about the possibility of its sponsoring the program. The two major obstacles included the remote location of Andapa and the distance the doctors would need to travel to attend the conference. Finances were needed for: transportation for the training team to this remote province, per diem and transport costs for the attendees, development and printing of posters for patient education, and office supplies. The AAD awarded us a Skin Care in Developing Countries grant, which provided the necessary funds for the project.

**Design.** This project was designed to promote a practice change in the treatment of chromoblastomycosis by using a multifocal training to educate medical doctors about the treatment options and tools used to address the barriers that prohibit them from properly diagnosing and treating this disease. The author developed a pretest, posttest, and three-month follow-up evaluation that was reviewed and validated by a nursing research professor at West Virginia University School of Nursing. The project design received approval on December 10, 2014 from the Institutional Review Board of Center for the Advancement of Healthcare Education and Delivery located in Colorado Springs, Colorado. Approval to hold the conference in Andapa was given under the covering of the Director of the National Program against Leprosy and Medicine Inspector of the SAVA province.

The multifocal training took place from 10–11th of February 2015 in Andapa, Madagascar. The target population was the doctors who live and practice in the SAVA province; therefore the Medicine Inspector for this province was contacted to ask for permission and for all the names of registered doctors in the province. Invitations were sent to all 51 doctors who are recognized by the government to participate in the multifocal training. The training include presentations on leprosy, skin and soft tissue infections, chromoblastomycosis, tropical dermatological skin infections, and treatment of dermatological conditions in the pregnant or breast feeding woman. There was exponential value in the multifocal training as each presenter was able to differentiate accurately among dermatological conditions that are sometimes confused for one another. The multifocal training for chromoblastomycosis included:

1. Administration before the presentation of an author-developed pretest (Appendix A) to assess practitioners’ knowledge of diagnosis, staging, and treatment options for chromoblastomycosis.
2. Presentation of diagnostic characteristics, treatment guidelines, past experience, techniques for using staging/scoring system (Appendix B), and patient education (Appendix C). These presentations took place in two sessions over a two-day period.
3. Dialogue with practitioners to address their concerns about and barriers to treating chromoblastomycosis.
4. Administration of an author-developed posttest (Appendix A) following the presentation and dialogue.
5. Administration of a three-month follow-up evaluation (Appendix D) to all practitioners who participated. The evaluation repeated the questions from the posttest and included self-report questions on use of newly acquired information on diagnosis, staging, and treatment.

Results

Demographic characteristics of the participants. Thirty-four doctors (67% of the doctors in the SAVA province) participated in the multi-focal trainings. The range of years in practice went from several years to more than 30 years of practice. The gender make up of the participants was 23 men and 11 women.

Results of the pretest and posttest. The pretest and posttest (Appendix E) assessed the knowledge and effectiveness of the educational program. The author developed an Excel spreadsheet for the data. The data were examined to see if there was any significant difference between the pretest and posttest scores, in an effort to assess the multifocal training's effectiveness. There were 15 questions on the identical pretest and posttest. A paired t-test was conducted comparing the results. The null hypothesis (that there would be no significant difference or lack of knowledge acquisition in comparing pretest with posttest scores) was rejected. The one-tailed t-test revealed that the posttest scores were significantly greater (m=14.94, s=.70) than pretest scores (m=8.54, s= 2.24), t(34) = 9.991E–17, p<.05). Thus, the first objective was met.

Three-month follow-up evaluations. The three-month follow-up evaluations were used to assess whether there was knowledge lost during the three months following the training, if the doctors had used the treatment recommendations and tools to care for patients, and if they were using the educational posters to educate their communities. According to Roger’s theory of diffusion of innovation, 13.5% of those who attended the training would be likely to have adopted and used the innovations (i.e., count as early adopters).

Fifteen participants returned follow-up evaluations. Of these 15, eight participants noted that they had treated a case of chromoblastomycosis within the three-month follow-up period and that the information and tools presented were beneficial in proper diagnosis and treatment. Thus, we found 23% adoption of the innovation (i.e., 23% of the total 34 participants), which is greater than the 13.5% expected. Thirteen participants remarked on their evaluations that the patient education poster was valuable in educating the community, and that the information presented at the training on the diagnosis and treatment was also valuable. Thus, we found a 38.2% adoption of the educational innovation (i.e., 38.2% of the total 34 participants), which is once again greater than the 13.5% expected.

The results of the statistical evaluation of the 15 participants who returned their evaluations were a mean of 14.93 and with a standard deviation of 0.73 (m=14.93, s= 0.73). The difference between the means of the 34 participants' pretests (m= 8.54, s=
2.24), and that of the 15 three-month follow-up evaluations \((m= 14.93, s=0.73)\) was 6.39, providing evidence that knowledge was retained. Participant’s knowledge level did not return to baseline at the time of the three-month follow-up evaluation. There was also only a one-tenth difference in the mean between the posttest \((m=14.94)\) and the three-month follow-up evaluation \((m=14.93)\), supporting the conclusion that there was an insignificant amount of knowledge lost from posttest to three-month follow-up. The second, third, and fourth objective were met.

**Evaluation.** Following the data collection, the author concluded that all four of the objectives for this training were met.

**Discussion**

Although there are not published works on Malagasy medical educational efforts similar to this one for the purpose of comparison, several recommendations can be based on this project on chromoblastomycosis. The first recommendation is that research must be conducted on possible treatment options that could be locally available in resource-poor countries. The literature review showed that there is a vast inequity in the treatment of this neglected disease in developing countries. Financially wealthy developed countries are conducting most of the research on treatment, but they are not focusing on medications or physical methods that are practical or available in resource-poor countries such as Madagascar, although they rank among those who need it most. The Malagasy doctors participating in the training expressed the view that even with knowledge of the proper treatments, their patients would not be able to afford the expensive long-term treatments that the literature supported (other than generic terbinafine). It is imperative that research focus on providing affordable and locally available solutions to realize long-term impact for the poor who are disproportionately infected by this disease.

Secondly, educational efforts and practice change projects should provide local doctors in developing countries with the tools needed to address the disease. Research has been done in the past on chromoblastomycosis in the SAVA province, but the Malagasy doctors who live and work in this province did not have patient education tools, a staging tool, or knowledge of the standard of care. These doctors are serving an already poor province and were prescribing medications that were ineffective against this disease. The Malagasy who were suffering with this disease were spending what little financial resources they had on medications that were ineffective, further driving them into both social and financial poverty. This could have been prevented if educational efforts focused on training local doctors on early diagnosis and proper treatment. The director of the national program for leprosy was present for the educational intervention and agreed that the staging tool and patient education tools would be of great value in their efforts against leprosy and against misdiagnosis and ineffective treatment. Specifically, he remarked that the posters provided education to those visiting local clinics and did not require the patients to be literate. He voiced that these types of resources would be something he would consider developing for use against leprosy.

Third, by training local doctors projects can affect the local population broadly and for a long time. It is common in the developing world for specialists to come on
short-term trips and treat the local population. While this is beneficial in the immediate aftermath, it does not have long-lasting effects on chronic diseases or processes that need long-term treatment and follow-up.

This project demonstrated that by training local doctors in the SAVA province concerning the standard of care, staging tool, and patient education material that this project had high potential for long-term impact on all four of the major towns and more than 50 villages in the province. Thirty-four Malagasy doctors returning to their place of service, which included the four major towns and other surrounding villages, demonstrated the potential for long-term impact. With the director of medical care for the province present during the educational intervention, these 34 doctors are now known in the province as referral targets for treatment.

During the three-month follow-up period, at least eight doctors applied the practice change switching from ineffective treatment to effective treatment of this disease, and perhaps more importantly these eight doctors mentioned that during the three-month follow-up period, 16 patients began treatment for chromoblastomycosis based on the standard of care. The social, psychological, and financial impact of treating 16 patients for this disease is difficult to quantify. However, these patients’ being able to enter back into social relationships is of profound importance to them and their social circles.

Concurrently, 13 doctors highlighted using the patient education material to inform the populations they serve concerning the importance of early recognition and treatment of this disease. The long-term impact of their educational efforts are once again difficult to quantify, but local experience in Andapa has proven that when word spread that there was treatment available for this disease, Malagasies began walking up to four days to seek treatment. It is paramount that efforts be made to train local doctors in locally available and affordable treatment protocols for diseases that are unique to their areas so that they can care for the local population.

**Summary.** The goal of this project was for medical doctors to move beyond knowledge of chromoblastomycosis and recognize how the early diagnosis, treatment recommendations, staging/scoring instrument, and patient education poster could facilitate application knowledge of treatment of chromoblastomycosis. Although chromoblastomycosis is usually not fatal, it has broad-reaching effects into social and interpersonal relationships, which are of utmost importance in Malagasy culture. Doctors must know the most effective method of treatment of chromoblastomycosis to resolve infection, prevent adverse health outcomes, prevent marginalization of those infected, and practice stewardship.

The findings from this project showed statistical significance. The doctors in the SAVA province of Madagascar did not have sufficient knowledge of chromoblastomycosis diagnosis, treatment, staging tool, and/or patient education materials evidenced by results of the pretest. However, when provided with training such as this one, Malagasy doctors are willing and ready to follow treatment recommendations and are positioned to provide culturally appropriate and contextualized care. This project also highlights the need for ongoing research to discover treatment options for chromoblastomycosis that are available and affordable in developing countries such as Madagascar.
Appendix A.

Box 1.

**PRE/POST TEST**

1. There are five different presentations types of chromoblastomycosis. Please list three of these __________________________________________

2. A common symptom with chromoblastomycosis is
   a. pain
   b. pruritus
   c. swelling
   d. burning

3. When using the scoring/staging instrument, which of the following is not considered in assessment?
   a. lymphedema
   b. ulceration
   c. number of lesions
   d. location of lesions

4. When using the staging/scoring instrument, how many points are assigned for past treatment failure?
   a. 2 points
   b. 3 points
   c. 1 point
   d. 4 points

5. When choosing treatment for chromoblastomycosis which of these mediations has the least amount of side effects?
   a. Griseofulvin
   b. Terbinafine
   c. Ketoconazole
   d. Amphotericin B

6. Which one of these medications has fungicidal affects?
   a. Itraconazole
   b. Terbinafine
   c. Amphotericin B
   d. Griseofulvin

7. Which medication would be the best choice for treatment of chromoblastomycosis in SAVA province?
   a. Itraconazole
   b. Terbinafine
   c. Fluconazole
   d. Ketoconazole

(Continued on p. 1002)
Box 1. (continued)

8. When counseling patients about treatment for chromoblastomycosis, it is accurate to state that treatment is
   a. 2 months
   b. 3 months
   c. 1 month
   d. 6 months
9. Have you treated a patient for chromoblastomycosis? (Y/N)
10. What is your biggest challenge in treating a patient with chromoblastomycosis?
    a. lack of information on how to treat it
    b. insufficient medications
    c. patient compliance
    d. cost of treatment

Appendix B.

Box 2.

**SCORING AND STAGING SYSTEM**

Name__________________
Age___________________
ID number______________
Date___________________

A scoring system for staging chromoblastomycosis is as follows:

- **Area of lesions:** Small lesions up to 25 cm$^2$ are 1 point. Medium lesions larger than 25 cm$^2$ and smaller than 100 cm$^2$ are 2 points. Lesions larger than 100 cm$^2$ are 3 points.

  **SCORE_____**

- **Number of lesions:** A single lesion is 1 point. One to 5 lesions is 2 points. More than 5 lesions or metastatic lesions is 3 points.

  **SCORE_____**

- **Complications (1 point for each complication present):** Lymphedema is 1 point. Ulceration is 1 point. Secondary infection is 1 point.

  **SCORE_____**

  Resistance to previous treatment or previous unsuccessful treatment is 1 point.

  **SCORE_____**
Appendix C.

Figure 1. Patient education poster 1.
Figure 2. Patient education poster 2.
Appendix D.

Box 3.

THREE MONTH FOLLOW-UP EVALUATION

For the current project, the purpose of this test is to ascertain practice patterns for the treatment of chromoblastomycosis in the SAVA province of Madagascar.

1. In the last three months, have you treated a patient for chromoblastomycosis (Yes/No)?
2. Did you apply information learned at the multifocal training (Y/N)
   IF YES:
   Did it help to decrease some of the barriers (yes/no)
   Rate the helpfulness on a scale of 1 (not at all helpful) to 5 (very helpful) for each component:
   - Guidelines 1 2 3 4 5
   - Identification 1 2 3 4 5
   - Scoring/Staging 1 2 3 4 5
   - Patient Education Information 1 2 3 4 5
3. Chromoblastomycosis is common in which group of people?
   a. men who work in the office
   b. women who work in the factory
   c. men who plant rice in the fields
   d. young boys who play soccer
4. Most infections of chromoblastomycosis begin with ________?
   a. a puncture wound from a piece of wood
   c. a sting from a wasp
   d. a bite from a rabid dog
   e. swimming in dirty water
5. After the initial infection, chromoblastomycosis normally progresses
   a. rapidly
   b. slowly
6. The initial lesion in chromoblastomycosis is normally all of the following except
   a. pink in color
   c. white in color
   d. palpable
   e. solitary
7. In your experience, what causative agent is responsible for most cases of chromoblastomycosis in the SAVA region?
   a. Staphylococcus
   b. F. pedrosi
   c. C. carrini
   d. Streptococcus
8. There are five different presentations types of chromoblastomycosis. Please list three of these ___________ ___________ ______________

(Continued on p. 1006)
Box 3. (continued)

9. A common symptom with chromoblastomycosis is
   a. pain
   b. pruritus
   c. swelling
   d. burning

10. When using the scoring/staging instrument, which of the following is not
    considered in assessment?
    a. lymphedema
    b. ulceration
    c. number of lesions
    d. location of lesions

11. When using the staging/scoring instrument, how many points are assigned for
    past treatment failure?
    a. 2 points
    b. 3 points
    c. 1 point
    d. 4 points

12. Which one of these medications has fungicidal affects?
    a. Itraconazole
    b. Terbinafine
    c. Amphotercin B
    d. Griseofulvin

13. Which medication would be the best choice for treatment of chromoblasto-
    mycosis in SAVA province?
    a. Itraconazole
    b. Terbinafine
    c. Fluconazole
    d. Ketaconazole

14. When counseling patients about treatment for chromoblastomycosis, it is
    accurate to state that treatment is
    a. 2 months
    b. 3 months
    c. 1 month
    d. 6 months

15. Have you treated a patient for chromoblastomycosis? (Y/N)

16. What is your biggest challenge in treating a patient with chromoblastomycosis?
    a. lack of information on how to treat it
    b. insufficient medications
    c. patient compliance
    d. cost of treatment
Appendix E.

Table 1.
PRE-TEST, POST-TEST, AND THREE MONTH EVALUATIONS

<table>
<thead>
<tr>
<th>DOCTOR</th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Three Month</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>5 (31%)</td>
<td>14 (88%)</td>
<td>16 (100%)</td>
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<tr>
<td>B</td>
<td>9 (56%)</td>
<td>15 (94%)</td>
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<td>C</td>
<td>7 (44%)</td>
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Appendix F.

Box 4.

OUTLINE OF EDUCATIONAL SESSION FOR CHROMOBLASTOMYCOSIS

A. Introduction
   1. Purpose of session
   2. Background and significance of chromoblastomycosis
   3. Statement of the Problem: The prevalence of chromoblastomycosis in Madagascar has been well documented, yet evidence and local experience suggests that medical doctors, nurses, and pharmacists are not following treatment guidelines in the treatment of this disease. Changes in treatment practices are of utmost importance to prevent the use of medications that have minimal effectiveness, misuse of resources, and to prevent progression of the disease.
   4. Literature review and synthesis
   5. Project
      a. Guiding theory
      b. Population
      c. Objectives
      d. Committee
      e. Timeline
      f. Evaluation

B. PICO statement—What is the effect of a multifocal training on chromoblastomycosis that educates Malagasy medical doctors, nurses, and pharmacists in the SAVA (Sambava, Andapa, Vohemar, and Antalaha) province of Madagascar about diagnosis, staging, and treatment options of chromoblastomycosis versus common treatment practices to increase participant's knowledge and utilization of current treatment recommendations for chromoblastomycosis?

C. Diagnosis of chromoblastomycosis
   a. Early signs and symptoms
   b. Types
   c. Causative agents

D. Guidelines for treatment of chromoblastomycosis
   a. Brief overview of guidelines
   b. Medications that are no longer used
   c. Current medications
   d. Common barriers to treatment

E. Staging/Scoring system
   a. Technique
   b. Barriers to use

F. Patient Education

G. Interaction and Questions
Acknowledgments

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