Revista Brasileira de Farmacognosia
BRAZILIAN JOURNAL OF PHARMACOGNOSY
www.sbfgnosia.org.br/revista

Original article

Herbalists, traditional healers and pharmacists: a view of the tuberculosis in Ghana

Solomon K.S. Amoah[a,*,★], *Louis Pergaud Sandjo*[b], *Maria Luiza Bazzo*[c], *Silvana N. Leite*[a], *Maique Weber Biavatti*[a,*]

[a]*Departamento de Ciências Farmacêuticas, Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil*
[b]*Institute of Organic Chemistry, Johannes Gutenberg University of Mainz, Germany*
[c]*Departamento de Análises Clínicas, Universidade Federal de Santa Catarina, Florianópolis, SC, Brazil*

ARTICLE INFO

Article history:
Received 16 September 2013
Accepted 6 March 2014

Keywords:
Herbalists
Healers
Tuberculosis
Traditional medicine
Western medicine
Ghana

A B S T R A C T

This paper is the result of a visit by Brazilian researchers to Ghana, with the aim of improving understanding of the relationship between traditional healers and conventional health practices, specifically in relation to tuberculosis. Through this exploratory visit, this group of researchers promoted by the *Edital Pro Africa* (CNPq) had an opportunity to learn about, reflect on, and discuss the different social, economic and cultural realities and contexts that have led to the different health conditions and forms of healthcare in Ghana. Besides the direct relationship between the social and economic conditions of the country and the health of its population, it was also concluded that there is a clear distancing, in the Ghanaian reality, between the traditional healers and the conventional system, in terms of culture and modes of operation, each constituting isolated systems with little or no collaboration between them.The visit enabled us to see the difficulties involved in managing TB, including diagnosis, treatment, monitoring and co-infection with HIV. The majority of patients with TB only go to hospital after several attempts at self-medication, due to the non-specificity of the principal symptoms, and also to the trust in the traditional medicine. Initiatives to encourage research into medicinal plants in Ghana are seeking partnerships with developed countries, but not always with clear or secure national interests. For the traditional healers, there are high hopes that the information gathered by researchers from the local universities, on the plants and traditional methods they use, will result in affirmation and recognition of their practices, but they complain strongly that they receive no feedback on the research carried out.

Introduction

In some parts of the world, particularly Africa, herbal remedies, in the context of so-called traditional medicine (TM), are often preferred over treatments recommended by cosmopolitan or western medicine (WM) (Abdullahi, 2011), sometimes because these treatments are easier to access, and lower in cost, and due to the perception that the treatment is harmless and

★*Ghanaian citizen.*
**Corresponding author.*
E-mail: maique.biavatti@ufsc.br (M.W. Biavatti).
solomon.amoah@posgrad.ufsc.br (S.K.S. Amoah).
0102-695X/$ - see front matter © 2014 Sociedade Brasileira de Farmacognosia. Published by Elsevier Editora Ltda. All rights reserved.
DOI: 10.1590/0102-695X2014241405

is guaranteed to bring favorable results. The preference for traditional medicine may also be related to personal beliefs and ways of understanding the health-disease process that are culturally different from those of western medicine. According to this cultural framework, the therapeutic practices that use medicinal plants may also be associated with rituals, performed by practitioners who hold the knowledge necessary to affect the cure.

Seeking to carry out joint research and share experiences and knowledge, a group consisting of Brazilian pharmaceutical researchers (specializing in natural products, microbiology and pharmaceutical services) and postgraduate African students undertook an expedition to Ghana, in response to the Pro Africa 2011 public call for research (CNPq). This paper reports the main findings of this field trip, presenting elements for reflection and discussion on issues such as the relationship between traditional healers (herbalists, traditional healers, therapists) and western medicine, academia, and the general population.

The social realities and healthcare in the cultural context of Ghana

In Ghana, it is estimated that around 70% of healthcare is provided by traditional healers. There is an estimated one traditional healer for every 400 inhabitants, and one physician with conventional medicaltraining for every 12,000 inhabitants. Until the beginning of the 21st century, with a population estimated at 18.4 million, there were 43 optometrists, thirty ophthalmologists, and two hundreds specialized nurses in the country, more than half of which worked in the capital, Accra (Hampshire and Owusu, 2012, Ntim-Amponsah et al., 2006). However, with economic growth estimated at 20% for the year 2011, and now with approximately 25 million inhabitants, Accra is considered one of the most populous and fastest-growing cities in the world. The majority of residents of the capital city are migrants, from rural parts of the country or neighboring countries, and today, the number of patients per doctor in the public system ranges from 6200 (in Accra) to 42200 (rural areas) (van Andel et al., 2012).

Since the 1970s, the WHO has encouraged actions to promote and improve dialog between native practices and those introduced by the colonizers (Hoff, 1997;Warren et al., 1982). The Kwame Nkrumah University of Science and Technology (KNUST) in Kumasi, Ghana, offers the country's first and only undergraduate course in Herbal Medicine (bachelor's degree).

For the traditional African healthcare system, the power of the traditional healer is not determined by their knowledge of possible remedies and the causes of diseases, but by their ability to apply their understanding of the intricate relationships between the patient with the world around them, within their social, natural and spiritual context, possibly using magic or other forms of treatment (Busia, 2005). This view implies that there is no preparation or training of new generations of traditional healers in the truly traditional system, with the likelihood that these practices will be lost, or fail to develop. Worse yet, it can lead to widespread charlatanism or misinformation, causing significant harm to the population (Yeboah, 2000). The author (Tsey, 1997) analyzing different situations of confrontation and complementarity of traditional therapies with cosmopolitan medicine in Ghana, contextualizes the strategies adopted by governments to integrate the two. In some observations of actual cases, the author notes that issues such as the methods considered scientific for determining the effectiveness, safety and validity of the use of medicinal plants used in TM often fail to consider the cause and etiological classification of diseases in the traditional system. Furthermore, the "modernization" of TM has generated costs and systems of payment by users that may lead to the same problems as they face in accessing WM. The author (Abdullahi, 2011) questions the forms of integration of TM on the African continent, without the practitioners of WM effectively recognizing, understanding and accepting the efficacy and effectiveness of traditional therapies (within the epistemological concepts that underpin these therapies), butsimply trying to fit them into a biomedical understanding of the health-disease process.

This need to integrate TM into WM has ended up creating a new generation of healers; the "modern" herbalists. The majority of these do not go to college, but they have appropriated elements and symbols of scientificity in their practices (such as the wearing of white jackets and going by the title of "doctor"), yet they continue to carry the mystical frame of reference in many cases. This combination is strategic for attracting a clientele that finds no support or space in the conventional system, but no longer accepts the traditional healer either, as it believes that that kind of treatment is somehow no longer ideal. (Hampshireand Owusu, 2012)

This fact must be linked, among other things, to the global increase in the acceptance of complementary and alternative practices, which are expanding and becoming a great commercial success, despite the lack of available scientific data to prove their effectiveness (Ernst, 2013; Frass et al., 2012). Factors linked to the use of alternative practices include not only a lack of satisfaction with, or non-accessibility of conventional practices, but also largely to the fact that these alternative practices are more congruent with users' personal values and beliefs, as well as with the philosophical guidelines in relation to health and lifestyle (Kemper et al., 2008). The choice of alternative practices may be related to difficulties encountered by patients in the relationship with health professionals, (the language used by the health professionals is probably quite different from that used by the patients), and the delay in establishing the diagnosis, requiring multiple visits to different hospitals (Dodor, 2012). The role played by traditional therapies should not be considered as a transitory phenomenon, but rather, a permanent need of the global population.

For the development of more comprehensive, realistic and promising public policies aimed at generating benefits for the population in terms of health conditions, valorization of the culture, and social development, it is important to recognize the experiences and stages of development of different countries and cultural and social contexts, seeking to promote cooperation and expansion of knowledge.

Brazilian Researchers in Ghana - tuberculosis and the healers and herbalists

The PROAFRICA program of the Ministry of Science and Technology, was put into operation by the CNPqwith the goal of contributing to *raising the scientific and technological capacity of the African countries, and financing the mobility of scientists and researchers with expertise in projects in selected areas due to their strategic relevance and priority interest for scientific and technological cooperation (CNPq, 2013)*.

Tuberculosis (TB) has received attention recently, particularly in developing countries, due to its direct link with HIV/AIDS. Low adherence to treatment is common due to several factors, requiring a greater understanding of the barriers and an effort to find more effective solutions (Munro et al., 2007).

The use of medicinal plants has been described as prevalent in groups with poor socioeconomic conditions and less access to formal education (Addo, 2008), and the group's premise in creating the project was to look for possible links between the use of medicinal plants, or alternative practices, and tuberculosis. How do the herbalists and traditional healers diagnose tuberculosis? How do they differentiate between tuberculosis and common cough? What procedures are carried out to deal with tuberculosis? Are the traditional healers aware of the chronic nature of this disease?

We visited the three types of practitioners of traditional therapies in Ghana:

1. Traditional healers with little formal education: two practitioners living in Sokoban, a suburb of Kumasi in the Ashanti Region (Fig. 1), about 16 km from the center of Kumasi.

Both men with low literacy, living in peripheral regions with very precarious infrastructure, far from the center of Kumasi. All justified their actions as therapists as an expression of their relationship with spirituality or gift offered by divinities (possession by spirits that indicate the treatments, divine inherited gift, or indications received in dreams). Some of them also perform religious rituals. They collect, cultivate and prepare medicinal plants by hand, in different formulations. They generally indicate suspending other treatments in order to treat with medicinal plants. According to their reports, some diseases cannot be cured with plants alone, but also require spiritual treatment. They receive money or other products in exchange for their visits, or for products that they provide, but they are invariablypoor and live in very humble conditions.

The "abandonment" of these traditional healers by the academic world was clear to our team, based on reports that they are still awaiting feedback from the university in relation to the information and botanical material provided by them on various occasions.

2. Traditional therapists with some formal education and higher literacy: one practitioner, living in Sepe Tinpom neighbor hood in the Kumasi metropolis in the Ashanti Region, about 4 km from the center of Kumasi (Figs. 1 and 2).

The visited practitioner has a computerized system and registration books to organize data on visits and therapeutic follow-up of patients. He also request laboratory tests and file the results to register cases of alleged cure from HIV, hepatitis and other situations. His walls boast several certificates of courses taken, and the therapist emphasizes, in particular, that he studied in England years ago. This therapist, when questioned whether what he learned from England, or the local culture is more important for his practice, replied that the course in England was more important. He sells products

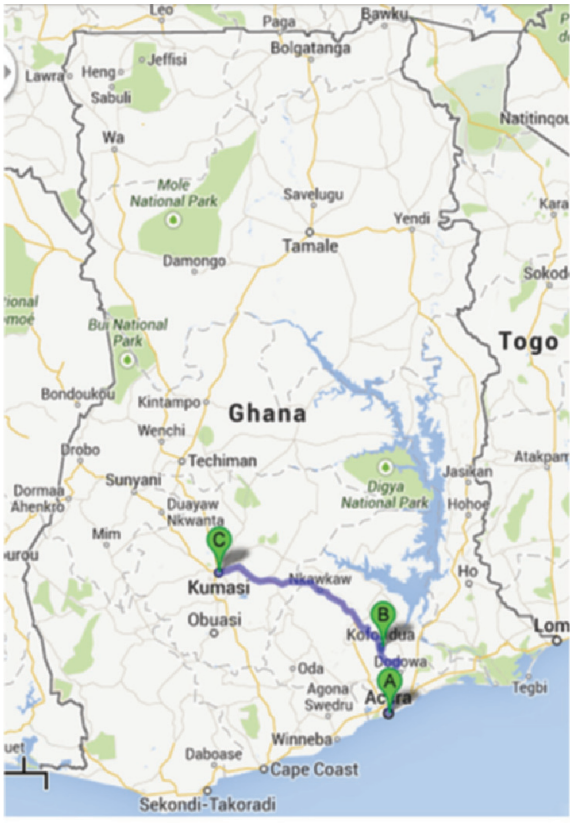

Figure 1 – Map of Ghana showing the visited places: Accra, Greater Accra Region to Kumasi, Ashanti Region through Koforidua, Eastern Region (Distance of about 280 km). Data obtained from Google Maps.

Figure 2 - A herbal clinic in Sepe Tinpom, Kumasi, Ghana.

that he produces and packages. This therapist also reports that some diseases, like high blood pressure, are family problems and need more comprehensive interventions, including conversations with the patient. It was quite obvious that this professional directly apply the knowledge and experience of the local culture, community interactions, and local plants, but seek the legitimacy of the formal system of knowledge production.

3. Graduated herbalists: three practitioners trained at Knust University working in a hospital at Kpeshie, and in a clinic in the Tema municipal area, both in Greater Accra (Figs. 1 and 3).

They offer consultations and have small laboratories for the production of phytotherapeutic medicines (with conditions of organization, hygiene and standardization that can be considered inadequate). The professionals visited showed very little relationship with practices and knowledge of the local culture, and sought to express their academic legitimacy to practice as health professionals. They described a highly autonomous practice, without reference or counter-reference in relation to the TM. Despite the professionalized and legalized discourse of these herbalists, the organization of their work places, and the records and descriptions of their activities, suggest considerable amateurism and a practice that is isolated from the social and public health context.

Among the comments, it was perceived that the new healers (university-trained herbalists) assume an attitude of mastery in relation to diseases, being self-determined to heal any condition, without false modesty - the same type of attitude that has already been reported in other studies (Opoku et al., 2012).

The creation of this new category apparently did not succeed in bringing a knowledge of the practices of the traditional healers to the academic world, but trained a type of professional whose practice is somewhere between western medicine and the traditional practice, *i.e.* the undergraduates are trained to work in primary healthcare, recognizing patients at risk for prompt referral, and to use medicinal products developed by the local phytotherapy industry, or to produce, evaluate and sell phytotherapeutic products. (Adusi-Poku et al., 2010).

Figure 3 - Photo with the graduated herbalists. Lekma Hospital, Kpeshie, Accra, Ghana.

Since 1975 the Government of Ghana established the Centre for Scientific Research into Plant Medicine (CSRPM), where several herbal products are produced. One of them, named Mist Tonica, has been produced for management of anemia and loss of appetite and was clinically investigated, but no standardization (or chemical marker) for this product was described (Adusi-Poku et al., 2008). At the time of the visited, it was realized that the centre lacked specialized personnel, consumable materials as well as equipments for analytical studies. Projected to be one of the leading research institutes in Africa for the development of herbal medicines, and "to make herbal medicine a natural choice for all", CSRPM is expected to be fully equipped and able to explore and standardize the herbal plants and extracts used in the country.

Meanwhile, the traditional healers continue to practice in the more remote communities, as witchdoctors, combining plants with supernatural powers (of divine origin, granted by deities, and still remain at the margins of the organized, conventional health services, despite being closer to the patients from the social, cultural and geographical points of view (Sudhinaraset et al., 2013).

In general, the Ghanaian population still suffers the problems typical of an underdeveloped, tropical country, with clear and markedly high death rates resulting from malnutrition, tropical parasitic infections, and low vaccine coverage. On the other hand, it is also clearly observed that dietary and social habits are protecting the majority of the population from the chronic diseases that afflict the developed world, such as dyslipidemias, stroke, and diabetes, as was described for the 1970s (Bacon, 1980). The Ghanaian population consumes very little salt and sugar (eating dessert is not a widespread custom) and it is rare to find processed foods. The family's provisions are bought almost exclusively at open-air markets. It is rare to find cigarettes, and due to the rapid expansion of the pentecostal and charismatic churches, alcoholic beverages are also not widespread. The lack of clean drinking water and the open sewers are still major public health problems. One of the health disorders most often cited by traditional healers is haemorrhoids. This could be linked to a low water consumption and the use of yams and banana plantains (both of which are relatively hard and dry) as staple foods of the diet.

Among the communicable diseases, tuberculosis and AIDS are huge public health problems in Ghana. It is estimated that approximately 20,000 people contracted tuberculosis in that country in 2011, of which around 22% were not detected and notified (WHO-CIDA, 2012). According to 2011 data from the World Health Organization, 14,962 cases of tuberculosis were notified, comprising an incidence of 79 cases per 100,000. Of these, eighteen cases per 100,000 corresponded to co-infection with HIV-TB (WHO, 2011). The policy for dealing with TB/HIV co-infection in Ghana states that *"No systematic, nationwide study has been conducted to assess the prevalence of TB/HIV co-infection in the country. However, it is estimated that the influence of HIV on TB has been increasing. Whereas in 1989 roughly 14% of Ghana's TB cases could be attributed to AIDS, by the year 2009 about*

59% of the projected TB cases will be due to the HIV/AIDS epidemic" (Service, 2006).

A large proportion of people with TB go to the hospitals in Ghana, however many cases are lost due to the inadequacy of diagnostic methods, and the lack of interaction between hospital services and the national TB program, as well as to the low adherence to protocols for diagnosis and treatment (WHO-CIDA, 2012). In Ghana, the sputum smear microscopy or AFB (Alcohol-Acid resistant Bacilli test) is the main laboratory method used for the diagnosis of TB. For this test, 1.1 laboratory is available per 100,000 people, and 0.6 cultures are performed for 5 million inhabitants (WHO, 2011).

We had the opportunity to visit the Tuberculosis Service at Korle-Bu hospital in Accra. During the meeting with the administrative professionals of that hospital, we learned a little about the national policy for dealing with TB, and the treatment strategies. In various parts of the capital Accra, there are no street names, with only imprecise addresses based on reference points like "the street with a big tree". It is therefore virtually impossible to ensure the efficiency of the DOTS (directly observed treatment, short-course) strategy for preventing abandonment of tuberculosis treatment. Owing to this difficulty, that service has adopted the policy of identifying a relative of the patient who can come to the hospital to collect the medication, and who will be responsible for giving it to the patient each day. Our visit to the clinic enabled us to see, first hand, the difficulties involved in managing TB, including diagnosis, treatment, monitoring and co-infection with HIV. Patient care in the outpatient clinic is divided into separate days (on the day when HIV patients are treated, patients with tuberculosis or suspected tuberculosis are not treated, and vice-versa) due to the high risk of of transmission between these two populations if they share the same physical space. That clinic has a laboratory dedicated to bacilloscopy. We paid a brief visit to the laboratory, and observed that they only performed BAAR tests. Considering the low sensitivity of sputum smear microscopy, which detects only 20 to 80% of TB cases, performing the culture tests could be considered, especially for cases of therapeutic failure (Pai et al., 2008).

As published recently, the majority of patients with TB in Ghana only go to hospital after several attempts at self-medication, due to the non-specificity of the principal symptoms, and also to the trust they place in the traditional medicine, and spiritual healing (Dodor, 2012). Several patient complaints were reported concerning the prejudiced attitudes towards this disease on the part of health professionals, which has been exposed as a major challenge in Ghana (Dodor and Kelly, 2009).

Another important difficulty seen is that in the services visited (as in the country as a whole), no second-line treatment is available. Only first-line drugs (rifampicin, isoniazid, pyrazinamide and ethambutol) are used in the treatment of TB, although 1.8% of the new cases of TB and 19% of cases of retreatment are for multiple-drug resistant tuberculosis (MDR-TB) (WHO, 2011). Culture tests are not performed, therefore it is not known whether the bacterium that circulates is only *M. tuberculosis*. Neither is the tuberculostatic drugs sensitivity test performed. The report of the pharmacist who told us about the treatment was that even after abandonment, patients who return receive first-line treatment again. Patients who do not respond to treatment are told that there is no other more therapeutic option available (due to a lack of other drugs). He also told us that in an attempt to find a cure, it is common for patients with therapeutic failure to move to another neighborhood or city, so that they can join another health service and receive first-line therapy again. This fact (although not monitored by laboratory tests) should contribute to the selection of MDR (multidrug resistant) strains.

It can be seen, therefore, that there are efforts to organize a healthcare service for TB and other prevalent diseases that impact the health of the population, and that in general, the model adopted follows the international guidelines (Fig. 4). However, without economic, geographical, cultural and organizational conditions that are consistent with the models developed in and for other regions of the world, there is a delay, and significant limitations in health programs for dealing effectively with communicable diseases, which compromise their results. What is noticeable is the clear separation between the official healthcare system and the therapists (especially the traditional healers, but also to the new herbalists and therapists with some formal education), and the health programs are failing to capitalize, in a systematic way, on the influence, proximity and legitimacy of these professionals, especially those practicing in more remote regions, as support

Figure 4 - Poster of a tribal chief motivating people to communicate TB (fixed in the Komfo Anokye teaching hospital, Kumasi, Ghana).

for practices of prevention or therapeutic follow-up. In a socio-geographical situation where even residential addresses are vague, for the registration and identification of patients, partnerships with the community and its leaders would be a hoped-for strategy.

The observations and lessons learned from the visit

The citation of Yeboah (2000) gained living expression and meaning, affirming that "It has also been made clear that traditional medical knowledge is created by the people and forms part of their way of life. It is therefore the responsibility of the government to ensure that this heritage of the community is not exploited and sold back to the detriment of poor, ignorant people. More important, the knowledge should not be sold back in a form designed to cheat the ignorant and enrich charlatans".

The sovereignty of WM is presented, even though TM is the most widely-used and accessible form, and leaves its clear reflections on society: it is still based on and consistent with the local culture, and it is accessible and available at all levels, and also it is essential for the present-day conditions that prevail. Not with standing that TM developed by popular therapists is starting to seek legitimacy not in itself, but in its foundations and its experiences of generations. The search for legitimacy seeks to anchor itself in western "science", in biomedical paradigms, and in academic diplomas. Thus, the hegemony of the western way of seeing the world is consolidated, and the truth and falsehood in any given reality is established.

In practice, we can see that the westernization of practices, and the desire to give them academic legitimacy, has contributed little to creating better healthcare for the population of Ghana, even in the large cities (with large suburbs). On the contrary, the form of organization of therapists adopted, including the academic training of herbalists, has not resulted, so far, in a movement of real integration of health practices, or any prospect of influencing the construction of a healthcare model that is more humanized, culturally accessible, and based on multidetermination of health and disease. The practice of WM attempts to follow foreign precepts, as far as the local possibilities allow (Fig. 5). The practice of TM is a reality, but it is now becoming apparent that it is quickly losing its legitimacy.

Figure 5 - Central Market, Kumasi, Ghana.

As an experience of public policy, it is important to mention that the creation of another profession to promote the integration of TM and WM does not yield significant results because it does not result in a movement of revision and interest among the practitioners of the WM towards a new healthcare model. Likewise, it can be inferred that public policies that provide for actions to promote academic, research, and offer products and services in TM as another service, apart from the hegemonic system, will have little chance of fulfilling the objective of integration, and bringing significant results for the objective conditions of the population's health.

Conclusions

In addition to the well-described direct relationships between a country's social and economic conditions and the health of its population, it was concluded that the cultural and operational distancing between the operators of TM and WM is very clear in the Ghanaian reality, constituting isolated systems that have little or no collaboration between them. This situation has consolidated traditional medicine (TM) as a peripheral model that has not had a significant impact on the official health system, and has not promoted a more efficient health system for the prevention and treatment of diseases with great social impact, such as TB. Initiatives to encourage research into medicinal plants in Ghana focus in partnerships mainly with developed countries. For the traditional therapists, there are high expectations that the information collected by researchers of the local universities on the plants and methods they use will result in affirmation and recognition; however they complain strongly that they do not receive feedback on the surveys carried out.

Authors' contributions

SKSA (PhD student) is a Ghanaian citizen that contributed in all steps of this project. LPS participated in the field trip and contributed to critical reading of the manuscript. MLB and SNL participated in the field trip and wrote the MS. MWB got the grant, supervised and wrote the MS. All the authors have read the final manuscript and approved the submission.

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgments

The Authors are very grateful to CNPq-Pro-Africa call for research (process no.490242/2010-3), to the Ambassador of the Brazilian Embassy in Ghana, her Excellency Irene Vida Gala for her warm reception on our visit. They are also grateful to the

Faculty of Pharmacy of the KNUST, Kumasi, Professor Abraham Yeboah Mensah of the Faculty of Pharmacy of KNUST and Paul Owusu Donkor (BPharm, MPhil), now assistant lecturer of the Pharmacy School of the University of Legon.

REFERENCES

Abdullahi, A.A., 2011. Trends and challenges of traditional medicine in Africa. Afr. J. Tradit. Complement. Altern. Med. 8, 115-123.

Addo, V., 2008. Herbal medicines: socio-demographic characteristics and pattern of use by patients in atertiary obstetrics and gynaecology unit. J. Sci. Technol. (Ghana) 27, 149-155.

Adusi-Poku, Y., Okine, L.K., Hlortsi-Akakpo, F., Fleischer, T.C., Mensah, M., Arhin, P., Agyemfra, G., Dabra, T., 2010. Assesssing herbal medical practitioners in professional qualifying examination in Ghana, a model. Afr. J. Tradit. Complement. Alternat. Med. 7, 85-87.

Adusi-Poku, Y., Sittie, A., Mensah, M.L., Sarpong, K., Fleischer, T.C., Ankrah, T.C., Nsiah, D., 2008. Effectiveness and safety assessment of mist tonica, a herbal haematinic. Afr. J. Tradit. Complement. Alternat. Med. 5, 115-119.

Bacon, L., 1980. Ghana-medical care amid economic problems. J. Roy. Coll. Gen. Pract. 30, 433-436.

Busia. K., 2005. Medical provision in Africa–Past and present. Phytother. Res. 19, 919-923.

Dodor, E.A., 2012. The feelings and experiences of patients with tuberculosis in the Sekondi-Takoradi metropolitan district: implications for TB control efforts. Ghana Med. J. 46, 211-218.

Dodor, E.A., Kelly, S., 2009. 'We are afraid of them': Attitudes and behaviours of community members towards tuberculosis in Ghana and implications for TB control efforts. Psychol.Health Med. 14, 170-179.

Ernst, E., 2013. Why is CAM popular? Focus Altern. Complement. Ther. 18, 33-34.

Frass, M., Strassl, R.P., Friehs, H., Müllner, M., Kundi, M., Kaye, A.D., 2012. Use and acceptance of complementary and alternative medicine among the general population and medical personnel: a systematic review. Ochsner J. 12, 45-56.

Hampshire, K.R., Owusu, S.A., 2012. Grandfathers, Google, and dreams: Medical pluralism, globalization, and new healing encounters in Ghana. Med. Anthropol. 32, 247-265.

Hoff, W., 1997. Traditional health practitioners as primary health care workers. Trop.l Doct. 27, 52-55.

Kemper, K.J., Vohra, S., Walls, R., 2008. The use of complementary and alternative medicine in pediatrics. Pediatrics 122, 1374-1386.

Munro, S.A., Lewin, S.A., Smith, H.J., Engel, M.E., Fretheim, A., Volmink, J., 2007. Patient adherence to tuberculosis treatment: a systematic review of qualitative research. PLoS Med. 4, e238.

Ntim-Amponsah, C., Amoaku, W., Ofosu-Amaah, S., 2006. Alternate eye care services in a Ghanaian District. Ghana Med. J. 39, 19-23.

Opoku, S.Y., Benwell, M., Yarney, J., 2012. Knowledge, attitudes, beliefs, behaviour and breast cancer screening practices in Ghana, West Africa. Pan African Med. J. 11, 28.

Pai, M., Zwerling, A., Menzies, D., 2008. Systematic review: T-cell–based assays for the diagnosis of latent tuberculosis infection: an update. Ann.Intern.Med. 149, 177-184.

Service G-GH, 2006. *Technical Policy and Guidelines for TB/ HIV Collaboration in Ghana*. Available in: http://www.ghanahealthservice.org/documents/Main%20Text_Technical%20_%20Policy%20Guidelines%20TB%20HIV%2031%20Jan%2007.pdf. Accessed 3 October 2014.

Sudhinaraset, M., Ingram, M., Lofthouse, H.K., Montagu, D., 2013. What is the role of informal healthcare providers in developing countries? asystematic review. PloS one 8, e54978.

Tsey, K., 1997. Traditional medicine in contemporary Ghana: A public policy analysis. Soc. Sci. Med. 45, 1065-1074.

van Andel, T., Myren, B., van Onselen, S., 2012. Ghana's herbal market. J. Ethnopharmacol. 140, 368-378.

Warren, D.M., Steven, Bova. G., Tregoning, M.A., Kliewer, M., 1982. Ghanaian national policy toward indigenous healers: The case of the Primary Health Training for Indigenous Healers (PRHETIH) program. Soc. Sci. Med. 16, 1873-1881.

WHO, 2011. Tuberculosis profile. Available in: https://extranet.who.int/sree/Reports?op=Replet&name=/WHO_HQ_Reports/G2/PROD/EXT/TBCountryProfile&ISO2=gh&outtype=pdf. Accessed 3 October 2014.

WHO, 2012. WHO-CIDA Initiative: INTENSIFYING TB CASE DETECTION GHANA. WHO.Available in: http://who.int/tb/Ghanafactsheet_Oct12.pdf. Accessed 3 October 2014.

Yeboah, T., 2000. Improving the provision of traditional health knowledge for rural communities in Ghana*. Health Libr. Rev. 17, 203-208.