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Full Length Research Paper

Ethnobotanical information on plants used for the management of cardiovascular diseases in Nkonkobe Municipality, South Africa

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Cardiovascular diseases are one of the major killer ailments in the world. The incidences of the diseases are on the alarming rate especially in the developing countries. An ethnobotanical survey of plants used for the treatment of these diseases and some of their predisposing factors was carried out in the Nkonkobe Municipality in the Eastern Cape of South Africa. Information on the names of plants, their parts used and methods of preparation was collected through a questionnaire which was administered to herbalists, traditional healers and rural dwellers. The study revealed 19 plant species that are used for the treatment of heart disease, stroke, high blood pressure and chest complaints in the Municipality. 53% of the plants mentioned were used for the management of chest pain, 47% for high blood pressure, 42% for heart disease, 16% for stroke and 11% for the treatment of hypercholesterolemia. These plants belong to 16 families of which Asteraceae, Hypoxidaceae and Fabaceae are the most prominent. The most commonly utilized portions of plants for medicinal purposes include the leaves and bulbs. Other parts used are roots, stems and corms. The methods of preparation often employed are decoctions and infusions whilst the medication was frequently administered orally. *Tulbaghia violacea* was repeatedly mentioned as the plant species used for the treatment of cardiovascular disease and is predisposing factors in the study area.

Key words: Medicinal plants, cardiovascular diseases, ethno-medicine, *Tulbaghia violacea.*

INTRODUCTION

Cardiovascular diseases refer to any disease of the heart and blood vessels. The most common ones are diseases of the heart muscle, strokes, heart attacks, heart failure and those caused by high blood pressure. Worldwide, cardiovascular disease is assuming an increasing role as a major cause of morbidity and mortality (Krisela, 2007). It is estimated at approximately 16.7 million lives per annum worldwide (World Health report, 2003). Between 1990 and 2020, the proportion of deaths from cardiovascular disease is projected to increase from 28.9 to 36.3% (Gowri et al., 2011). Moreover, in terms of number of years of life lost, cardiovascular disease is expected to jump in ranking from fourth to first, while as a cause of premature death and disability, it will rise from fifth to first (Hennekens, 2000). The predisposing factors to cardiovascular diseases include cigarette smoking, elevated cholesterol, hypertension, obesity, physical inactivity and diabetes. In South Africa, there is paucity of data regarding cardiovascular diseases. The prevalence and treatment status of common heart conditions, such as ischaemia heart disease, heart failure, rheumatic heart problem, diseases of the heart muscle, the heart valves, heart disease caused by hypercholesterolemia, high blood pressure, cigarettes smoking, physical inactivity and alcohol uses is unknown in South Africa (Sliwa et al., 2005; Commerford, 2005; Mayosi et al., 2006; Misra et al., 2007). The few available data suggest that these conditions are poorly managed and it is predicted that by 2020 cardiovascular problems will be among the top five

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causes of death and diseases in South Africa. The expected high incidence of the diseases, couple with high cost of western pharmaceuticals and healthcare remedies, makes it all important to search for safe, effective and cheaper remedies.

Before the advent of modern medicine, various plants have been employed by man in the management, treatment and the related complications of cardiovascular diseases. In the Eastern Cape Providence of South Africa, a number of plants are reputed to possess cardio protective properties, resulting in their use by traditional healer for treatment of chest complaints, high cholesterol, high and low blood pressure and general heart problems. Considering the rate at which the vegetation is getting depleted in this part of the world, couple with increasing demand for effective, cheap and less toxic drugs, it is necessary and important to document the precious knowledge of these plants and to search for more plants with cardio-protective potential. In this article, we report the information gathered from traditional and elder rural dwellers, on plants used in Nkonkobe Municipality for treatment of the cardiovascular disease and some of their predisposing factors.

MATERIALS AND METHODS

Study area

Nkonkobe Municipality is an area in South Africa that is situated between 32° 47' S and 26° 50' E. The area is bounded by the sea in the east and drier Karroo in the west. The altitude is approximately 1300 m above sea level and the vegetation is veld type 7 (Masika and Afolayan, 2003). The people of the region use herbal medications either alone or in combination with orthodox medicines for the treatment of several diseases. Majority of the people in the area are rural dwellers and they use plants for the treatment of common diseases, such as heart problems and cancer.

Methodology

The data was collected from traditional healers, herbalists and rural dwellers using scientifically guided questionnaires, interviews and general conversations. Although informants were not scientifically literate, they were born in the region and had lived there for most of their lives. Plants used in each individual case were collected with the help of actual users and were identified by proper flora. Voucher of the reported plants with cardio-protective potential were identified by Prof D.S. Grierson of Botany Department, University of Fort Hare and deposited (Sin 2010/1–Sin 2010/19) at the Giffen Herbarium.

Intellectual property agreement statement

All the elderly and the traditional healers who contributed one information or the other during our ethnobotanical survey, were adequately financially rewarded with further verbal agreement that this research shall not be for commercial purposes but to serve as an enlightenment information to the community and the entire Eastern Cape.

Compliance statement

No part of this study in any form has been or will be commercialized; instead the entire article is meant to be used as a tool for information dissemination on the medicinal plants used for the treatment of cardiovascular diseases in Eastern Cape Province of South Africa.

RESULTS AND DISCUSSION

The results of this study have revealed that 19 plant species belonging to 16 families are frequently used for the treatment of cardiovascular diseases and their predisposing factors in the study site (Table 1). The informants consulted in this investigation claimed that the diagnoses of cardiovascular diseases in their patients is determine by symptoms such as chest pains, palpitation, short breath, swollen eyes, severe back pain, profuse sweating and in most cases patients that have been diagnose of high blood pressure.

Two species of each of the Hypoxidaceae, Asteraceae and Fabaceae families are the most commonly mentioned plants during the survey. Previous reports have also linked some of these plants to remedies for common cold, hypertension, psoriasis, urinary tract infections, prostate diseases, gastrointestinal complaints, and even mental disorders (Mac Donald et al., 2004; Laporta et al., 2007).

50% of the methods of preparation are by infusion while 15% is by decocotion (Table 1). The leaves are the most used for the treatment of the diseases. 78% of herbal preparations used in the management of cardiovascular disease are made from leaf extracts followed by the bulb (53%) and root (21%), while the stem and the corm contributed 16% and 5% respectively.

Extracts are mainly taken orally twice per day (morning and afternoon) for a long period of time depending on the severity of the disease. 53% of the plants reported were used in treatment of chest pain complaints, 47% for the treatment of high blood pressure, 42% for heart disease, 16% for stroke and 11% for the management of high blood cholesterol. During this investigation, *T. violaecea* Harv, was repeatedly mentioned as the plant used in the treatment of cardiovascular diseases and their associated risk factors. In addition to the results obtained on ethnobotanical survey, literature search also showed that *T. violaecea* is an important plant used locally and found throughout the Eastern Cape and southern KwaZulu-Natal (Wyk et al., 1997). The bulbs and leaves are commonly used as decoctions for the treatment of various ailments including fever, colds, asthma, tuberculosis, stomach problems and intestinal worms

Table 1. The plants used for the treatment of cardiovascular diseases and their predisposing factors in Nkonkobe Municipality of South Africa.

Scientific name	Family name	Local name	Therapeutic indications	Parts used	Preparation
Agathosma betulina (P.J. Bergium) Pillans.	Rutaceae	iBuchu	High blood pressure and chest complaints.	Leaves and stem	Infusion of both parts of plant is taken orally for several weeks.
Cannabis sativa L.	Cannabaceae	UmYa	Stroke, high blood pressure.	Leaves	Fresh leaf infusion and decoction is taken orally until symptoms disappear
Cissampelos capensis L.f	Minespermaceae	uMayisake or idabulitye	Heart problems and high and low blood pressure.	Root	Root infusion warmed gently and taken orally for several weeks.
Dodonaea angustifolia L.f	Sapindaceae	Ysterhouttoppe	Chest complaints.	Leaves	Decoction of the leaves is taken orally twice a day
Elephantorrhiza elephantine (Burch) Skeels.	Fabaceae	Intolwane or igwejobmvu	High blood pressure.	Leaves	Infusion of leaf taken orally until symptom disappears.
Gunnera perpensa L.	Gunneracea	iPhuzi lomlambo	High cholesterol.	Bulb and leaves	Aqueous infusion or decoctions of both parts are taken orally for several days.
Geranium incanum (Burm .F)	Geranaiceae	Tlako	Heart problem and chest complaints.	Leaves and stem	Both plant parts are Boiled together and rub on the chest.
Helichrysum odoratissimum L.	Asteraceae	imphepho	Heart problems, high blood pressure, stroke and chest pain complaints.	Leaves and root	Leaves are burnt and the smoke is inhaled or infusion of root taken orally.
Hpoxis sp.c.filifolia.	Hypoxidaceae	Ikhubalo	High blood pressure	Bulb	The bulb is chewed twice a day for several weeks.
Hypoxishemerocallidea. Fisch. Mey. & Ave-Lall.	Hypoxidaceae	INonqwe	Stroke, high blood pressure and heart weakness.	Corm and root	Both parts are boiled and administered orally until the patient is cure.
Leonotis leonurus (L.). R.Br.	Lamiaceae	umfincafincane	High blood pressure and chest complaints.	Bulb and leaves	Infusion of the leaf and bulb is taken orally twice a day for several weeks.
Lichtensteina lacera cham. & Schltdl.	Apiaceae	iQwili	Chest complaints	Leaves and bulb	Both parts boiled together to wash and rubbed on the chest.

Table 1. Contd.

Ocimum basilicum L.	Lamiaceae	Timie (Africaana) or basil.	Heart problems and chest complaints.	Leaves and stem	Infusion of both parts of plant is taken orally for many days.
Olea europea L. subsp. *Africana*. Mill. P.S. Green	Oleaceae	uMquma	Heart problems.	Leaves and root	Both plant parts are boiled together to wash and rub on the chest until symptoms disappeared.
Osteospermum imbricatum Subsp.*nervatum* (DC) T.Norl	Asteraceae	inkhupuhlana	Chest complaints	Bulb and leaves	Parts are boiled to wash and rubbed on the chest.
Phylsalis peruviana L.	Scophulariaeae	igquzu	Chest complaints	Leaves and bulb	Both parts are boiled together to wash and rubbed on the chest.
Rhoicissus digitata (L.f.) Gilg & M.Brandt	Vitaceae	Uchithithibuna	High blood pressure	Bulb	Infusion of bulb is taken orally for several weeks.
Ruta graveolens L.	Rutaceae	Gwabeni or iVendrit (Africaans	Heart disease and cardiac asthma.	Leaves	Leaf infusion is taken orally for several weeks.
Sutherlandia frutescesnce (L.) R.Br.	Fabaceae	UmNwele	High blood pressure	Leaves	Leaves are boiled with imphepho leaves and taken orally for several weeks
Tulbaghia violaecea Harv.	Alliaceae	itswele lomlambo	High blood pressure, heart problems, chest complaints and high cholesterol.	Bulbs	Fresh bulb is boiled in water and infusion taken orally for several weeks.

(Buwa and Afolayan, 2009). The Zulus also grow *T. violacea* around their homes to repel snakes (Hutchings et al., 1996; Wyk and Gericke, 2000). The active ingredient, alliin, appears to be antiseptic and anti-hypertensive (George et al., 2001). Based on this observation, work is currently in progress on the scientific evaluation of the therapeutic claims; mechanism(s) of action(s) as well as toxicological effect of this plant in our laboratory.

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REFERENCES

Buwa LV, Afolayan AJ (2009). Antimicrobial activity of some medicinal plants used for the treatment of tuberculosis in the Eastern Cape Province. South Africa. Afr. J. Biotechnol., 8(23): 6683-6687.

Commerford PJ (2005). Valvular heart disease in South Africa in 2005. South Afr. Med. J., 95: 568-574.

George J, Laing MD, Drewes SE (2001). Phytochemical research in South Africa. South Afr. J. Sci., 97(3): 93-105.

Gowri J, Vijaya AA, Achi RS, Archunan G, Kalavathy S, Sampath KS, Vijaya KK (2011). Redemptive benefit of atorvastatin in the risk factors of coronary artery disease. J. Pharm. Res., 4(3): 627-629.

Hennekens HC (2000). Clinical and research challenges in risk factors for cardiovascular diseases. Eur. Heart J., 21: 1917-1921.

Hutchings A, Scott AH, Lewis G, Cunningham AB (1996). Zulu Medicinal Plants: An Inventory. Natal University Press,

Pietermaritzbur.
Krisela S (2007). The heart and stroke foundation South Africa heart disease in South Africa Media data document.http://www.heartfoundation.co.za/docs/heartmonth/HeartDiseaseinSA.pdf.
Laporta O, Perez-Fons L, Mallavia R, Caturla N, Micol V (2007). Isolation, characterization and anti-oxidant capacity assessment of the bioactive compounds derived from *Hypoxis rooperii* corm extract (African potato). Food Chem., 101: 1425-1437.
Mac DJA, Marchand ME, Langler RF (2004). Improving upon the *in vitro* biological activity of antithrombotic disulfides. Blood Coagul. Fibrinol., 15: 447-450.
Masika PJ, Afolayan AJ (2003). An ethenobotanical study of plants used for the treatment of livestock diseases in the Eastern Cape Province, South Afr. Pharm. Biol., 41: 16-21.
Mayosi B, Robertson K, Volmink J, Adebo W, Akinyore K, Amoah A, Bannerman C, Biesman-Simons S, Carapetis J, Cilliers A, Commerford P, Croasdale A, Damasceno A, Dean J, Dean M, De SR, Filipe A, Hugo-Hamman C, Jurgens-Clur SA, Kombila-Koumba P, Kotzenberg C, Lawrenson J, Manga P, Matenga J, Mathivha T, Mntla P, Mocumbi A, Mokone T, Ogola E, Omokhodion S, Palweni C, Pearce A, Salo A, Thomas B, Walker K, Wiysonge C, Zaher S (2006). The Drakensberg declaration on the control of rheumatic fever and rheumatic heart disease in Africa. South Afr. Med. J., 96(3): 246.
Misra M, Mittal M, Singh R, Verma A, Rai R, Chandra G, Singh R, Mall A, Khan MJ, Khane S, Yadar k (2007). Prevalence of rheumatic heart disease in school-going children of eastern Uttar Pradesh. Indian Heart J., 59: 42-43.
Van Wyk, Van BE, Oudshoorn B, Gerike N (1997). Medicinal plants of South Africa. South Africa (Pretoria): Briza Publications.
Van Wyk, Van BE, Gericke N (2000). People's plants, a guide to useful plants of Southern Africa, Briza Publications, Pretoria.
World Health Organization (2003). The World Health Report, 2003. Shaping the future. Geneva: WHO.
Sliwa K, Damasceno A, Mayosi BM (2005). Epidemiology and etiology of cardiomyopathy in Africa. Circulation, 112: 3577-3583.