Special Communication

Towards the Prevention and Management of Prostatic Diseases in Nigeria: A Framework

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Abstract

The prevalence of prostatic diseases is reportedly high in Nigeria, and in some cases, it is comparable to figures from industrialised countries. However, to date, the research and policy responses in Nigeria are regrettably inadequate. The presence of "the double burden of diseases" and a limited appreciation of recent trends in prostatic diseases may be partly responsible for this situation. Given the frequently meagre healthcare budgetary allocations, it is pertinent to develop a properly thought-out plan for the prevention and management of prostatic diseases in Nigeria. A framework aimed at contributing to the development of such a plan is presented here. The development of a Central Prostatic Diseases Unit (CPDU) in the Federal Ministry of Health is advocated. The CPDU would be responsible for planning research and information dissemination programmes. Emphasis should be placed on targeting modifiable risk factors at the population level, proper surveillance to identify emerging trends, and research on both the operational dynamics and the efficacy of locally available herbs that could be useful in the management of prostatic diseases.

Keywords: *disease management, health planning, Nigeria, prevention, prostatic diseases, public health*

Introduction

The prostate gland is a walnut-shaped gland that ordinarily weighs approximately 26 g at the end of puberty. Androgens are the major factors required for the growth and development of the prostate (1). Prostatic fluid accounts for up to 30% of the volume of semen, and its production is the primary role of the prostate. Prostatic fluid constituents ensure the nourishment and proper motility of sperm. Currently, there is limited knowledge about all the secretory products of the prostate and how these products relate to reproduction and infertility (2). Three major disorders afflict the prostate gland: prostate cancer, benign prostatic hyperplasia, and prostatitis.

Prostate cancer is the most common non-cutaneous cancer in men (3). It is thought to originate from the secretory epithelial cells that line the luminal surface of the ducts and acini of the prostate (4). The majority of cancers originate in the peripheral zone of the prostate, where prostate intraepithelial neoplasia is also found (4–6). The principal rate-limiting step in prostate cancer progression is thought to be the progression of histological cancer to tumours that are clinically evident (7).

Benign prostatic hyperplasia (BPH) is an age-related non-malignant enlargement of the prostate gland (8). It is a highly prevalent disease of older men and is the result of unregulated neoplastic growth of the prostate gland. In severe cases, BPH may lead to sepsis, irreversible bladder damage, renal failure, or even death (9). In humans, BPH originates as nodules in the glands and stroma of the transition zone. Massive enlargement and glandular proliferation occur within the nodules in men older than 70 years (10,11).

Prostatitis is a common debilitating urologic disease that is characterised by inflammation of the prostate gland. It has long been estimated that up to half of all men suffer from symptoms of prostatitis at some time in their lives (12). More recently, prostatitis has been reported to be the most common urologic diagnosis in men younger than 50 years old and the third most common urologic diagnosis in men older than 50 years old (13,14). The National Institutes of Health classification of prostatitis has four categories, designated I, II, III, and IV, representing acute bacterial prostatitis, chronic bacterial prostatitis, chronic prostatitis or chronic pelvic pain syndrome (inflammatory and non-inflammatory), and asymptomatic inflammatory prostatitis, respectively (15).

Studies have shown many developing countries that have long battled with largely communicable diseases are now also facing higher occurrence of chronic diseases (16). For example, in Nigeria, the prevalence of prostate cancer, BPH, and prostatitis are as high as figures reported in some industrialised nations (17–20). As much as 11% of all cancers in Nigeria are reported to be of the prostate (17), whereas as many as 25% and 12% of adult male Nigerians were reported to have BPH (19) and prostatitis (20), respectively. Mortality figures are not readily available from Nigeria, but they are presumably quite high. The need to address chronic diseases in the developing world, especially in sub-Saharan Africa and in Nigeria in particular, has therefore become evident (21). In countries that face this double burden of disease with meagre health care budgets, the goal should be the implementation of cost-effective prevention and management programmes for as many prevalent diseases as possible (22,23). Unfortunately, there is no clear-cut programme for prostatic diseases.

Lifestyle risk factor modification is the most cost-effective approach to reducing the burden of chronic diseases. Cooper et al. (24) estimated that treating a chronic disease, such as hypertension, could cost approximately USD36 per person in sub-Saharan Africa, where the per capita health expenditure is less than USD30 (25) and poor patients pay more money for health services (26). This buttresses the advantage of prevention over management.

Although the prevalence of prostatic diseases has generated little or no attention among policy makers, the threat they pose to our health care system is quite enormous. Several studies have shown that prostatic diseases may be associated with conditions such as obesity, diabetes, insulin resistance, hypercholesterolemia, and hypertension (27–33), the prevalence of which are reportedly high in Nigeria (34,35). It is therefore important to develop a health policy framework that is geared towards the prevention and management of prostatic diseases in Nigeria.

The Framework

Premature morbidity and mortality reduction should be the centrepiece of any strategy that is aimed at the prevention and management of prostatic diseases, especially in resource poor countries, such as Nigeria. Such strategies should have clearly provided details that are not only relevant to the local needs of the communities but are also understandable to the individuals who will implement the strategies. In many sub-Saharan African countries, finely drafted policies have no impact if there is no political driving force to facilitate its implementation. Based on the above considerations, the following strategies are suggested.

Establishment of a Central Prostatic Diseases Unit in the Federal Ministry of Health

An established Central Prostatic Diseases Unit (CPDU) should be charged with providing guidance and leadership in the areas of research, information dissemination, health policy formulation (with respect to prostatic diseases) and appropriate legislation. Such a unit must have members drawn from relevant sectors of the economy—relevant government ministries, academia, health practitioners, educationists, civil society, National Assembly members, lawyers, et cetera—if it is to be successful and sustainable. The unit has to be funded directly by the government. International organisations and non-governmental organisations should also be lobbied to provide funding for the CPDU. Such a properly funded multi-sectorial unit would definitely highlight the prevention and management of prostatic diseases in our national discourse. Such a central unit proved effective for cardiovascular diseases in Mauritius (36) and will undoubtedly work for prostatic diseases in Nigeria.

A replication of the CPDU in all of the states of the federation would enhance the accessibility of the unit to grassroots organisations, thereby making programmes implementation easy. These state arms of the CPDU would be properly suited to perform activities, such as school health programmes and interventions, using participatory methods that target rural illiterate populations. Data collection at the grassroots level could be conducted at the state levels of the CPDU and transmitted to the central body for processing, interpretation, and utilisation. Therefore, proper information flow between the federal CPDU and the state CPDUs would enhance the timely and efficient bi-directional transmission of information (Figure 1).

The CPDU could also use the mass media, especially the radio, as they are known to be useful in targeting both urban and rural dwellers. Easy-to-remember jingles relaying relevant information on the programmes of the CPDU or information on health-related lifestyle modifications for the population could be produced and disseminated using the mass media. Telecommunication providers could be lobbied to send messages on

prostatic disease prevention and management to their subscribers using their short message services.

Modifiable risk factors linked to prostatic diseases include physical inactivity (37,38), alcohol consumption, and tobacco smoking (39–41). Unfortunately, these factors are associated with urbanised lifestyles and appear to be desirable markers of affluence and "breaking into a high social class" among the poor and middle-income segments of the society. Programmes targeted at correcting these erroneous concepts should be implemented and should focus on targeting the low and middle-income populations. Affluent urban dwellers are usually more inclined to change their lifestyles when presented with scientific evidence that shows its deleterious consequences. In addition, these individuals can often afford proper medical care if they develop a disease.

For such a programme to be successful and effective, it must have a component that addresses treatment and counselling to those who already have the aforementioned risk factors. Such a component could be located in existing tertiary health care facilities in all states of the federation and would build the confidence of the population in the programme and encourage participation. Health workers involved in the programme could be trained so that they are conscious of these modifiable risk factors among the high-risk groups (such as the urban dwellers, the elderly, and first-degree relatives of known sufferers of prostatic diseases) irrespective of their place of residence and can identify the modifiable risk factors early. Individuals who belong to these high-risk groups should be encouraged to attend regular check-ups at designated facilities near their homes where basic tests and measurements can be completed, counselling can be provided, and medicines can be administered, while referrals would be directed to the tertiary health care facility nearest to their place of residence. Therefore, the activities of the CPDU will be integrated with existing three-tier health care infrastructure in the country.

Monitoring of emerging trends/risk factors and progress

Monitoring and evaluating emerging trends/risk factors and assessing progress made in the fields is another important part of the programme. Researchers from academia or other facilities involved in prostatic disease research should be attached to centres that attend to high-risk individuals and the general population. Therefore, relevant data that could aid the understanding of the pathophysiological mechanisms, prevalence/dynamics, and correlates (especially in terms of emerging trends, such as local environmental factors, inflammatory cytokines, and microbial infections) of these disorders could be collected, analysed, and interpreted.

The researchers could also conduct further surveillance to assess the magnitude of prostatic diseases and the associated morbidity and mortality. Verbal autopsies, cohort studies, cross-sectional studies, and partnerships with other researchers working on other chronic diseases would be useful ways of gathering such information. With the necessary information, it would be possible to calculate aggregate mortality and morbidity figures, as well as the disability adjusted life-years and absolute risk of each of these diseases. Data from operational research could help assess the cost-effectiveness of intervention and management programmes and the barriers to their development.

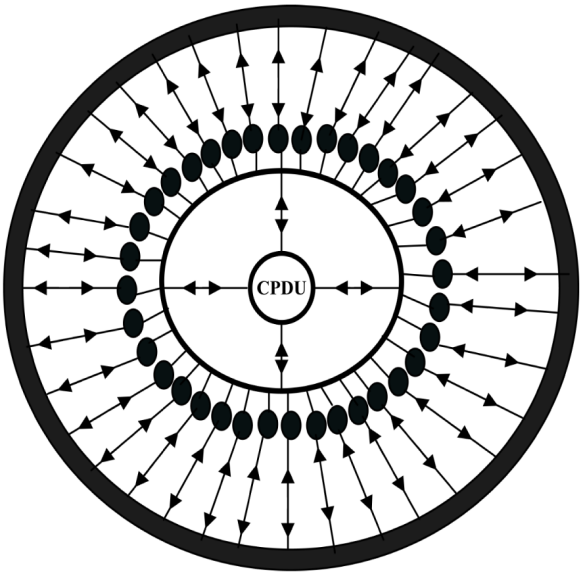

Figure 1: Diagram representing the suggested routes of information flow from the Central Prostatic Diseases Unit (CPDU) to the public and vice-versa. The dark circles represent the state versions of the CPDU, which are all linked to a common circle, whereas the outermost circle represents the population. The bi-directional arrows represent the vice-versa information flow from the CPDU to the state units and to the population.

Research on alternative treatment/management options

The use of locally available materials, mostly of plant origin, has recently gained recognition as alternatives to orthodox medicine. In fact, almost 90% of all medicines prescribed for BPH in Germany and Austria are phytotherapeutic agents (42). The biodiversity of plants found in Africa, which is arguably the richest in the world (43), coupled with the low purchasing power of Africans, especially with respect to orthodox drugs, make this type of research even more important. The research arm of the CPDU could coordinate the search for novel phytotherapeutics that could be useful in managing prostatic diseases.

Currently, extracts from plants, such as *Serenoa repens* (44), *Urtica dioica* (45), *Pygeum africanum* (46), *Secale cereale* (47), *Curcubita pepo* (48), *Hypoxis rooperi* (49), *Piper cubeba* (50), *Bixa orellana* (51), *Cocos nucifera* (52), and *Telfairia occidentalis* (53), are known to be potent botanicals in the management of prostatic diseases. It is reasonable to expect that many other locally available plants harbour phytochemicals that can be used to manage prostatic diseases. It is therefore imperative that these plants be assessed for possible therapeutic activity so that phytotherapeutics and nutraceuticals can be developed locally to aid the management of these debilitating conditions. Scientists could consult with practitioners of traditional medicine and operators of herbal homes to determine the herbs that they use to achieve certain results in their patients. For example, the herbs that are useful in the induction of urination in patients may contain agents that relax smooth muscles and, as such, can be useful in lowering prostatic muscle tone, a management goal in BPH.

Such research may have to include the isolation and characterisation of the active principles in the herbs and the determination of their specific mechanisms of action. Other factors, such as their interaction with other drugs and whether they act individually or in combination with other phytochemicals (synergism), will necessarily need to be determined. The results from such studies could lead to the development of novel therapies and possible blockbuster drugs.

Conclusion

Awareness on the prevalence and correlates of and risk factors for prostatic diseases need to be urgently increased in Nigeria. It is important to develop a framework that can be used to address these conditions, while not losing sight of the communicable diseases that blight the nation. The focus of such a framework should be on population-level interventions aimed at containing modifiable risk factors for prostatic diseases. Such interventions have been attempted for some other diseases in sub-Saharan Africa (36,54) and can be adapted for prostatic diseases in Nigeria. Clearly, to accomplish this task, a lot of funding would be required to conduct baseline studies and meaningful research, train personnel, disseminate vital information, and sustain the programme. Only a properly constituted and funded CPDU can effectively coordinate these responsibilities.

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References

1. Hayward SW, Rosen MA, Cunha GR. Stromal-epithelial interactions in the normal and neoplastic prostate. *Br J Urol*. 1997;**79(Suppl 2)**:18–26.
2. Ganong WF. *Review of Medical Physiology*. 18th ed. Stamford (CT): Appleton & Lange; 1997.
3. Landis SH, Murray T, Bolden S, Wingo PA. Cancer statistics, 1999. *CA Cancer J Clin*. 1999;**49(1)**:8–31.
4. Ware JL. Prostate cancer progression. Implications of histopathology. *Am J Pathol*. 1994;**145(5)**:983–993.
5. Bostwick DG, Brawer MK. Prostatic intra-epithelial neoplasia and early invasion in prostate cancer. *Cancer*. 1987;**59(4)**:788–794.
6. Sakr WA, Haas GP, Cassin BF, Pontes JE, Crissman JD. The frequency of carcinoma and intraepithelial prostatic neoplasia of the prostate in young male patients. *J Urol*. 1993;**150(2 Pt 1)**:379–382.
7. Mika M. Genetic epidermiology of hereditary prostate cancer in Finland [dissertation]. [Finland]: University of Tampere; 2001.
8. Bushman W. Etiology, epidemiology, and natural history of benign prostatic hyperplasia. *Urol Clin North Am*. 2009;**36(4)**:403–415.

9. Roehrborn CG, McConnell JD. Etiology, pathophysiology, epidemiology, and natural history of benign prostate hyperplasia. In: Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ, editors. *Campbell's Urology*. 8th ed. Philadelphia (PA): WB Saunders; 2002. p. 1297–1336.

10. McNeal JE. Origin and evolution of benign prostatic enlargement. *Invest Urol*. 1978;**15(4)**:340–345.

11. Jeyaraj DA, Uduyakumar TS, Rajalakshmi M, Pal PC, Sharma RS. Effects of long-term administration of androgens and estrogen on rhesus monkey prostate: Possible induction of benign prostatic hyperplasia. *J Androl*. 2000;**21(6)**:833–841.

12. Stamey TA. *Pathogenesis and treatment of urinary tract infections*. Baltimore (MD): Williams & Wilkins;1980.

13. Mehik A, Hellstrom P, Lukkarinen O, Sarpola A, Jarvelin MR. Epidemiology of prostatitis in Finnish men: A population-based cross sectional study in Finland. *BJU Int*. 2000;**86(4)**:443–448.

14. Nickel JC, Downey J, Hunter D, Clark J. Prevalence of prostatitis-like symptoms in a population-based study using the National Institutes of Health Chronic prostatitis symptom index. *J Urol*. 2001;**165(3)**: 842–845.

15. Krieger JN, Nyberg L Jr, Nickel JC. NIH consensus definition and classification of prostatitis. *J Am Med Assoc*. 1999;**282(3)**:236–237.

16. Reddy KS, Yusuf S. Emerging epidemic of cardiovascular disease in developing countries. *Circulation*. 1998;**97(6)**:596–601.

17. Ogunbiyi JO, Shittu OB. Increased incidence of prostate cancer in Nigerians. *J Natl Med Assoc*. 1999;**91(3)**:159–164.

18. Ukoli F, Osime U, Akereyeni F, Okunzuwa O, Kittles R, Adams-Campbell L. Prevalence of elevated serum prostate-specific antigen in rural Nigeria. *Int J Urol*. 2003;**10(6)**:315–322.

19. Ezeanyika LUS, Ejike CECC., Obidoa O, Elom SO. Prostate disorders in an apparently normal Nigerian population 1: Prevalence. *Biokemistri*. 2006;**18(2)**:127–132.

20. Ejike CE, Ezeanyika LU. Prevalence of chronic prostatitis symptoms in a randomly surveyed adult population of urban-community-dwelling Nigerian males. *Int J Urol* 2008;**15(4)**:340–343.

21. World Bank. *World development report 1993: Investing in health*. New York (NY): Oxford University Press for the World Bank; 1993.

22. Gwartkin DR, Guillot M, Heuveline P. The burden of diseases among the global poor. *Lancet*. 1999;**354(9178)**:586–589.

23. Gwartkin DR, Guillot M. *The burden of diseases among the global poor: Current situation, future trends, and implications for strategy*. Washington (DC): The World Bank; 1999.

24. Cooper RS, Rotimi CN, Kaufman JS, Muna WF, Mensah GA. Hypertension treatment and control in sub-Saharan Africa: The epidemiological basis for policy. *BMJ*. 1998;**316(7131)**:614–617.

25. World Health Organization. *The world health report 2000: Health systems: Improving performance*. Geneva (CH): World Health Organization; 2000.

26. Fabricant C, Kamara C, Mills A. Why the poor pay more: Household curative expenditures in rural Sierra Leone. *Int J Health Plann Manage*. 1999;**14(3)**: 179–199.

27. Hammarsten J, Hogstedt B. Hyperinsulinaemia as a risk factor for benign prostate hyperplasia. *Eur Urol*. 2001;**39(2)**:151–158.

28. Khosravi J, Diamandi A, Mistry J, Scorilas A. Insulin-like growth factor 1 (IGF-1) and IGF-binding protein 3 in benign prostatic hyperplasia and prostate cancer. *J Clin Endocrinol Metab*. 2001;**86(2)**:694–699.

29. Lee S, Min GH, Choi SH, Kim YJ, Oh SW, Kim YJ, et al. Central obesity as a risk factor for prostatic hyperplasia. *Obesity (Silver Spring)*. 2006;**14(1)**:172–179.

30. Parsons JK, Carter BH, Partin AW, Windham BG, Metter EJ, Ferucci L, et al. Metabolic factors associated with benign prostatic hyperplasia. *J Clin Endocrinol Metab*. 2006;**91(7)**:2562–2568.

31. Ejike CECC, Ezeanyika LUS. Metabolic syndrome in sub-Saharan Africa: "Smaller twin" of a regions prostatic diseases? *Int Urol Nephrol*. 2008;**40(4)**:909–920.

32. Ejike CECC, Ezeanyika LUS. Lifestyle changes in Nsukka metropolis in relation to prostate cancer and benign prostate hyperplasia. *Nig J Biochem Mol Biol*. 2009;**24(1)**:55–59.

33. Stamatiou K, Lardas M, Kostakos E, Koutsonasions V, Michail E. The impact of diabetes type 2 in the pathogenesis of benign prostatic hyperplasia: A review. *Adv Urol*. 2009:818965.

34. Ejike CECC, Ugwu CE, Ezeanyika LUS. Nutritional status, prevalence of some metabolic risk factors for cardiovascular disease and BMI-metabolic-risk sub-phenotypes in an adult Nigerian population. *Biokemistri*. 2009;**21(1)**:17–24.

35. Ijeh II, Okorie U, Ejike CECC. Obesity, metabolic syndrome and BMI-metabolic-risk sub-phenotypes: A study of an adult Nigerian population. *J Med Med Sci*. 2010;**1(6)**:254–260.

36. Dowse GK, Gareeboo H, Alberti KG, Zimmet P, Tuomilehto J, Purran A, et al. Changes in population cholesterol concentration and other cardiovascular risk factor levels after five years of the non-communicable disease intervention programme in Mauritius. Mauritius Non-communicable Disease Group. *BMJ*. 1995;**311(7015)**:1255–1259.

37. Platz EA, Kawachi I, Rimm EB, Colditz GA, Stampfer MJ, Willet WC, et al. Physical activity and benign prostatic hyperplasia. *Arch Intern Med*. 1998;**158(21)**:2349–2356.

38. Parsons JK , Kashefi C. Physical activity, benign prostatic hyperplasia, and lower urinary symptoms. *Eur Urol*. 2008;53(6):1228–1235.

39. Lee E, Park MS, Shin C, Lee H, Yoo K, Kim Y, et al. A high-risk group for prostatism: A population-based epidemiological study in Korea. *Br J Urol*. 1997;**79(5)**:736–741.

40. Platz EA, Rimm EB, Kawachi I, Colditz GA, Stampfer MJ, Willet WC, et al. Alcohol consumption, cigarette smoking, and risk of benign prostatic hyperplasia. *Am J Epidemiol*. 1999;**149(2)**:106–115.

41. Parsons JK, Im R. Alcohol consumption is associated with a decreased risk of benign prostatic hyperplasia. *J Urol*. 2009;**182(4)**:1463–1468.

42. Buck AC. Phytotherapy for the prostate. *BJU Int*. 1996;**78(3)**:325–336.

43. Farombi EO. African indigenous plants with chemotherapeutic potentials and biotechnological approach to the production of bioactive prophylactic agents. *Afr J Biotech*. 2003;**2(12)**:662–667.

44. Tacklind J, MacDonald R, Rutks I , Wilt TJ. *Serenoa repens* for benign prostatic hyperplasia. *Cochrane Database Syst Rev*. 2009;**(2)**.

45. Hryb DJ, Khan MS, Romas NA, Rosner W. The effect of the extracts of roots of the stinging nettle (*Urtica dioca*) on the interaction of SHBG with its receptor on human prostatic membranes. *Planta Med*. 1995;**61(1)**:31–32.

46. Wilt T, Ishani A, Mac Donald R, Rutks J, Stark G. Pygeum africanum for benign prostatic hyperplasia. *Cochrane Database Syst Rev*. 2002;**(1)**:CD001044.

47. Lowe FC, Fagelman E. Phytotherapy in the treatment of benign prostatic hyperplasia: An update. *Urology*. 1999;**53(4)**:671–678.

48. Tsai YS, Tong YC, Cheng JT, Lee CH, Yang FS, Lee HY. Pumpkin seed oil and phytosterol-F can block testosterone/prazosin-induced prostate growth in rats. *Urol Int*. 2006;**77(3)**:269–77.

49. Gerber GS. Phytotherapy for benign prostatic hyperplasia. *Curr Urol Rep*. 2002;**3(4)**:285–291.

50. Yam J, Schaab A, Kreuter M, Drewe J. *Piper cubeba* demonstrates anti-estrogenic and anti-inflammatory properties. *Planta Med*. 2008;**74(2)**:142–146.

51. Zegarra L, Vaisberg A, Loza C, Aguirre RL, Campos M, Fernandez I, et al. Double-blind randomized placebo-controlled study of Bixa orellana in patients with lower urinary tract symptoms associated to benign prostatic hyperplasia. *Int Braz J Urol*. 2007;**33(4)**:493–500.

52. De Lourdes Arruzazabala M, Molina V, Mas R, Carbajal D, Marrero D, Gonzalez V, et al. Effects of coconut oil on testosterone-induced prostatic hyperplasia in Sprague-Dawley rats. *J Pharm Pharmacol*. 2007;**59(7)**:995–999.

53. Ejike CECC. Evaluation of the usefulness of fluted pumpkin (*Telfairia occidentalis* Hook f.) seeds in the management of experimental benign prostatic hyperplasia [PhD thesis]. [Nsukka (NG)]: University of Nigeria; 2010.

54. Metcalf CA, Hoffman MN, Steyn K, Katzenellenbogen JM, Fourie JM. Design and baseline characteristics of a hypertension intervention program in a South African village. *J Hum HypertensI*. 1996;**10(1)**: 21–26.