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## Review

# The plight of Haitian refugees in the Dominican Republic: Physical/psychosocial consequences

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**Haitians are the largest minority living in Dominican Republic. These destitute people escaped the deprivations and disasters of their home country only to face other more tyrannical situations at asylums in the Dominican Republic. This manuscript focuses on the health consequences facing Haitians living on the north coast of the Dominican Republic. Their plight is a humanitarian crisis that requires the joint efforts of the international community and the local governments.**

**Key words:** Haitians, Dominican Republic, asylum, health, humanitarian crisis.

## INTRODUCTION

Hispaniola or the "little Spain" is the first name for the major island in the Caribbean after the arrival of Christopher Columbus in 1492. The native people had named this island, "Taino Amerindians" (McIntosh, 2000). Currently, the island contains two independent states, the Dominican Republic and Haiti; this division of the island is a consequence of a long history of European struggle for control of the new world of America since the 17<sup>th</sup> century (Lancer, 2002).

The population of Haiti is almost 10 million; this is a similar figure to the Dominican Republic (World Bank, 2011a). Economically, Haiti is the poorest nation in the Western Hemisphere, with 80% of the general populace living under the poverty line and 54% living in severe poverty. Haiti had a very low gross domestic product (GDP) of US \$ 6.494 billion in 2010, with deteriorating GDP growth rate by -8.5% while the Dominican Republic has an increasing GDP of US \$ 50.874 billions and a GDP growth rate of 5.5% during 2010. Other comparative indices between these two states also demonstrate their economical differences. For example, the total labor force of Haiti consists of only 7.2 % of the population while that of the Dominican Republic is 14.2%. The life expectancy at birth is 73 years for Dominicans and 61 years for Haitians. The literacy rate among Dominican adults

(above 15 years old) is 88% in comparison to only 49 % in Haiti (World Bank, 2011b). During 2010, the under-five mortality rate was 27 per 1,000 newborns in Dominican Republic and it was 165 per 1,000 in Haiti (WHO, 2011).

*Political unrest and natural disasters add more stress to the population, especially among Haitians. In recent history, Haiti has experienced the effects of hurricanes, floods and earthquakes. The 2010 high magnitude earthquake in Haiti killed and injured many thousands of people and ruined the already fragile infrastructures of the state (Margesson and Taft-Morales, 2010; Kolbe et al., 2010).*

For decades, more than one million Haitians have crossed the border into Dominican Republic to work on sugar plantations and in agricultural and other physically difficult and cheap labor jobs. Over time, Haitians who had been born in Dominican Republic formed a major minority in the Dominican Republic (Ferguson, 2003). One of the primary challenges faced by Haitian workers in the Dominican Republic is their immigration status, as the majority are residing there illegally and have no formal means of identification. For many children whose parents are Haitians and who were born in Dominican Republic, they do not even have any names. They are exposed to multiple forms of abuse and they do not possess any human rights. With limited assistance from local and international organizations, the situation of Haitians living in Dominican Republic is unlikely to improve significantly (Human Right Features, 2003).

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Worldwide, it has been documented that disasters, conflicts, instability of life, geographical displacement, immigration and becoming refugees have tremendous impacts on the physical and psychosocial status of the people. People in general who are trapped by these circumstances are traumatised; women and children, in particular, are more vulnerable victims (Keyes, 2000; Murthy, 2008; Noji, 1997; Wess et al., 2003). The disaster situation needs an integrated holistic approach of multi-level and multi-agency efforts (IASC, 2007).

This study aims to evaluate the physical and psychosocial status of Haitian people who are living in the area of Puerto Plata on the north coast of the Dominican Republic. This study is based on the available published literature and the direct field experience and resulting observations of the authors who visited the area during April 2011.

## **THE HUMANITARIAN CRISIS**

### **Physical-psychosocial impacts**

The former sugarcane workers from Haiti form the poorest community living in remote isolated areas in the Dominican Republic. These families are living without safe water or toilets in abandoned small houses, unfinished concrete barracks and/or tin and cardboard hovels surrounded by garbage with wandering stray dogs and other animals. These innocent people are under continuous exposure to all forms of environmental hazards. They have almost no right to receive health care and do not receive adequate nutrition. They cannot access social services and are socially discriminated against by the dominant Dominican society, including denial of their rights to practice their own culture and traditions, such as voodoo practices and Creole language (UNHCR, 2000).

Children are living in such tragic conditions where they have little or no access to schools and health care. Often, families are separated by forced deportations, resulting in the children being left behind, unaccompanied, in the Dominican Republic. The poverty obliges these children to work instead of attending school, leading to high levels of illiteracy in this community (Women's Commission for Refugee Women and Children, 2003).

Although many of the Haitians were born in the Dominican Republic, the state refuses to issue them birth certificates, so they exist as stateless people, facing the threat of forceful deportation to even more desperate situations in their home country. Due to their unstable political situation and low economic status, Haitians in the Dominican Republic are unable to participate in local politics (UNHCR, 2011a).

The impact of all this on both the physical and mental health of these families and their children is great. Diarrheas, infectious diseases and malnutrition are so

prevalent among Haitian children that they are the leading causes of the high rate of infant mortality. In spite of scarcity of available documented figures, WHO (2011) and USAID (2008) reported that only 58% of the population can access purified water. Haiti has the highest measles, mumps, and rubella infection rates in the region with an approximate mortality of 630 deaths per 100,000. Other leading causes of death among Haitians are HIV/AIDS and other infectious diseases including tuberculosis. In 2009, there were 49,535 reported cases of malaria (WHO, 2011). There are higher incidence rates of malignancies and women's health problems such as hypertension, eclampsia and other pregnancy and labor complications. In addition, there are high rate of child sexual and physical abuse (Pan American Health Organization, 2003). Mental health disorders are also of concern as many Haitians attribute mental health problems to supernatural and spiritual forces and they are less likely to use general psychiatric services where these exist (WHO, 2010). Even in Haiti itself, half of the population has no access to basic healthcare services (Eichler et al., 2009). The recent natural disasters detrimentally affected the Haitians' physical and psycho-social status and the consequences may continue for years (Shafer et al., 2010; Budosan and Bruno, 2011). The additional issues of physical and psychosocial disorders are even more complicated for the Haitians who are living in the Dominican Republic.

The authors' view came from direct observations and preliminary clinical health assessments and psychosocial support have been offered of the Haitians who are living in the area of Puerto Plata on the north coast of the Dominican Republic. Healthcare clinics were opened in semi-covered spaces and clinical assessment was provided to cases presented during any of scheduled places. A variety of physical illnesses were found among the people who had been medically assessed. For adults, somatic complaints were most prevalent among this group. Pains such as headaches, abdominal pains and other kinds of symptoms like breathing difficulties and dizziness were common. It is likely that psychological factors may be behind many of these cases. Many women complained of symptoms indicating genito-urinary infections. Pregnant women claimed that they were not receiving any prenatal care.

Physical examinations of children were conducted to assess their general health well-being and their current health complains. Malnutrition (underweight, anaemia) and skin infections were the two major health problems among those children. The heartbreaking complaint of stomach pain due to hunger was found among the majority of the children examined at the time of assessment as the families could offer them only one meal per day (the lunch) which they had not yet received at the time of assessment. However, the impression remains that the main health problems among these children include malnutrition, infection of the chest and

skin, and hair lice. It should be noted that the clinical assessment was done in a rapid and informal way. It is suggested that further explorations using standardized survey tools would generate more precise information particularly in terms of the psychosocial status of the population.

Given the shortage of time and limited resources during the visit to this area, our exploration was limited. However, the purpose of this preliminary report is to present a snapshot of the current physical and psychosocial status of Haitians who are trapped in the Dominican Republic which may be a guide to other more extensive research projects.

## CONCLUSIONS

Haitians in the Dominican Republic fundamentally lack any meaningful protection as refugees. Haitians left their home country to escape the economic deprivation and disasters of their homeland. They carry with them the major health and psychosocial problems which merit a wide variety of forms of human protection and care (Women's Commission for Refugee Women and Children, 2003). Children should have free access to health and education services. There is a great need to ensure the Child International Rights including re-union with their families. Children in asylums and as refugees are silent victims that are easily neglected. The uprooting, multiple losses and the hardship process of immigration and crossing borders compounds the trauma. Children are dependent on outside sources of protection and care. Specific attention should be paid to their development and emotional requirements. Separation of children from their families in emergencies and disaster situation has damaging consequences; they lose their care and protection in the time of extreme need (Save the Children, 2010). There is a great need to address the psychosocial needs of this vulnerable group of the community by government and other policy makers (Fazel and Stein, 2002). Displacement due to disasters necessitates adjustment in people's interpersonal, socio-economic, cultural and geographic boundaries (Schinina et al., 2010). For the children in emergencies, it has been proven that maintaining children within families is the best way to protect them from harm and exploitation (Save the Children, 2010).

The Dominican Republic governmental and non-governmental agencies should take further steps to offer the Haitians who are living in the Dominican Republic with the appropriate and basic assistance needs, including work authorization. Dominicans should protect them from all kinds of abuse, respect their traditions and beliefs, and insure the enforcement of human rights obligations.

The international community and aid organizations have an ethical responsibility to assist the Dominican community and the Haitian community living in the

Dominican Republic so that international obligations related to refugees' rights are met. UNHCR is trying to coordinate efforts with other NGOs and local authorities to support displaced Haitians in both Haiti and Dominican Republic, with a current primary focus on the documentation program to alleviate the statelessness status of Haitians living in Dominican Republic (UNHCR, 2011b). However, all these efforts are challenged with the reality of the magnitude of the problem, a shortage of resources and political interference.

Further health and psychosocial assessments are needed to be implemented and to guide a better approach to assisting these people. Realistic resources need to be made available for people in distressing situations. The laws protecting children need to be strengthened and applied. The management of the mental health aspects of suffering need to be further developed. It is not only the Dominican Republic's responsibility but it is the international community that needs to take steps to alleviate the pressures on Haitians in their home country and other places where they seek help.

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*Full Length Research Paper*

# Primary health care services in Nigeria: Critical issues and strategies for enhancing the use by the rural communities

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**Quality health is a fundamental right of all Nigerian citizens. While primary health care (PHC) centers are relatively uniformly distributed throughout local government areas (LGAs) in Nigeria, the rural people tend to underuse the basic health services. This article examines some cross cutting issues in PHC and outlines strategies to enhance the utilization of health services by rural people. The responsibility for perpetuating the existing low use of PHC services should be held by PHC policy makers and LGA. Responsible health personnel can build a new social order, based on greater equity and human dignity, in which health for all by the year 2015, including that of rural populations, will no more be a dream but a reality. Capacity building and empowerment of communities through orientation, mobilization and community organization as regards training, information sharing and continuous dialogue, could further enhance the utilization of PHC services by rural populations.**

**Key words:** Healthcare, services, strategies, use, rural.

## INTRODUCTION

The goal of primary health care (PHC) was to provide accessible health for all by the year 2000 and beyond. Unfortunately, this is yet to be achieved in Nigeria and seems to be unrealistic in the next decade. The PHC aims at providing people of the world with the basic health services. Though PHC centers were established in both rural and urban areas in Nigeria with the intention of equity and easy access, regrettably, the rural populations in Nigeria are seriously underserved when compared with their urban counterparts. About two-thirds of Nigerians reside in rural (<http://www.fao.org/countryprofiles/index.asp>) areas therefore they deserve to be served with all the components of PHC.

Primary health care, which is supposed to be the bedrock of the country's health care policy, is currently catering for less than 20% of the potential patients (Gupta

et al., 2004). While most PHC facilities are in various state of disrepair, with equipment and infrastructure being either absent or obsolete, the referral system is almost non-existent. The goal of the National Health Policy (1987) is to bring about a comprehensive health care system, based on primary health care that is promotive, protective, preventive, restorative and rehabilitative to all citizens within the available resources so that individuals and communities are assured of productivity, social well-being and enjoyment of living. The health services, based on PHC, include among other things: education concerning prevailing health problems and the methods of preventing and controlling them, promotion of food supply and proper nutrition, material and child care, including family planning immunization against the major infectious diseases, prevention and control of locally endemic and epidemic diseases and provision of essential drugs and supplies. The provision of health care at PHC level is largely the responsibility of local governments with the support of state ministries of health

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and within the overall national health policy (Nigeria Constitution, 1999). Private medical practitioners also provide health care at this level. Although PHC was said to have made much progress in the 1980s, its goal of 90% coverage was probably excessively ambitious, especially in view of the economic strains of structural adjustment that permeated the Nigerian economy throughout the late 1980s. But many international donor agencies such as UNICEF, World Health Organization (WHO) and the United States Aids for International Development, (USAID) embraced the programme and participated actively in the design and implementation of programmes at that level (USAID, 1994). At a stage, most of the programmes were donor driven. It was not surprising that at the height of the political crisis in 1993, most of them withdrew their funding and the programme started experiencing hiccups. With the return to democracy in 1999, however, primary health care system deteriorated to an unacceptable level. The availability of basic health services provided by the PHC especially to rural areas in a country might be used as a yardstick to measure the extent of its health level of development. The aim of this article is to describe some strategies which, if implemented, might enhance the proper and timely use of PHC by Nigerian rural populations.

## **METHODS OF LITERATURE SEARCH**

An extensive search of the Pub Med database, Medline and Google Scholar was done to retrieve literature on PHC services and strategies for enhancing the use in rural community, which were published either in English or with an English abstract (foreign-language publication). A separate search was also conducted to identify the problem areas and gaps in the implementation of PHC services in Nigeria. The time period of the search range from 1987 till 2008. Combinations of the following types of keywords were used such as issues in PHC services, strategies for improving PHC services, Nigerian rural community, etc. All keywords were first used to search for papers in Nigeria, and then papers published elsewhere but related to PHC in Nigeria. Other countries were added to get more information. Furthermore, Pub Med, Medline and Google Scholar searches were conducted using the research title and the related articles link for key publications, and additional papers were also identified from the respective reference lists. Non-indexed literature and reports from international organizations were also accessed using Google and organizational websites ([www.ngnhc.org](http://www.ngnhc.org)). The following data was used from two main global sources: the WHO PHC capacity building strategies, PATH guideline for implementing supportive supervision. Due to the variability in quality of information and the broad range of values reported in published literature and reports, this paper did not attempt to provide any quantitative summary of effects of programs. Instead a review of information is being presented with

analysis of overall trends and knowledge gaps. Contacts were made with colleagues with relevant information on our topic. All sources have been referenced in the text of the paper.

## **CRITICAL ISSUES IN PRIMARY HEALTH CARE SERVICES IN NIGERIA**

The Nigerian government is committed to quality and accessible public health services through provision of primary health care (PHC) in rural areas as well as provision of preventive and curative services (Nigeria Constitution, 1999). PHC is provided by local government authority through health centers and health posts and they are staffed by nurses, midwives, community health officers, health technicians, community health extension workers and by physicians (doctors) especially in the southern part of the country. The services provided at these PHCs include: prevention and treatment of communicable diseases, immunization, maternal and child health services, family planning, public health education, environmental health and the collection of statistical data on health and health related events. The health care delivery at the LGA is headed politically by a supervisory councilor and technically and administratively by a PHC coordinator and assisted by a deputy coordinator. The PHC co-coordinator reports to the supervisory councilor who in turn reports to the LGA chairman (Adeyemo, 2005; Federal Ministry of Health, 2004). The different components of the LGA PHC are manned by personnel of diverse specialty. The LGA is running her primary health care services delivery in compliance with the principles / framework of the National Health Policy (Nigerian National Health Bill, 1987). The LGA is divided into various health districts/wards so as to enhance maximum benefit of the principle of decentralization of the health sector whereby people are involved, participate and mobilized in the PHC processes.

### **Problem areas in the implementation of PHC**

The essence of health care to the local government is to make the management of PHC services more effective and closer to the grassroots. However, in view of the level of health awareness, one begins to question the extent to which health care has been taken to the doorstep of the rural people. One of the hindrances to the development of health especially in Nigeria has to do with insufficient number of medical personnel as well as their uneven distribution. The Third Development Plan (1975 to 1980) for Nigeria focused on the inequity in the distribution of medical facilities and manpower/personnel. Despite the desire by the government to ensure a more equitable distribution of resources, glaring disparities are still evident. The deterioration in government facilities, low salaries and poor working conditions had resulted in a

mass exodus of health professionals (Iyun, 1988). There has been too much concentration of medical personnel at the urban to the neglect of the rural areas. Another significant problem in the management of PHC is transportation. It has been reported in LGA PHCs that there are not enough vehicles for workers to perform their task especially to the rural areas. Immunization outreach services are inadequately conducted. The maintenance culture of the existing vehicles is poor while PHC vehicles were used for other purposes other than health related activities. To put succinctly, many of the PHC vehicles donated by UNICEF in the 1980s are totally non-functional (Wunsch and Olowu, 1996).

Access to many parts of the communities is a function of: natural topographical and weather conditions ([http://en.wikipedia.org/wiki/Geography\\_of\\_Nigeria](http://en.wikipedia.org/wiki/Geography_of_Nigeria)); inadequate finance; over dependence of the LGA on federal, state and international agencies for support - the internally generated revenue of the LGA is meager (Adeyemo, 2005); low level of community involvement (Omoleke, 2005), general misuse and abuse of the scarce resources by some political and administrative leadership and high leadership turnover at LGAs (Adeyemo, 2005).

### Health needs and problems of rural populations

There are three health care delivery systems in Nigeria (primary, secondary and tertiary). There are innumerable problems within primary health care delivery system which affect the whole population. An assessment of these problems and needs is important to assure easy accessibility to health care services by rural people. Apparently, people living in remote areas show an adaptability that allows them to adjust to the adverse conditions. Critical observation of some groups of nomads, for example the Fulanis and fishermen from the core northern states, the migrant Tiv farmers from Benue State, reveals satisfactory physical health and increasing resistance to disease or illness, but they are not without health problems. The health and health-related problems of nomads, migrant farmers and rural people include the following:

- i. Poverty associated with poor housing, unsatisfactory environmental sanitation, polluted water and food which predispose to malnutrition and infectious diseases.
- ii. Uneven distribution of health services, and shortage of physicians, nurses and trained health personnel in rural areas.
- iii. High mortality and low average life expectancy, due to lack of access to health services. It is unfortunate that systematically collected data are lacking about levels of morbidity and mortality in rural communities. Despite the availability of PHC services, some rural dwellers in Nigeria tend to underuse the services due to perceptions of poor quality and inadequacy of available services (Sule

et al., 2008). Various reasons can be adduced for the underuse of the services provided: a) difficulties associated with transportation and communications; b) high rates of illiteracy among rural peoples; c) traditional conservatism and resistance to ideas from outside; deep rooted traditions and customs, including health beliefs and practices, which increase the patronage of the services of traditional healers; and d) lack of understanding of PHC among health professionals and decision-makers resulting in poor quality services; and e) health worker attitude to work (frequent abstinence from the work place) (Adeyemo, 2005).

iv. A tendency to press older children into adult responsibilities early, resulting in psychological problems due to role conflicts.

v. Endemic diseases prevalence, such as malaria and trachoma.

vi. Zoonotic diseases as a result of their close contact with animals as part of their way of life.

Clearly most of the problems and needs of rural areas are multifactorial in origin and require multidisciplinary interventions (Abiodun et al., 2010).

### CURRENT STATUS AND GAPS IN PHC SERVICES IN RURAL COMMUNITIES

PHC centers are filtering units for those who require specialized services at the higher levels of care. Specialized medical services such as radiotherapy, orthopaedic procedures and surgeries are completely absent. There are many variations in the ways that medical care is given to rural people. The psychosocial health of rural dwellers is a neglected aspect of services provided. Gap remains in the knowledge of rural health workers to respond satisfactorily to identified problems.

This gap needs to be addressed because patients' satisfaction with health care is an important health outcome which has implications for capacity utilisation. And, in health systems that emphasizes the cooperation and involvement of the community, both in terms of resources contribution and management, satisfaction with health care assumes an important dimension in terms of its implication for success of public health programmes (Hegazy et al., 1992).

Some of the health workers are untrained and the trained ones lack the modern concept of PHC practice. Although, in principle, PHC requires intrasectoral and intersectoral coordinations and community participation, they are often lacking when put into real practice. Most of the services rendered lack community linkage and because of this, most community members are unaware of some available services. In general, nomadic women and children especially in the northern part of the country are the most underprivileged and chronically neglected segment in rural areas. Study has shown that rural women especially nomads, when compared with the

urban population, significantly underuse maternal and child health services (Abiodun et al., 2010).

## **STRATEGIES FOR ENHANCING THE USE OF PHC SERVICES BY RURAL COMMUNITIES**

### **Operational strategy**

A comprehensive baseline survey using rapid appraisal techniques should be planned in the initial stages to collect information about the health status, socio-demographic variables, civic amenities, existing health facilities as well as the attitudes and beliefs of the target population towards PHC services.

### **Reviewing and restructuring of PHC services**

Public health goals at all levels of government are influenced by demographic and background variables. In view of this, information about community felt needs becomes paramount. These needs should be properly evaluated and coordinated with different sectors and incorporated into existing PHC services. In addition, new programmes should be developed to meet their unfulfilled needs. Some PHC centers are badly located in terms of physical accessibility. Accessibility can be improved by either relocation of the existing PHC centers, or adding more centers at the village level to bring the services within walking distance of the population of the catchment area. It is essential that PHC personnel are trained and re-trained to orientate people towards the concept and principles of PHC. Likewise, the skills of traditional birth attendants and voluntary village health workers should be enhanced by adequate and pertinent training.

Mobile health services intended to meet the needs of the remotest population have proved ineffective and rather too costly. In summary, such mobile services are not cost-effective. The establishment of health centers to serve remote populations would be a better strategy. If need be, working hours of the PHC centers should be adjusted and more emphasis be placed on the care of specific groups, such as mothers, children and the elderly. Therefore, PHC services should be based on fixed structures with a reasonably wide coverage, sufficient flexibility and adequate mobile capacity to fulfill their obligations to all sectors in the population, especially the highly migrant population. Legislation should be enacted for special services like immunization and reproductive health. Family health file/card should be prepared with all information related to health, so that they can be taken by families on the move from one place to another for quick acceptance, greater access and prompt management. Village health committee should be restructured and revitalized to include health personnel, community members, including nomadic people, and women.

Periodic evaluation of PHC centers with regards to the impact of new health programmes and policies. Secondary-level health care facilities should be empowered to monitor and supervise PHC services. The secondary health facilities should also have some disciplinary authority on erring PHC centers.

### **Community participation and involvement**

It is almost universally acknowledged by national and international health planners that community participation is the key to the successful implementation of primary health care (PHC). The 1978 Declaration of Alma-Ata identified community participation as 'the process by which individuals and families assume responsibility for their own health and welfare and for those of the community, and develop the capacity to contribute to their community's development (World Health Organization, 1978). Nigeria is one of the few countries in the developing world that has systematically decentralized the delivery of basic services in health to locally elected governments and community based organizations. Community participation has been institutionalized through the creation of village development committees and district development committees that are grass-roots organizations expected to work closely with local governments in monitoring and supporting primary health care services. Recently, there have been several governmental initiatives to strengthen these institutions of community participation to improve health services (World Bank, 2003). The National Health Policy in Nigeria emphasizes active community engagement in the provision of PHC services in the spirit of the Bamako Initiative of 1987, when Health Ministers from various African nations adopted resolutions for promoting sustainable primary health care through community participation in financing, maintenance, and monitoring of services. Community participation was institutionalized in Nigeria through the creation of District Development Committee (DDC) and the Village Development Committee (VDC) (World Bank, 2003). There is a large and growing body of evidence (Mike, 2010) that certain types of service delivery are enhanced with the active participation of the communities they serve. As end-users of the services, communities have a stake in ensuring that services are well-provided, and are also well-positioned to monitor the quality of services. With the benefit of local information, they can assess the specific obstacles facing facilities in providing services and they can seek to ensure that facilities have the necessary infrastructure, supplies and staff motivation to provide the services they are supposed to provide. Some of this can be done through volunteer efforts, such as donations for buying supplies, but most of the benefits of community participation can only be harnessed if there are specific mechanisms in place to enable them to do so. For example, whether or not they are allowed to raise local resources will affect their ability to ensure a smooth

flow of supplies. Similarly, whether or not they have a say in the evaluation and rewards/sanctioning of facility staff will affect the extent to which they are able to translate their observation of staff behavior into improved staff responsiveness to local needs. In planning the community participation aspects of primary health care, the collaboration of an anthropologist or rural sociologist with field experience is recommended. Promoting community participation is a skill which must be taught to community health workers, and backed up with support services. The genuine commitment of medical staff to community self help is crucial to the motivation process. Motivation within the community quickly breaks down if materials, expertise, and salaries fail to arrive when promised. Community activities are most successfully promoted with reference to the people's own ideas of purity/pollution, cleanliness/dirtiness, and health/illness. Guidelines for successful community participation include: projects undertaken should be ones that the community has identified as a priority; demonstrations and activities to promote health might be linked with agricultural initiatives, adult literacy campaigns, or programs from other sectors; and it is necessary to make sure the community fully understands all the costs in labor, time, money, and materials. If projects or long term community health programs fail, a quick, simple analysis should be made of constraints that may be operating. Apart from providing health care services based on their expertise, community also help in ensuring professional commitment to achieving the goal of health for all. In the last three decades, there has been an increasing demand for a shift of emphasis from acute care to the prevention of disease and promotion of health, education and research. Health workers should try to achieve the maximum possible while trying to solve other deep-rooted problems so as to make health the right of every individual. Professionals working in outreach areas need to develop confidence and expertise in making decisions, even under extreme conditions. It is advisable to accord suitable rewards and recognition for work under difficult and rigorous conditions to boost the morale of the workers. In rural areas, PHC centers are assisted and manned by local people who are selected and trained in addition to the trained medical personnels from outside the locality. In order to strengthen the interest of these people and ensure their retention in the rural areas special incentives should be given, for example, financial inducement of trained nurse aides or midwives to migrate to rural areas and thereby be permanently available to work. Increased awareness of the public, but especially of nomads and rural communities, about health problems, as a result of encouragement and stimulation from health professionals, leads to the mobilization of community resources and greater control over the social, political, economic and environmental factors which affect global health. This is necessary because health begins at home and in the work place. It is where people live and

work that health is made or neglected. So the involvement of the community in devising health plans cannot be over-emphasized. The participation of the public in defining problems, planning, implementation and evaluation of community resources makes them feel responsible, not only for their own health, but also that of others. All members of the community can be involved in some aspects of the health programmes. In rural areas especially, the cooperation of local people is fundamental. Their participation can be encouraged by disseminating relevant health information, increased literacy and making the necessary institutional arrangements. Mutual support between the community and the government is highly needed. Planners should realize that individuals need not feel they are obliged to accept solutions unsuitable for them. The approaches to the delivery of PHC for rural populations should, therefore, be practical and feasible.

Women from nomadic and rural communities constitute a major health risk group. So, in PHC programmes, if women are actively involved and treated as responsible and concerned members, they can play an enormously effective part, not just in improving the overall health status, but in achieving greater social justice within their own communities as well. PHC, being people-oriented, should make use of all channels through which people express their concerns over health and health supportive policies and programmes. A social climate can be created in which various groups in society accept the health practices recommended, and thereby help individuals make wiser choices. An enlightened community (that is, a public that knows its rights and responsibilities, supported by political will and awareness at all levels of government) holds the key to making health for all a reality.

### **Advocacy and political support/ commitment for health equity**

A concern for health equity is not new in global health. Equity was central to the World Health Organization (WHO) 1946 constitution, and to the work that culminated in the Declaration of Alma Ata in 1978. Despite this, the health agenda has mostly focused on securing progress on priority challenges. This has contributed to substantial advances in average life expectancy in most parts of the world. Yet the global health community has often seemed unable to counter the widening inequities brought by uneven progress.

The World Health Assembly has the potential to be a turning point in addressing health inequities. Two resolutions should be passed, and they should fundamentally have concern for equity and social justice – one on 'primary health care, including health systems strengthening' and another on 'reducing health inequities through action on the social determinants of health. It can seem a long way from a high-level policy review to action

that makes a difference on the ground. Three points are important here. First, health inequities are associated with social inequalities. Health outcomes are linked to position in social hierarchies, described by income, occupation and education, by ethnic group or by gender and to geographic location, for example, rural or urban. In particular, poor health outcomes are likely where social inequalities intersect, for example, for children of women with no education in poor households in rural areas. Studies (Lucas and Gilles, 1984) in low and middle income countries in Africa and Asia show a stepwise increase in under-five mortality across households by wealth, with children from the poorest fifth of households more likely to die before their fifth birthday than the next poorest and so on across the distribution. This pattern is seen for a number of health outcomes and is known as the social gradient in health, meaning that health outcomes are associated with people's position in the social hierarchy. The social gradient has important implications for policy as it means that policies and programmes must not only target the worst off in society, but must also address the conditions of the whole of society in order to tackle the gradient in health. Second, and crucial to the social determinants of health approach, is that where differential health outcomes are linked to social inequalities, then action to improve health outcomes must include action to reduce social inequalities. Seen in this light, every sector is, in effect, a health sector, because every sector, including finance, business, agriculture, trade, energy, education, employment, and welfare, impacts on health and health equity.

Thirdly, health workers at the heart of communities have a pivotal role to play in raising awareness and calling for action on social determinants and in the process of developing and evaluating action at local and national level. A clear political commitment to health for all and to equity in all sectors is essential to tackle the existing inequalities in the provision of health. Health policy makers and planners should note that health and its maintenance is a major social investment. Formal support from the government and community leaders is required to re-orientate national health strategies, especially the transfer of a greater share of resources to underserved populations. Authority should be given to local administrations regarding decisions about matters related to local needs. Those in power need to go to the people in order to receive and hear their complaints and take the necessary steps to solve them, especially in rural and nomadic settlements. Political commitment is a crucial factor in the process of policy formulation and implementation to ensure adequate services to the neglected sections of society (World Health Organization, 1991).

Political environment plays a significant role in making accessible to every person the complete range of health, psychological and social services, including prevention and rehabilitation, thus meeting the needs of underserved

individuals, families and special groups. Unfortunately/surprisingly, health planners in Nigeria have not realized this need.

Government must first make the PHC centers attractive by putting up clean structures and equipping them with the right tools, personnel as well as drugs. There is need for total turn around of many of the PHCs. In a bid to strengthen the primary health care, the government should also pass the National Health bill. The bill should aim to establish a framework for the regulation, development and management of the national health system and underpins primary health care as the entry point into the national health system. The bill should also establish a Primary Healthcare Development Fund, which shall see to the provision of basic health care to as many as possible through the National Health Insurance Scheme. The fund should be administered by the National Primary Health Care Development Agency (NPHCDA). The bill should also provide that funding for the Primary Health Care Development Fund should come from "an amount not less than two per cent of the value of the Consolidated Revenue Fund as well as grants from international donor partners."

The bill should stipulate a sharing formula in the utilisation of the fund to the effect that "fifty percent of the amount in the fund would be expended on basic health care for all citizens," while 25% of the fund would be used to provide essential drugs for primary healthcare and 15% of the fund should be used in providing and maintaining logistics used under the primary health care system. The remaining 10% of the fund should be utilized in building human capacity used under the primary healthcare system. The bill should also set guidelines for states and local governments to benefit from the fund. The bill should authorize the state to provide at least ten percent of the cost of the project envisaged while local governments should contribute 5% of the cost of the project.

As part of efforts to revitalize the PHC sector and to facilitate the establishment of the Ward Health System, the federal government through the National Primary Health Care Development Agency should complete the construction of model health centers in various needy political wards across the country. There should be also be a 5-year developmental plan to construct model health centers in all political wards in the country

### **Awareness creation**

There is a need for a national approach to health education/promotion/behavior change. Currently, the unit within the PHC responsible for health promotion needs to be supported and strengthened to discharge her responsibilities effectively. Community-based activities should support increased family participation in their own health care. This should include educating them on what

services they should expect from PHC, as well as activities/messages on promotion of healthy lifestyles and prevention and early treatment of common illnesses.

The PHC should address several aspects of communications/health promotion linked to building awareness and achieving behavior change. It should include communications approaches directed at the family and community level.

To enhance the utilization of the health services by people, it is most important that they should recognize the need for such services. This need will only be felt if they start to value health as a worthwhile asset (Morley et al., 1983). For this, they need adequate, relevant, scientific information and education about health, disease and hazardous environments (Lucas and Gilles, 1984). Maximum efforts should be made to study the beliefs and practices about health and disease prevailing among different tribes and population groups. Traditional healers serve as the best source of information in this regard. Practices should be categorized into those that are clearly beneficial or clearly harmful.

The information provided should be expressed in simple but quantitative form (Morley et al., 1983), starting from simple matters, such as personal hygiene, and gradually progressing towards more comprehensive health education, fostering behavioural changes and community action for health. The language for communication should be the same as that of the local people, audiovisual aids used must be produced locally and be appropriate, and finally the educational programme should be carried out by trained and experienced personnel from the locality (World Health Organization, 1991).

Health personnel must be aware of the harmful effects of rapid intervention. It is easier to change practices rather than beliefs because the latter are deep rooted, especially among the rural people. The commitment of rural people to religion can be utilized to support the health messages through quotation from the Quran and *hadith* and Bible. Local beliefs can be interpreted to fit in with the desired health practices (Last, 1984). Traditional media, such as folk songs and drama shows, are very useful in educating illiterate people, especially rural women, who need a rigorous campaign to utilize effectively the maternal and child health services provided at the PHC centers. Health information should be available to the public in the communication media they know and use regularly (World Health Organization, 1991). Adequate knowledge and desirable attitudes about health are necessarily accompanied by appropriate practices.

### **Collaboration and partnership with other agencies**

Collaboration in PHC focuses on how to create conditions for health care providers every where to work together in the most effective and efficient way with the aim of producing the best health outcomes. Collaboration with

other related sectors in the improvement of PHC as part of total socioeconomic development is very important. It has been emphasized that no sector involved in socioeconomic development, especially the health sector, can function properly in isolation (Hegazy et al., 1992). Many social factors such as education, housing, transport and communications influence health (Last, 1984), and so does economic factors too. Therefore, collaboration with the relevant sectors is especially important for worthwhile mutual benefits. Collaborative efforts focused on economic development and progress leads to better health.

Educational institutions play an important role in the health status of the community, especially in the field of prevention. Teachers can help in the early detection of ill health in students. Students are used as messengers of health to the community. Literacy programmes have been shown to have a great impact on equity-oriented development in rural areas (World Health Organization, 1991). The educational status of the mother plays a pivotal role in the health of the family. As maternal education among rural and nomadic groups is relatively lacking, adult educational programmes would be of great help. The mass media can contribute effectively to the dissemination of health messages to the population at large. The health sector must play a leading role in health supportive public policies. Health activities should be undertaken concurrently with such measures as the improvement of nutrition, particularly that of children and mothers.

Coordination of health-related activities should be devoid of duplication (Hegazy et al., 1992). To make intersectoral coordination a reality, concerted efforts should be made to demonstrate how ill health and disease are closely related to illiteracy, poverty, poor sanitation and environmental conditions, etc. (World Health Organization, 1991). PHC lay emphasis on health care that is essential, practical, scientifically sound, coordinated, accessible, appropriately delivered, and affordable. One route to achievement of improved health outcomes within these parameters is the formation of partnerships. Partnerships adopting the philosophy and five principles of primary health care (PHC) focus on health promotion and prevention of illness and disability, maximum community participation, accessibility to health and health services, interdisciplinary and intersectoral collaboration, and use of appropriate technologies such as resources and strategies.

### **Appropriate technology**

Technical appropriateness means that whatever policies and procedures are used in the delivery of health care, they should be acceptable to all concerned. When introducing any new technology, the authorities must be assured that it will not contravene the beliefs and practices of the local culture. The whole health system

should be used in a rational way to satisfy the essential health needs of rural people, by using methods acceptable to them such as the use of oral rehydration fluid in place of intravenous fluid; and standpipes which are socially acceptable and financially more feasible than house-to-house connections, etc.

## Supervision

The word “supervision” literally means “to over-see”. It implies that someone higher up the scale is watching to see that someone lower down is performing their job properly. As early as the Egyptian pyramid builders, supervisors oversaw teams of slaves pulling huge building blocks into place. Since then, those in power, including colonialists, exerted their influence over others by appointing supervisors and inspectors. This form of supervision was most often focused on outcomes and was usually not open to dialogue and consultation about the process. It often favoured ridicule and discipline to push individuals and communities to perform their duties. And it has not fulfilled its promise to improve primary health care delivery.

The more traditional supervisory visit focused on inspection and fault finding. Health workers often received little guidance or mentoring on how to improve their performance. They were “frequently left undirected, with few or no milestones to help assess their performance, until the next supervisory visit, and motivation was hard to maintain in such an atmosphere” (Guidelines for Implementing Supportive Supervision, 2003). While most primary health care services acknowledge the need for some form of supervision, we maintain that effective (traditional) supervision has been an abject failure in most primary health care settings in developing countries.

For instance, inadequacy in the quality of primary health care facilities in Nigeria was felt to be the product of failure in a range of quality measures – structural (lack of equipment and essential drugs), and process (not using the national case management algorithm and lack of a protocol for systematic supervision of health workers). This study recommends that efforts should be put in place to improve the quality and use of primary health care in Nigeria by focusing not only on providing better resources, but also on low-cost, cost-effective measures that address the process of service delivery such as supervision (Ehiri et al., 2005).

From a feeling of dissatisfaction with the old model of supervision (that is, traditional supervision) emerged a new paradigm for supportive supervision. The maximizing access and quality initiative (MAQ) described supportive supervision as “a process that promotes quality at all levels of the health system by strengthening relationships within the system, focusing on the identification and resolution of problems, and helping to optimize the allocation of resources-promoting high standards, teamwork, and better two-way communication (World

Health Organization, 1991).”

By 2001, the move away from traditional supervision had begun. Decisions were made by WHO to re-write the training modules (World Health Organization, 1991). This guideline clearly laid out the new principles of supportive supervision. While we believe these guidelines provide the basis for improving supervision in most of the developing world, there is also scope for yet more innovative approaches to supervision. Independence, autonomy, community participation and empowerment without the cultural or political climate to ensure that supervision can be conducted may not create an environment conducive to improving outcomes. Health workers at the periphery are faced with complex problems over which they may have little control, scarce resources, and few problem-solving skills. No amount of traditional supervision will overcome this situation. However, the new paradigm of supportive supervision might – where supervisors sit along side the health worker and attempt to solve the problems together.

Our observation and data collection during the supervisory visits to some PHC centers revealed that they were being operated erratically a situation leading to non use by the communities.

Worryingly, those placed in the role of supervisor have often lacked the technical, managerial, or supervisory skills needed to carry such a task out well – making it unlikely that supervision would be truly supportive. Therefore, for the supervision to be supportive, the supervisors need to be regularly trained.

## CONCLUSION

While the PHC centers are relatively uniformly distributed throughout Nigeria, rural people tend to under-use the basic health services. Although there is no single solution to this problem in Nigeria, some strategies have been outlined which could result in enhancing the use of health services by the rural communities. Capacity building and empowerment of communities through orientation, mobilization and community organization as regards training, information sharing and continuous dialogue, could further enhance the utilization of PHC services by rural populations. Quality of care and service delivery must be assured by those in management positions. In situations of scarce resources, it is particularly important to maintain standards of practice when huge demands are placed on staff, often resulting in less-than-ideal behaviour. It is precisely in such situations that staffs need to know there is support from their superiors, and managers need to know that the scarce health budget is being used to best advantage. Primary health care in Nigeria and especially in rural areas have come a long way and certainly still require more effort so as to achieve the goal of health for all now and beyond.

## RECOMMENDATIONS FOR FUTURE IMPROVEMENT

Having identified the litany of problems against effective and efficient implementation and achievement of the goals and objectives of primary health care services delivery at the local government, the following recommendations are suggested as a way forward:

1. There is the dearth need for the Local government as well as all the other tiers of government to increase their allocation to the health sector. Local governments on the other hand should be more inward-looking and aggressive in the area of internally-generated revenue. This is to reduce the dependence on the federation account in financing health programmes.
2. Priority should be given to improved living condition of the people beyond the present poverty level, so as to enhance better healthy living. To this end, intensive and effective health education of the public must of necessity, be reinforced in other to eliminate such diseases as malaria, typhoid and other infectious diseases.
3. There is the need for maintenance of minimum health standard, improved housing condition, adequate potable water supply, environment sanitation and food supply for the sustenance of good health condition.
4. Poor leadership and political instability have been the basis for unsuccessful implementation of most government policies and programmes on health care delivery. Therefore, good leadership and political stability is desirable to provide enabling environment for the implementation of the PHC programmes. This will invariably reduce the problem of abandoned projects in the health sector.
5. There is the need to put a stop to unnecessary responsibilities being given to LGA's by the state governments. It is a common occurrence for federal and state governments to shift part of their responsibilities to LGA, such as purchase of nonfunctioning generator, fridges, iceliners and solar fridges and imposition of sponsored programmes. All these are drains on the lean purse of the local governments with its attendant effects on health services delivery.
6. Adequate supervision, monitoring and evaluation of programmes should be pursued with vigor and required manpower provided. The Nigerian health policy makers should give priority to the training of more rural health workers. This is to prevent the drift of rural health workers from the rural communities to the urban centers.
7. More financial and other incentives should be provided to prevent the high staff turn-over of health workers.

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*Full Length Research Paper*

# A study of fertility intentions of women in Uyo, Nigeria

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Fertility desires are known to reflect subsequent fertility behaviour, therefore, understanding these desires therefore could help in planning strategies to modify fertility behaviour. We undertook the study to contribute useful information in planning future family planning strategies in our region. This was a questionnaire-based cross-sectional study among antenatal women in two health facilities in Uyo, Nigeria. Results show that the mean number of children desired was four. Majority of women (73.2%) desired a maximum of four children while 24.1% wanted 5 to 6 children. The number of children desired was significantly related to the patient's education ( $P<0.001$ ) and the husband's education ( $P<0.001$ ) and majority of women (94%) had discussed this with their husbands. The most common reasons given for the number of children desired were the number they can cater for (45.2%), husband's desires (35.8%) and to protect the woman's health (21.5%). Majority of respondents (66.7%) were aware of the previous government policy on the number of children to have and contraception (92.4%), but only 52.6% had ever used any form of contraception. In conclusion, women in Uyo are generally desirous of smaller family sizes. It is important to develop strategies to increase contraceptive uptake if these desires are to be achieved.

**Keywords:** Fertility, fertility intention, fertility desire, contraception, Nigeria.

## INTRODUCTION

Nigeria's population was estimated to be over 158 million in 2010 (PRB, 2010) with a fertility rate of 5.7 (NPC and ICF Macro, 2009), making it the eighth most populous nation in the world. Nigeria's reproductive indices are also very worrisome with a maternal mortality ratio of 545/100,000 live births, infant mortality rate of 75 /1000 live births, under-five mortality rate of 157/1000 live births (NPC and ICF Macro, 2009 ) and an estimated yearly prevalence of induced abortion of 760,000 (Bankole et al., 2006). The complex relationship between fertility and development is well established and is not lost on the Nigerian authorities who in 1988, concerned about the rate of demographic growth relative to economic growth, established the National Population Commission and also adopted her first population policy with the aim of achieving a total fertility rate of 4 by the year 2000, or what was generally referred to as the four children per

family (woman) policy (NPC, 1988). In February 2005, Nigerian government launched a reviewed population policy tagged the National Policy on Population for Sustainable Development (NPC, 2004a). Among the targets of this new policy were to reduce population growth rate to 2% or lower by 2015 and to reduce the total fertility rate by at least 0.6 children every 5 years by encouraging child spacing through the use of family planning. Indeed, the aim of different Nigerian population policies and programmes has since been to reduce fertility in the country (NPC, 1988; NPC and ICF Macro, 2009; NPC, 2004a). In spite of this, the Nigerian population has continued to grow while her GDP had continued to decline (PRB, 2010). Also in spite of a high awareness of contraception, contraceptive prevalence for modern contraceptives in the country has remained low (NPC and ICF Macro, 2009, Oye-Adeniran et al., 2006; PRB, 2010).

Studies have shown that those who begin child bearing early and those who begin late have increased odds for unmet fertility desires (Bankole and Singh, 1998; Ibisomi et al., 2011). Also, women with low levels of education, from poor households, rural residents as well as those

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who had experienced child death were at a higher risk of unmet fertility desires (Ibisomi et al., 2011). Even infection with some diseases such as HIV does not seem to negatively modify the fertility intentions of some patients. A study among HIV positive patients also showed that majority of them intended to have more than two children (Oladapo et al., 2005; Iliyasu et al., 2009).

Studies have also shown that a woman's fertility intention fairly forecasts subsequent fertility behaviour of such a woman hence intentions must be taken seriously and come in useful in policy formulation and design of strategies for achieving fertility targets (Poo and Nai, 1994; Schoen et al., 1999; Kodzi et al., 2010). Indeed, the National Demographic and Health Survey, (NDHS) regularly includes fertility desires or intentions as part of its evaluations (NPC and ICF Macro, 2009; NPC, 2004b).

This study was therefore undertaken to understand the fertility intentions of women in Uyo, within the Niger Delta region of Nigeria, in order to provide insight into possible future expectations with regards to fertility within the region and useful information that could help in planning future strategies in family planning and other intervention programmes.

## MATERIALS AND METHODS

### Setting

Uyo is the capital city of Akwa Ibom State in the Niger Delta region in South-south Nigeria. The people are mainly Christians, monogamous and of the Ibibio/Efik speaking stock. The state has a population of about 4 million people (NPC, 2006) and is served by one tertiary health institution, the University of Uyo Teaching Hospital (UUTH). Another health institution, the St. Lukes Hospital, Anua, functions as a secondary health facility and enjoys good patronage by women of the middle and lower socio economic class as the cost of service, especially for maternity services for which it is reputed for, is much cheaper.

### Sources of data and analysis

This was a cross-sectional study utilizing semi-structured questionnaire. The questionnaire covered areas of socio-demographic characteristics of respondents, their fertility profiles and intentions and contraceptive awareness and knowledge. The questionnaire included both open-ended and closed-ended questions.

Assuming a maximum variability of 0.5 and a precision of  $\pm 5$  at 95% confidence level, a minimum sample size of 400 was obtained from the table provided by Israel (2009) for large populations. To make up for non-response, a sample of 550 consecutive women attending the antenatal care units of both the tertiary and secondary health facilities who consented to participate in the study were requested to complete the questionnaires which had been pre-tested among the antenatal attendees. Nurses were recruited as research assistants and specially trained to provide assistance to those who may require such in completing the questionnaire. The only exclusion criterion was refusal to give consent. The questionnaires were carefully examined for completion, coded and entered into the computer for analysis by the researcher. Data obtained were analysed using the Statistical Package for Social Sciences (SPSS) version 17 for Windows. Level of significance was set at  $p < 0.05$ .

## RESULTS

A total of 550 women participated in the study with 522 (94.9% - 330 from UUTH and 192 from Anua) correctly completing the questionnaire and these were used for the analysis.

### Socio-demographic characteristics

Majority of respondents (90.8%) were between the ages of 20 - 34 years with a mean age of 27.75 years. Also, majority of respondents (67.7%) were of the predominant Ibibio tribe, while the Anang and Igbo tribe constituted 11.4 and 10.3% respectively. The married respondents were in the majority (93.7%) while those engaged constituted 3.3%, the single ones were 1.7% and others 1.3%. Out of those married respondents, 96.9% were in their first marriage and 97.5% were in monogamous relationships. However, 25.6% of the women were born into polygamous homes.

The Pentecostal was the most prevalent religious affiliation among respondents (53.3%). Other religious affiliations were Catholic 18.9%, spiritual 10.5%, protestant 8.9% and Islam 1.4%. Students constituted 28.6% of respondents while civil/public servants, sales/trading, professional and fulltime housewives were 24.1, 17, 4.7 and 4.9% respectively. Those unemployed were 11.4%. About 90% of respondents had at least a secondary level education out of while 44.3% had had a university education.

### Fertility profile and intentions

63.8% of respondents had experienced previous pregnancies, 45% had previous childbirth while 39.6% had children who were alive at the time of the survey. The highest total number of pregnancies reported by respondents was 15 while the highest total number of childbirth and children alive were 8 and 7 respectively. Of those who had living children 67.5% had at least a male child and 65.1% had at least a female child.

The number of children the women in Uyo desire to have ranged from 2 to 12 with a mean of 4 (Table 1). Majority of respondents (53.3%) would want to have four children in all, 16.8% wanted 3, 3.3% wanted 2, 24.1% wanted 5-6 and only 2.3% wanted 7 or more children. Interestingly, none wanted one child only. The number of children desired was significantly related to the patient's education ( $P < 0.001$ ), the husband's education ( $P < 0.001$ ) and the number of children alive (boy  $P < 0.01$ , girl  $P < 0.05$ ). However there was no significant relationship between the number of children desired and awareness of contraception ( $P > 0.05$ ) or the number of wives the husband has ( $P > 0.05$ ).

Majority of the women (94%) had discussed with their husbands/partners the number of children they intended

**Table 1.** Total number of children women in Uyo desire to have.

Number of children desired	Frequency	Percent
2	16	3.3
3	81	16.8
4	257	53.3
5	94	19.5
6	22	4.6
7	6	1.2
8	4	0.8
10	1	0.2
12	1	0.2
Total	482	100

N = 482.

**Table 2.** Reasons for the number of children desired by women in Uyo, Nigeria.\*

Reason	Percent
That is the number I can cater for	45.2
My husband wants me to have that number	35.8
To protect my health	21.5
The number I believe God wants me to have	9.2
To have a (more) female	2.9
My mother had the same number	1.7
It is a tradition in my village	1.5
To have a (more) male child	1.1
I have no reason	3.1

\*Multiple responses included.

to have and for 91.9% of those who had discussed, this number was agreeable to both partners.

Reasons for the number of children desired by the women are shown in Table 2. Other reasons (not on the table) included – to have a balance of two boys and two girls - 3 respondents; and the following by given by one respondent each – in case some become wayward (for one person who chose a high number); for better education; I love the number 5 - it stands for 'grace'; I just love children; and it is my discretion.

Majority of respondents (66.7%) said they were aware of government policy on the number of children one should have. Of this number, 79.3% could mention the previous four-child-per-family policy. One mentioned 20 children-per family. The number of children wanted was significantly related to awareness of the number of children stated in the country's old population policy ( $P < 0.05$ ).

### Contraception

The women were generally aware of contraception, family planning or ways to delay/avoid pregnancy

(92.4%) and 52.6% had used a form of contraception at some point in the past while 61.9% intend to use a method in the future to plan the number of children they intend to have.

### DISCUSSION

The mean number of children desired by women in our study was four. About 73.4% of the women desired to have a maximum of 4 children while 19.5 and 4.6% would prefer 5 and 6 children respectively. The observed findings is similar to that reported in a study in Southwest Nigeria where 60% of women desired 3 to 4 children and that among Nigeria students in a tertiary institution where 50% also desired a maximum of 4 children (Omobude-idiado and Konwea, 2009; Adedini and Liasu, 2009). It is however different from the finding of the NDHS 2008 (NPC and ICF Macro, 2009) where only 25.2% of women nationally, and 32% in the south south geopolitical zone, with four living children desired no more children. Our study shows that despite the generally higher desire for children by women in the national study, the women in Uyo do not desire such high number of children. This supports the findings in the same national report where while the national total fertility rate TFR was found to be 5.7, the TFR for Akwa Ibom state, where Uyo is the capital city, was found to be 4.0 (NPC and ICF Macro, 2009).

Although fertility generally appears to be decreasing as the years progress (NPC and ICF Macro, 2009), and as had been predicted (Caldwell et al., 1992), Uyo is probably just reaping the fruits of the wide enlightenment campaigns and programmes of the safe motherhood era which were widely implemented in the state. Other probable causes of the lower desire maybe due to the high cost of living especially in the urban areas, increasing cost of child care, especially in terms of providing quality education.

Several reasons were given by our respondents for the number of children they desired with majority (45%) giving economic condition viz- the number they can cater for as the main reason while others gave their husbands' desires and the protection of the woman's health as their main reasons. The preference of our study population and attendant reasons may be a product of the generally low economic situation and their level of education which will have raised their awareness to their responsibilities for the care of their offspring beyond mere provision of food and shelter. Indeed education has been known to modify the fertility preferences of women (Oyediran, 2006; NPC and ICF Macro, 2009). In the NDHS 2008 (NPC and ICF Macro, 2009), the more educated women tended to desire fewer children. It is known though that 80% of women in the reproductive age group in the study area (Akwa Ibom state) are literate (NPC and ICF Macro, 2009). In our study, majority of the women were educated despite the inclusion of a secondary health facility to

capture more women of the lower socioeconomic class. A community based study to also involve those in the rural areas is suggested to give a broader view of fertility desires for women in the state. Interestingly, only 1.1% of the women gave desire for a male child as a reason for their fertility intention. This is against the generally held believe that women would go to any length to have a son in order to secure their place in the family as this is a patrilineal society.

It has been found that changes in child-bearing plans may occur in response to partner's wishes, social norms, re-partnering and from knowledge got about implications of parenthood (Bankole and Singh, 1998), thus, as the economic conditions improve from oil derivation dividends and increased minimum wage benefits, changes may be observed in the fertility intentions of women in Uyo in no distant time. Partners' desire as reason for fertility preference is not surprising as this was found in other works (Izugbara and Ezeh, 2010; Ibisomi and Odimegwu, 2011). In this study, it was found that 94% of our women had discussed their fertility desire with their husband/ partner with 92% of whom reaching an agreement. A study using matched wife-husband samples also indicated high levels of concurrence among husbands and wives on fertility intention and where differences existed, husbands were in favour of more children than their wives (Oyediran, 2006). In Northern Nigeria, noted for very high TFR, maternal mortality and low contraceptive prevalence, husbands were considered to be responsible for the high parity as women reported deliberately giving birth to many children in order to inhibit men's tendency to divorce or engage in plural marriage (Izugbara and Ezeh, 2010). It was also found from focus group discussions among major Nigerian ethnic groups that differential fertility intentions between couples are resolved in favour of the man as he's deemed to be 'in-charge' (Ibisomi and Odimegwu, 2011). A retrospective analysis of the demographic and health survey of some developing countries showed a lower spouse fertility intentions agreement of between 27 and 70% (Bankole and Singh, 1998). The higher concordance found in our study may be a product of the high monogamous relationships (97.5%) among respondents compared with a high prevalence of polygamy in that work of Bankole and Singh (1998).

Majority of the women were aware of the previous four-child-per-person policy of government and there was a significant association between this knowledge and those who desired four children only. How this could affect this decision and actual practice may require a more in-depth study.

While there is documented relationship between fertility intentions and actual fertility (Poo and Nai, 1994; Schoen et al., 1999; Kodzi et al., 2010), the chances of achieving these desires may be doubtful if contraceptive prevalence remains at its present low levels. This can be seen in the failure of the reduction in the TFR from 6 to 4 as expressed in the NPC policy of 1988, or a drop of 0.6

from the 2004 level as expressed in the reviewed document of 2004 (NPC, 2004a), as the current TFR by the NDHS 2008 (NPC and ICF Macro, 2009) is still 5.7 for the country. The implication for practice, is that efforts in contraceptive counselling and provision must be increased in order to assist the women achieve their fertility desires otherwise the desired targets of the current population policy may be a mirage at the present levels of contraceptive prevalence.

## Conclusion

In conclusion, the fertility preferences of women in Uyo showed that majority desired four children which if practiced would lead to the achievement of the Nigerian National population policy of reducing fertility her rate. The current low contraceptive prevalence in the region does not however give the confidence that this would be easily achieved. It is important therefore to address the unmet need for contraception through increased contraceptive counselling and service provision in order to increase contraceptive uptake. This would also have the added benefit of incorporating, and bringing the immediate and long term economic benefits of small family size to the few, but significant proportion with intention for five or more children.

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Full Length Research Paper

# Antimicrobial susceptibility of *Salmonella* serotypes isolated from human and animals in Sudan

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The aim of the present study was to determine the prevalence of multidrug resistance among *Salmonella enterica* serotypes recovered from human and animals in Sudan. A total of 119 *Salmonella* isolates recovered from stools of humans, cattle, camels and poultry were subjected to *in vitro* susceptibility against 10 commonly prescribed antibacterial agents. The test was done by the disc diffusion assay, isolates were categorized as sensitive or resistant based on standardized zones of inhibition and the odd ratio (OR) was performed to measures of degree of association between the two result characteristics of agents. The majority of *Salmonella* serotypes (80.67%) were found resistant to at least one of the tested nine antibacterial agents and 45 isolates (37.82%) were found multidrug resistant (MDR). Human isolates were found to be more resistant than the animal's isolates. Ciprofloxacin, gentamicin and colistin were found to be highly active against the isolates. But the isolates showed high resistance to ampicillin, chloramphenicol, tetracycline, furazolidone and sulfamethoxazole + trimethoprim. The odd ratios (OR) among the isolates to combination of two antimicrobials ranged from 1.1 to 5.75. The highest OR was shown in combination cefalexin-nalidixic acid, which has an OR of 5.75. *Salmonella* serotypes revealed very high resistance (80.67%) and high MDR (37.82%) rates. *Salmonella* sp. recovered from human exhibited higher rates of resistance than those recovered from animals.

**Key words:** *Salmonella*, Sudan, antimicrobials, multidrug resistance, odd ratio (OR).

## INTRODUCTION

*Salmonella enterica* infections are the second leading cause of bacterial foodborne illness and approximately 95% of cases of human salmonellosis are associated with the consumption of contaminated products such as meat, poultry, eggs, milk, seafood, and fresh produce. Typically, the disease is self-limiting; however, with more severe manifestations such as bacteremia. Antimicrobial therapy is often administered to treat the infection (Mead et al., 1999; Foley and Lynne, 2008). Animals are main source of multiple resistant salmonella for human, indicating their significance in the epidemiology of human salmonellosis. Antibiotic resistance has been attributed to

genetic and environmental factors (Angulo et al., 2004; Hammerum et al., 2009).

A number of studies have been undertaken in Sudan on *Salmonella* and salmonellosis notably in animals. Mamoun et al. (1992) isolated 21 *Salmonella* strains from several poultry farms in three different States in the Sudan. *Salmonella enteritidis* was detected in 1.43% of raw milk samples (Yagoub and Mohammed, 1987; Yagoub et al., 2005). Yagoub et al. (2006) isolated *Salmonella paratyphi* A and *Salmonella paratyphi* B from 6% of the white cheese samples collected from retailer shops and restaurants in Khartoum and Omdurman cities during the period from February to November, 2001. Yagoub (2009) detected *Salmonella* sp. in 6.2% of fish samples and Hag Elsafi et al. (2009) detected *Salmonella* sp. in 3.4% of fecal samples collected from in and around

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Khartoum State. *S. enterica* subspecies was recovered from 9.2% of different raw and cooked food items (El-Hussein et al., 2010). Saeed and Hamid (2010) confirmed the role of food handlers in the spread and transmission of food borne communicable diseases which includes salmonellosis as they detected pathogens in 30.1% of the food handlers.

The present study aimed to determine the prevalence of multidrug resistant strains among *Salmonella* serotypes isolated from human and animals in Sudan.

## MATERIALS AND METHODS

### Salmonella isolates

A total of 119 *S. enterica* isolates belonging to different *Salmonella* serotypes were included in the study. The strains were isolated from stools of human ( $n = 87$ ), cattle ( $n = 6$ ), camels ( $n = 2$ ) and poultry ( $n = 24$ ). *S. enterica* serotypes were identified using (O) and (H) anti-sera (VLA Scientific Product Sales, Surrey, UK). Some isolate could not be typed by the available antisera. The serotypes and their sources are shown in Table 2.

### Antimicrobial susceptibility testing

The 119 *Salmonella* serotypes were tested against 10 antimicrobial agents namely: ampicillin, cefalexin, chloramphenicol, ciprofloxacin, colistin, furazolidone, gentamicin, nalidixic acid, sulfamethoxazole + trimethoprim and tetracycline. The antimicrobial susceptibility test was performed by the disk diffusion method with standard antibiotics disks (Oxoid, Basingstoke and Hampshire, England) using Muller-Hinton agar plates as per the National Committee for Clinical Laboratory standards (NCCLS, 2002). The disks are placed on the agar with flamed forceps or a single disk applicator and gently pressed down to ensure contact. Plates are incubated immediately, or within 30 min. If several colonies are seen within a zone of inhibition, the strain was checked for purity and retested. Isolates were categorized as sensitive or resistant based on standardized zones of inhibition.

### Odds ratios and sensitivity patterns

The odds ratio (OR) was chosen as the measures of degree of association between the 2 characteristics, that is, resistance to A and B. An OR equal to 1 indicates no association between the two characteristics, ratios greater than 1 indicated a positive association (increased probability of resistance to the 2nd antimicrobial of a 2-way combination). Confidence intervals (95%) for OR were computed as described by Fienberg (1977). Chi-square values were computed to test the null hypothesis  $OR = 1$ . The probability of rejecting the null hypothesis was set at 0.05. The continuity correlation was applied to the computation OR, standard error OR and chi-square (Fienberg, 1977).

## RESULTS

### In vitro antimicrobial susceptibility testing

The results of the in vitro antimicrobial susceptibility testing and presence of multi drug resistance (MDR)

among *Salmonella* serotypes from human and animals are shown in Table 1. Antimicrobial resistance was observed in 93.1% of the human, and 46.8% of the animal isolates. Resistance among *Salmonella* serotype from human isolates was significantly higher (47.1%) than those from animals (0 to 16.7%). The percentage resistance of *Salmonella* serotype to the 10 antimicrobial drugs is shown in Table 2. *Salmonella choleraesuis* revealed the highest MDR (66.6%) whereas the percentages of resistance shown by *Salmonella typhi* and *Salmonella enteritidis* is 33.3%.

The frequency of resistance to antimicrobials among isolates from human was higher than that among animal isolates. All isolates from human and animals were susceptible to gentamicin. But strains showed high resistance to ciprofloxacin, tetracycline. Human isolates showed higher percentages than that of animal ones ( $P < 0.05$ ) (Table 3). The percentage of resistance to tetracycline was highest among human than animal isolates. All isolates from human and animals were sensitive to ciprofloxacin and with very low resistance pattern to gentamicin. Furazolidone showed a moderately high rate of resistance.

### Odds ratio (OR)

The odds ratios for *Salmonella* serotypes resistance to 2-way antimicrobial is presented in Table 4. The OR among *Salmonella* serotypes isolates to combination of two antimicrobial ranged from 1.1 to 5.75. The highest OR shown in combination cefalexin-nalidixic acid, which have an OR of 5.75. This means that when a *Salmonella* isolate is resistant to cefalexin, nalidixic acid resistance is 5.75 times more likely to be observed in the same isolate than when the strain is cefalexin sensitive. Chloramphenicol-gentamicin combination has the lowest odds ratio of 1.1. Other antimicrobial combinations not listed are the ones that statistically have low odds ratios.

## DISCUSSION

In the present study, resistance to antimicrobials was observed in 93.1% of the human isolates and 46.8% of the animal isolates with an overall of 80.67% for both sources. Antimicrobial susceptibility test of the 98 isolates of *Salmonella* revealed that 32.7% were resistant to one or more of the 24 antimicrobials tested. Generally, resistance for 13 different antimicrobial drugs was recognized. The most common resistance was to streptomycin (24/32, 75%), ampicillin (19/32, 59.4%), tetracycline (15/32, 46.9%), spectinomycin (13/32, 40.6%) and sulfisoxazole (13/32, 40.6%). These results reflect some known cross resistance, as exemplified by the high odds ratios, it also reflect the prevalence of a plasmid carrying the 2 resistance genes as reported

**Table 1.** Antimicrobial resistance and MDR of *Salmonella enterica* isolates recovered from human and animals.

Source	No. of isolates	Resistance		Multiple resistance	
		N	%	N	%
Human	87	81	93.1	41	47.1
Poultry	24	9	37.5	3	12.5
Cattle	6	4	66.7	1	16.7
Camels	2	2	100	0.0	0.0
Total	119	96	80.67	45	37.82

**Table 2.** Percentage resistance and MDR of *Salmonella* serotype to 10 antimicrobial drugs.

Serotype	Resistance %	Multiple drug resistance
<i>Salmonella typhi</i>	76.2	33.3
<i>Salmonella paratyphi A</i>	66.6	50
<i>Salmonella paratyphi B</i>	79.3	48.3
<i>Salmonella choleraesuis</i>	83.3	66.6
<i>Salmonella enteritidis</i>	58.3	33.3
Non-typeable isolates	80	47.5

before (Davidson and Babish, 1982).

Tetracycline, ampicillin, sulfamethoxazole + trimethoprim, chloramphenicol and furazolidone revealed the highest incidence of resistance. While ciprofloxacin, gentamicin and cefalexin showed low to moderate frequencies of resistance in human and animal isolates.

The tetracycline, ampicillin, sulfamethoxazole + trimethoprim and chloramphenicol resistances were observed in 65, 45, 41 and 59 isolates respectively, while all isolates were sensitive to ciprofloxacin. This could be due to exhaustive use of the first group of antimicrobials, while the other group is newly introduced in the medical field, and not used for animal treatment. *S. paratyphi B* was the serotype with the highest incidence of drug resistance among the human strains, which was observed in 79.3% of the isolates. *S. enteritidis* was the serotype with the lowest drug resistance frequency, which was observed in 58.3%. It is probable that the high incidence of resistance in *S. paratyphi B* has resulted from an extensive use of antibiotics, although, it is the more common strains in the human isolates.

The WHO Global Foodborne Infections Network (2011) has no available data about resistance profiles of salmonella in Sudan. In Ethiopia, a significant proportion of *Salmonella* isolates have developed resistance for a number of anti-salmonella drugs, 32.7% of isolates were found resistant to one or more of the tested antimicrobial agents. The most common resistance was to streptomycin (24/32, 75%), ampicillin (19/32, 59.4%), tetracycline (15/32, 46.9%), spectinomycin (13/32, 40.6%) and sulfisoxazole (13/32, 40.6%) (Zewdu and

Cornelius, 2009). In USA, 18.0% isolates from all sources were found resistant to two or more antimicrobials. Resistance to sulfisoxazole, streptomycin, and tetracycline was the most prevalent, whereas resistance to ciprofloxacin was the least. 27.7% isolates from animal feed, dog and environmental swabs were resistant to two or more antimicrobials. Resistance to sulfisoxazole was found increasing, but resistance to tetracycline was decreasing (Kiesling et al., 2007; Foley and Lynne, 2008).

The OR can be used to help in formulating the treatment of diseases. For example, if *Salmonella paratyphi B* is resistant to ampicillin 14% of the time and tetracycline 24% of the time (Table 3), neither one of these antimicrobials would be a likely choice for the treatment of *Salmonella*. However, if ampicillin was the 1st antimicrobial to be used and the animal did not respond, then the choice to use different antimicrobials would likely be made. However, if the OR for the combination of ampicillin opposed to tetracycline is 4.7 (Table 4), this means that *S. paratyphi B* is 4.7 times more likely to be resistant to tetracycline, than ampicillin. In this case, tetracycline would not be a good antimicrobial to be used. This information can be used in 2 ways - in the treatment of clinical cases and to predict the antimicrobial to which the organism is less likely to be resistant.

Ampicillin, ciprofloxacin, cefalexin and sulfamethoxazole + trimethoprim has been reported to be the drugs of choice for treatment of salmonella and other Enterobacteriaceae (Stoycheva and Murdjeva, 2006). The extensive use, use in sub-curative doses that may be

**Table 3.** Resistance to individual antimicrobial among *Salmonella* serotype from human and animals.

Source	<i>Salmonella</i> serotypes	Antimicrobial resistance									
		Ampicillin	Chloramphenico	Cefalexin	Ciprofloxaci	Colistin	Furazolidon	Gentamycin	Nalidixic acid	Sulfamethoxazole + trimethoprim	Tetracycline
Human	<i>Salmonella typhi</i>	5	9	9	0	4	13	0	8	7	10
	<i>Salmonella paratyphi A</i>	2	2	1	0	0	3	2	1	2	5
	<i>Salmonella paratyphi B</i>	14	13	13	0	4	18	1	11	15	24
	<i>Salmonella choleraesuis</i>	3	2	3	0	1	4	1	4	2	4
	<i>Salmonella enteritidis</i>	1	2	1	0	1	1	1	1	1	2
	Non-typeable isolates	4	2	5	0	1	11	0	3	6	7
	Total	29	30	32	0	8	50	5	28	33	52
Poultry	<i>Salmonella enteritidis</i>	2	2	0	0	0	1	0	1	2	1
	<i>Salmonella heidelberg</i>	0	0	1	0	0	1	0	0	1	1
	<i>Salmonella amsterdam</i>	1	1	1	0	0	2	0	0	0	1
	Non-typeable isolates	4	6	1	0	1	2	0	1	3	7
	Total	7	9	3	0	1	6	0	2	6	10
Cattle	<i>Salmonella enteritidis</i>	1	0	1	0	0	1	0	0	0	1
	Non-typeable isolates	1	1	1	0	0	1	0	1	1	1
	Total	2	1	2	0	0	2	0	1	1	2
Camels	Non-typeable isolates	1	1	1	0	0	1	0	1	1	1
Grand total		45	41	38	0	12	59	5	32	45	65

**Table 4.** Odds ratios for *Salmonella* sp. resistance to 2-way antimicrobial combinations.

Antimicrobial combination	Odds ratio	Antimicrobial combination	Odds ratio
Ampicillin X Cefalexin	1.14	Cefalexin X gentamycin	3.3
Ampicillin X nalidixic acid	1.26	Cefalexin X nalidixic acid	5.75
Ampicillin X tetracycline	4.7	Cefalexin X tetracycline	2.2
Chloramphenicol X colistin	1.2	Cefalexin X sulfamethoxazole + trimethoprim	1.3
Chloramphenicol X gentamycin	1.1	Furazolidone? X nalidixic acid	2.8
Chloramphenicol X nalidixic acid	1.6	Furazolidon? X tetracycline	1.6
Chloramphenicol X sulfamethoxazole + trimethoprim	1.2	Furazolidone X sulfamethoxazole + trimethoprim	1.2
Chloramphenicol X tetracycline	2.3	Nalidixic acid x sulfamethoxazole + trimethoprim	1.4
Cefalexin X colistin	1.6	Nalidixic acid X tetracycline	2.9
Cefalexin X furazolidone	2.3	Sulfamethoxazole + trimethoprim X tetracycline	1.3

outdated preparation of these antimicrobials, were used in human and animals. In this study, there are some

isolates which are resistant to the recommended dose of ampicillin and sulfamethoxazole + trimethoprim. All

isolates are susceptible to ciprofloxacin and cefalexin in recommended doses (20 and 50 mg/kg body weight (bwt) respectively). The prolonged use of ampicillin and sulfamethoxazole + trimethoprim in Sudan might have led to the emergence of resistant isolates. The curative dose for sulfamethoxazole + trimethoprim were found to be above 100 mg/kg bwt for *S. enterica* which is slightly higher than the recommended dose. All doses below the recommended doses for ampicillin, cefalexin and sulfamithoxazole + trimethoprim are not curative, except ciprofloxacin which showed a dose of 15 mg/kg bwt as a curative dose.

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*Full Length Research Paper*

# An ecological view of the risk factors for tuberculosis in the United States

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**There is scientific evidence of socio-demographic, behavioral and health risk factors associated with tuberculosis (TB) infection and TB disease. The primary objective of the study was to examine the correlation of TB risk factors at the state level in the United States (US) to obtain insights specific to the state of TB in the US. Secondary data from the centers for disease control and prevention (CDC) and US Census Bureau on line databases were used. Simple and multiple linear regressions were carried out. The model created to represent the TB rate by state included the percent of the population which was non-Hispanic white ( $p < 0.001$ ), the AIDS diagnosis rate/100,000 ( $p = 0.067$ ) and the percentage of the population which is foreign born. Per capita income, GINI, diabetes rates, smoking rates and alcohol abuse rates were excluded from the final model. Race/ethnicity acts as a marker for a number of risk factors, and the focus of the fight against TB in the US should be on minority communities, those populated by the foreign-born and those with high rates of AIDS particularly where a large degree of income inequality is present.**

**Keywords:** Tuberculosis, race, ethnicity, HIV, foreign-born.

## INTRODUCTION

The United States (US) has made great strides in reducing the annual incidence rate of tuberculosis (TB) over the past century. In 1945, the rate was 73/100,000; and in 1993, it was 9.0/100,000 (Snider, 1997). In 2009, the rate of TB fell to 3.8/100,000 reaching an all-time low. However, the Centers for Disease Control and Prevention's goal of eliminating TB (defined as a case rate of 1/1,000,000) appears to be a distant target (CDC, 2009). One of the great challenges in the eradication of TB is the high level of global latent TB infection (LTBI) estimated to encompass nearly 1/3 of the world population (World Health Organization, 2010). There are generally two broad approaches to fighting TB: 1) raising the standard of living; and 2) chemotherapy both for those infected with TB, as well as those with active TB disease.

Some of the risk factors which influence the incidence of TB include heavy alcohol use, smoking, drug use (injection and non-injection), homelessness,

incarceration, residence in a long-term care facility, diabetes, HIV, foreign-born status in the US, and race/ethnicity in the US (CDC, 2010; Dye et al., 2009; Stead et al., 1990). In the US, not all of these risk factors play the same role as they might on the world stage due to the relatively low level of TB endemicity in the US.

With a death rate of 0.4/100,000 in 2007, TB is a disease easily ignored by the wider population (United Nations Statistics Division, 2009). This paper studies the correlation of TB risk factors in the US and derives a model for TB to sharpen our focus on the issues most likely to continue the diminution of TB in the US. The variables examined were AIDS diagnosis rates, diabetes death rates, rates of smoking, rates of alcohol abuse, percentage of the population which is foreign-born versus US born, race/ethnicity (percentage which is non-Hispanic White) and poverty (as expressed by per capita income as well as GINI).

## METHODS

Data was retrieved from the CDC Online Tuberculosis Information System (OTIS), the National Center for Health Statistics (NCHS)

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Behavioral Risk Factor Surveillance Survey (BRFSS), the CDC HIV Surveillance Report and the US Census Bureau. The data was entered and merged in Microsoft Excel, and SPSS (version 18) for regression analysis of individual risk factors and the TB rate by state. The analysis examined 2008 data from all sources when available. SPSS was also used to generate an overall model.

The information on verified TB cases reported to the CDC by state health departments, the District of Columbia, New York City, Puerto Rico and seven other US jurisdictions in the Pacific and Caribbean from 1993 through 2008 is accessible in OTIS (CDC, 2010). This system was utilized to extract TB rates by each state and the District of Columbia in 2008 (Subsequent references to the states or US imply inclusion of the 50 states plus DC unless otherwise stated).

The NCHS BRFSS is a state-based system of health surveys that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury (CDC, 2008). Diabetes death rates, adult smoking rates and heavy alcohol use rates were obtained from the BRFSS. Heavy drinkers were defined as adult men having more than two drinks per day and adult women having more than one drink per day. AIDS diagnosis rates were obtained from the HIV Surveillance Report located at: <http://www.cdc.gov/hiv/surveillance/resources/reports/2008report/table20.htm>.

The US Census Bureau conducts the American Community Survey (ACS) every year to collect data on social and economic issues. The information collected is combined into statistics that are used to help justify expenditures on a broad range of initiatives from school lunch programs to new hospitals (US Census Bureau, 2010). Population data, the percentage of the population which is foreign-born, per capita income, GINI and the percentage of the population which is non-Hispanic White were obtained from the ACS. GINI by state in 2006 comes from the American Community Survey (Webster and Bishaw, 2007).

## RESULTS

The dominant variable in forecasting the TB rate by state was the percent of the population which was Non-Hispanic White. The forward selection process chose this as the sole variable ( $p < 0.001$ ) to include in the model using the criteria of  $p < 0.05$  for the t-test. The backward elimination process which had a criterion of  $p < 0.10$  for the t-test additionally included the AIDS diagnosis rate/100,000 ( $p = 0.067$ ). The percent of the population which is foreign-born ( $p = 0.154$ ) was included in the model because this group is disproportionately represented in the TB rate. These variables provided the following model:

$$\text{State TB Rate/100,000} = 9.012 - 0.088\% \text{NHW} + 0.025 \text{AIDS Diagnosis Rate/100,000} + 0.053\% \text{Foreign-Born}$$

The scatter diagram showing the Pearson correlation of the percentage non-Hispanic white population versus the TB rate by state is shown in Figure 1 and for the percentage foreign-born versus the TB rate by state in Figure 2. The standardized residuals versus the predicted TB rates are shown in Figure 3, and a listing of Pearson correlation results by risk factor is in Table 1.

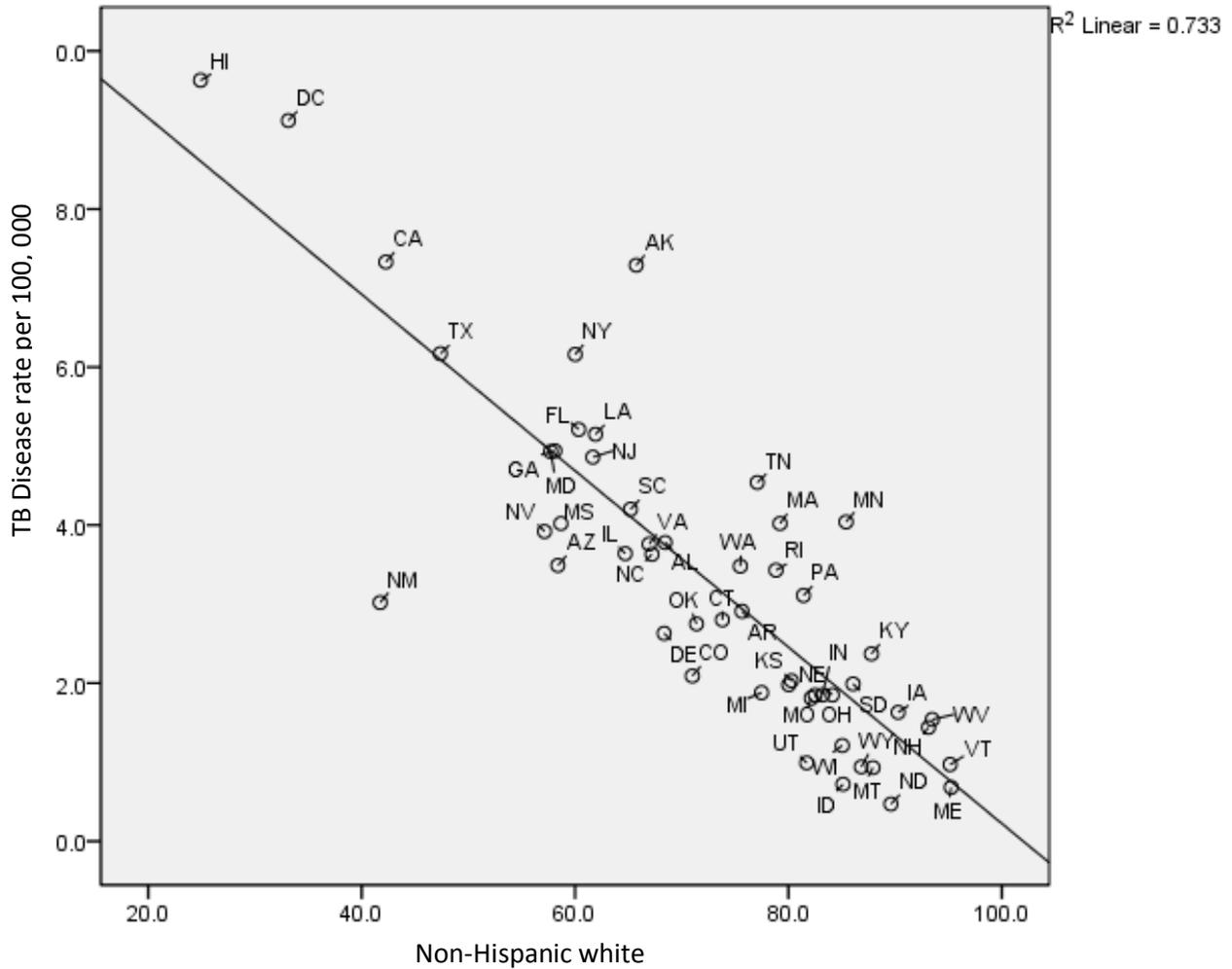
## DISCUSSION

Whereas 1 person in 3 is estimated to be infected with TB at the global level, only 1 person in 25 is estimated to be infected in the US (Khan et al., 2008). The risk factors can be categorized in 3 ways: 1) primary risk factors which are principally associated with exposure to the *tubercle bacillus*; 2) secondary risk factors which reduce one's immunity and may enhance the risk of infection as well as act to convert Latent TB Infection to active TB; and 3) hybrid risk factors which may play an important indirect role in the exposure to the *T. bacillus* as well as contraction of the infection and progression to the active disease. The associations found between the risk factors and TB disease are examined and discussed within these 3 categories.

### Primary risk factors

Being non-Hispanic white, serves as a marker for a number of factors closer to the root causes of TB. Given current immigration patterns, this risk factor largely encompasses the foreign-born population while excluding White immigrants from Western Europe who are less likely to be infected with TB. By 2007 over 80% of the foreign-born population originated from Latin America or Asia (Grieco, 2010). Other US groups not part of the Non-Hispanic White category such as African-Americans, American Indians and Native Alaskans, Asian-Pacific Islanders and Hispanics have historically had high TB rates (Cantwell et al., 1998). The circumstances of these groups are exacerbated by elevated levels of poverty characterized by overcrowding, malnutrition and lack of access to healthcare services. Given the nature of TB to sustain itself within a given community, it will be necessary to continue to focus on all groups which have historically had a high rate of TB disease and explore methods of empowering these groups to help themselves.

Being foreign-born generated the second highest correlation coefficient of the risk factors examined. It is a very strong predictor variable of the rate of TB disease within a state. Hawaii, Alaska and DC are the greatest outliers and have distinct populations which account for their deviation. Hawaii has a large established Asian-American population which has shown a high rate of TB but is not foreign-born. As well Alaska has a large Native American population which historically has had a high rate of TB. DC is a purely urban entity that includes substantial enclaves that are economically disadvantaged. Tuberculosis rates are generally higher in urban areas and amongst groups that are economically disadvantaged. The southeastern states form a cluster of states which exhibit higher rates of TB than projected by the percentage of their population which is foreign-born. They have seen a substantial influx of foreign-born



**Figure 1.** Simple regression of percent of the population which is Non-Hispanic White versus TB disease rates per 100,000 by state.

persons in recent years comprising 8 of the top 10 states with the greatest percentage increase in the percentage of their population which is foreign-born (Migration Policy Institute, 2011). Since TB rates among the foreign-born are almost five times higher in the first two years after entry into the US, this could partially account for these states having disproportionately high TB rates in relation to their foreign-born population (Cain et al., 2008).

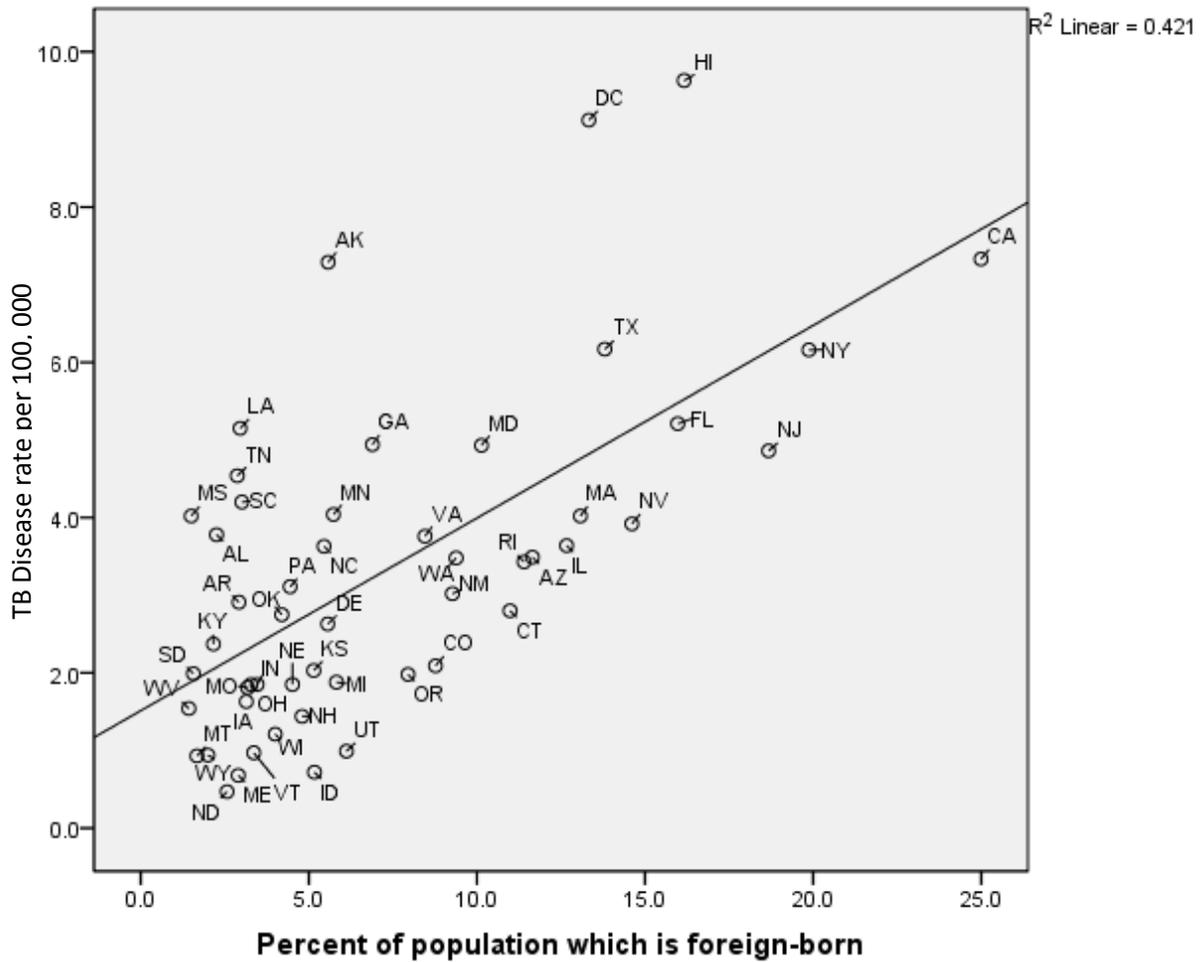
**Secondary risk factors**

Diabetes death rates and smoking rates showed no association with TB disease rates across the states. It is recommended that those at risk of developing diabetes should be encouraged to take steps both to preclude diabetes as well as undertake isoniazid prevention therapy (IPT). Anyone who is in a high risk group to be infected or already infected with TB should take steps

toward cessation of smoking and in the case of LTBI subscribe to a protocol of IPT.

**Hybrid risk factors**

Alcohol usage involves both a social factor as well as an immunological issue. Poverty is a risk factor for TB disease although a positive relationship was found between per capita income by state and TB rates by state. This seeming contradiction points out both the hazards of an ecological study and the need to measure poverty in a more meaningful way at the state level. TB typically flourishes in areas with overcrowding, malnutrition and poor access to healthcare, all of which are indicative of poverty. A positive relationship was found between poverty and GINI by state suggesting that income inequality has a negative effect on TB health outcomes.



**Figure 2.** Simple regression of percent of the population which is foreign-born versus TB disease rates per 100,000 by state.

AIDS diagnosis rates showed a significant association with TB disease rates. The degree to which HIV is concentrated in specific communities such as the African-American, Hispanic and Gay communities, particularly those of lower income, may contribute to a social environment that sustains the spread of TB. Someone already infected with TB is much more likely to progress to the active TB disease stage if they contract HIV. Vigilance and aggressive medical treatment for either TB infection and/or HIV is imperative to preclude the often deadly combination of these two infections. As the TB rate in the US falls, it is important that measures to protect everyone, especially HIV patients, from TB infection are maintained.

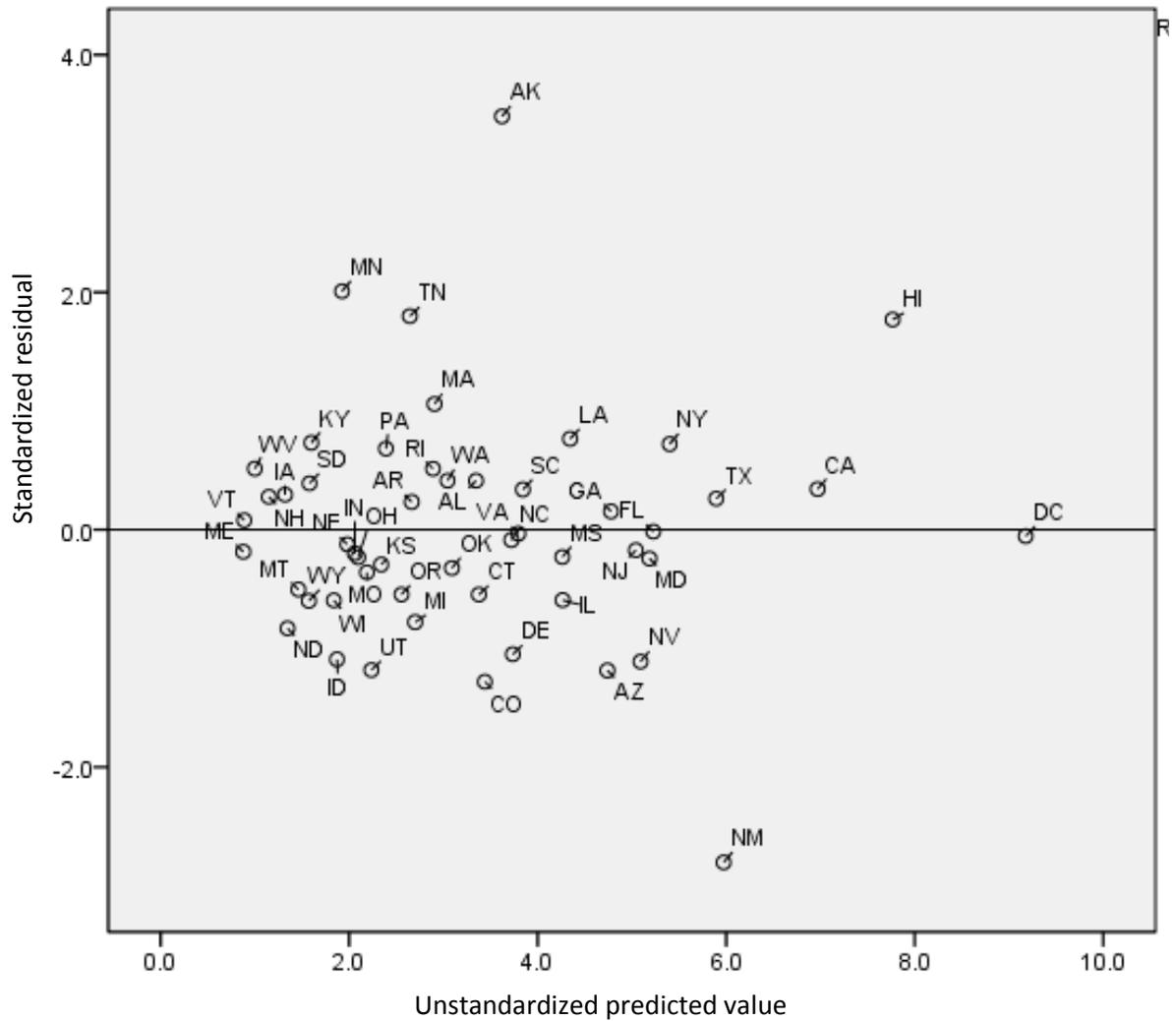
**THE MODEL**

The two greatest outliers, New Mexico and Alaska, pose interesting questions. Why does New Mexico have a

much lower TB rate than that projected and Alaska a much higher TB rate? Alaska has a larger percentage American Indian/Alaskan Native population (15.2%) compared to New Mexico (9.7%). Alaska also proportionately has a larger Asian population (5.0%) than New Mexico (1.5%) (US Census Bureau, 2010). Additionally the largest minority in New Mexico, Hispanics (45.6%), forms a plurality of the population and has substantial political power holding the governor, speaker of the house and senate majority posts in 2010 (Jennings, 2010). Alaskan Natives and American Indians on the other hand while of political importance in their state do not have the numerical strength to control the government. Further research into how political power and ownership of health issues contributes to the health of a community is warranted.

**Limitations**

This is an ecological study which carries inherent



**Figure 3.** Standardized residuals versus predicted TB rates for the proposed model.

**Table 1.** Summary of simple regression results.

Risk factor	Correlation with TB disease rates at the state level	
	R	p value
AIDS diagnosis rates/100K	0.579	<0.001
Diabetes deaths per 100K	-0.053	0.71
Percent of adults who smoke	-0.157	0.27
Percent of adults who drink heavily	0.019	0.9
Percentage of population foreign-born	0.649	<0.001
Per capita income	0.46	0.001
GINI	0.588	<0.001
Percent of population non-Hispanic White	-0.856	<0.001

limitations regarding the conclusions one may draw. The study was limited by the use of secondary data in terms of extensibility and reliability.

**Conclusion**

This study reviewed seven known risk factors associated

with TB and provided evidence that the primary focus of the fight against TB in the US should be on minority communities, those populated by the foreign-born and those with high rates of AIDS particularly in conjunction with disadvantaged communities in areas of income inequality. This is consistent with the assertion by Coberly and Chaisson (2007) that the risk of TB infection is a function of exposure (Coberly and Chaisson, 2007). In a low endemicity environment, such as the US, the issues of exposure and infection predominate in an ecological study at the state level. While aggressive identification and treatment of LTBI and TB cases must continue, we should not ignore the sociodemographic aspects driven by factors such as income inequality and healthcare access for all including immigrants, the homeless and prisoners that serve as a breeding ground for this insidious disease and which can be improved at the federal, state and local levels.

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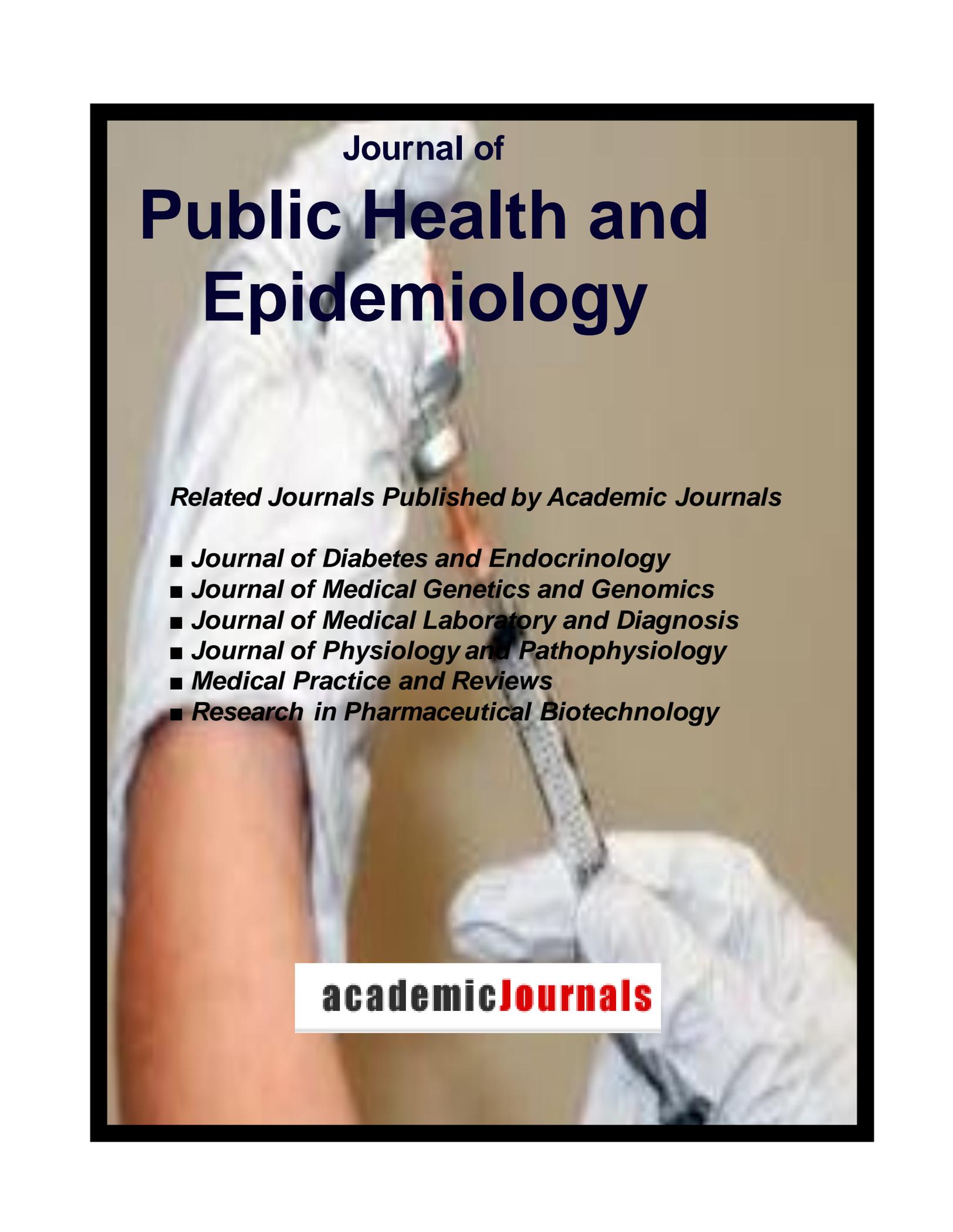
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