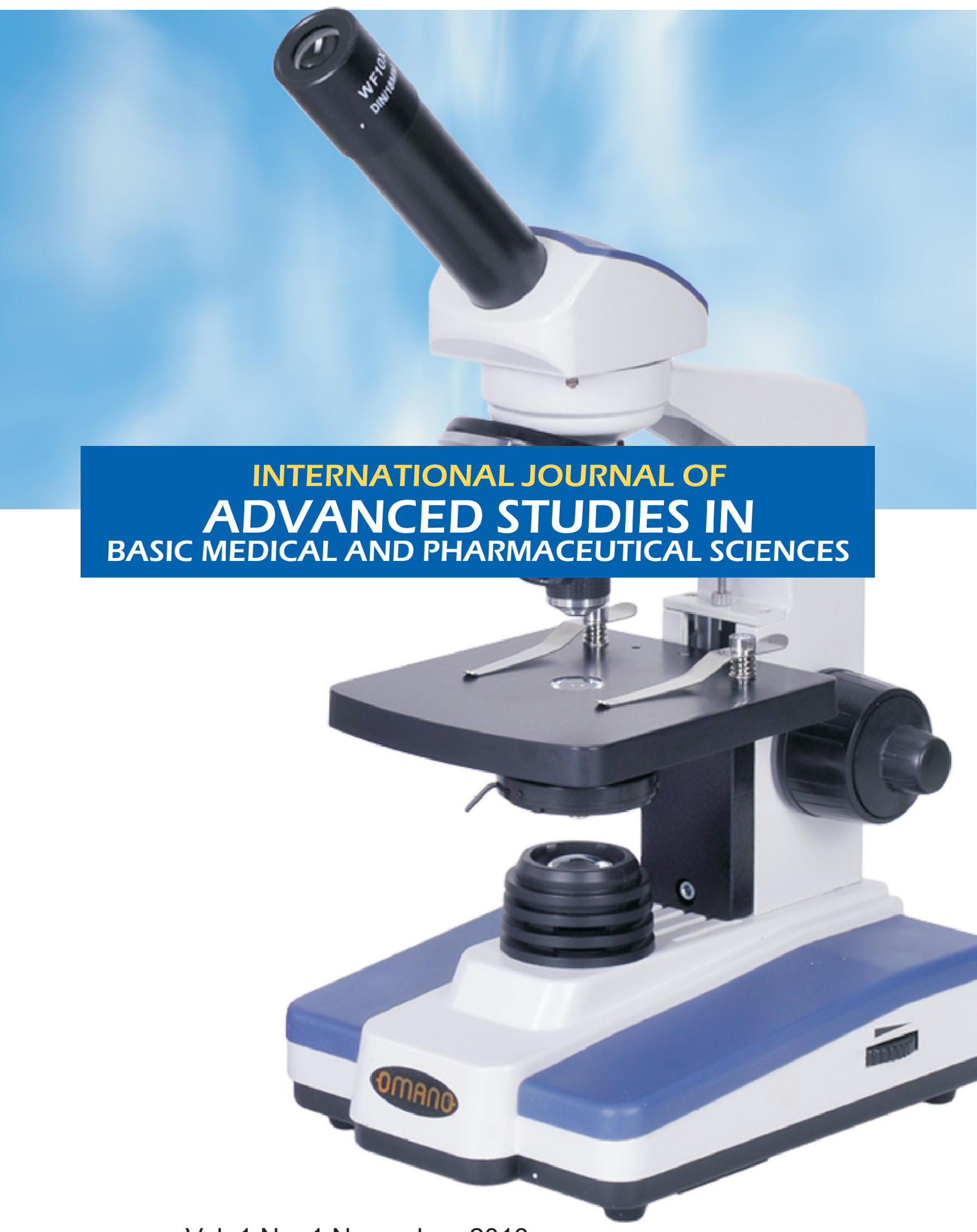

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DETECTION AND PREVALENCE OF TRICHOMONAS VAGINALIS AMONG WOMEN IN BIRNINKEBBI, NORTH WEST NIGERIA

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ABSTRACT

Objective: *This study aimed at investigating the prevalence of Trichomoniasis among women in Birnin Kebbi -Kebbi State, Nigeria. Trichomoniasis is a sexually transmitted disease associated with reproductive health complication and various other genitourinary tract syndrome including cervicitis, epididymitis and prostitis. The risk of Trichomonas vaginalis is higher in women.*

Methodology and Results: *Two hospitals were used as the study area, Sir Yahaya Memorial Hospital (S.Y.M.H) and the Vesico Vagina Fistula (V.V.F) centre all in Birnin Kebbi Metropolis. Questionnaire was used to obtained information on the age and educational status of the two hundred and twenty patients studied. Urine and high vaginal swab samples collected were analysed using standard parasitological method, for the identification of flagellate form of Trichomonas vaginalis. Out of the 220 women studied, 4.1% (7 of 170) pregnant women were significantly more infected with Trichomonas vaginalis than non pregnant women 4% (2 of 50 samples)($p<0.05$). T. vaginalis detection was significantly dependent on the sample used ($p<0.05$) swab samples had 13.5% (5 of 37)than urine 2.2% (4 of 183). women aged between 20-29years had higher rate of infection 6%,(6 of 100) followed by <20 years age group 4% (2 of 50) with least prevalence in 30-39years age group 2(1 of 50). While women aged >40 tested negative for the infection with T. vaginalis. Infection with T. vaginalis is age dependant ($p<0.05$). the result of this study shows no relationship in educational status and infection with T. vaginalis.*

Application of findings: *This study has confirmed the existance of Trichomonas vaginalis infection among women in Birnin Kebbi, Kebbi State. This suggest the need for control of Trichomoniasis through public health programmes including; persistent efforts to educate people on the need to improve on their personal hygiene, screen, diagnose, and treat infected patients.*

Keywords: *T.vaginalis, trichomoniasis, sexually transmitted infections prevalence, women, Birninkebbi.*

INTRODUCTION

Trichomonas vaginalis is a causative agent of sexually transmitted infection (or sexually transmitted disease STD) known as trichomoniasis. The parasite which is usually found in the vagina and urethra tissues of human, presents medical, social and economical implication (Pierre *et al*, 2011). These include, discomfort and psychosocial distress in infected patients (Jatau *et al,* 2006). Although this condition is most often treated in women, men can also be infected (and often have no symptoms). The pathological effect of the parasite includes production of mechanical stress on host cells and then ingestion of cell fragments after death (Schwebke, 2004).

Rein (1995) rated *Trichomans vaginalis* infection as the most prevalent non-viral sexually transmitted disease in the world. Approximately 180 million women worldwide are infected with *Trichomonas vaginalis* annually (Nwadioha *el al,* 2012). The infection elicits a broad range of clinical symptoms varying from asymptomatic to severe inflammatory manifestations. Around 25-50% of the infected females are asymptomatic, while in symptomatic females, the disease is characterized by vulvo vaginitis, cervicitis and urethritis. This may be associated with dysuria, dyspareunia and abdominal pain. Trichomoniasis has been found to be associated with adverse pregnancy outcome like preterm rupture of membrane; low birth weight babies, post abortion and post hysterectomy complications (Swygard *et. al*. 2004). Majority of female patient harboring this organism present with vaginal discharge, which is usually frothy, greenish yellow and offensive (Nwadioha *et al,* 2012).

Trichomonas vaginalis is detectable in vaginal, prostatic or urethral secretion, semen and urine of infected individuals (Jatau *et al.,* 2006). Direct examination of the wet mount preparation of clinical specimen is the most rapid, most commonly used and least expensive method for identifying the flagellate form of *Trichomonas vaginalis* (Alcamo, 2000).

The aim of this study is to examine the prevalence rate of *Trichomonas vaginalis* infection, age distribution of the infection, distribution of the infection by educational status, and to compare the occurrence rate of the parasite between urine specimen and swab collection among women in Birninkebbi metropolis, Nigeria.

MATERIALS AND METHODS

Study Area

The study location was Birnin Kebbi the Capital of Kebbi State is in North-Western Nigeria. The State was found from part of Sokoto State in 1991. Kebbi State is bordered by Sokoto State, Niger State Dosso region in the republic of Niger and the nation of Benin. It has a total area of 36,800 km^2.The study is conducted in two different hospitals. The hospitals includes Sir Yahaya Memorial Hospital (S.Y.M.H) and Vesico vagina fistula centre (V.V.F) Birnin Kebbi.

Ethical Consideration

Ethical approvals were obtained from the hospitals included in the study and informed consent of the subjects were sought before commencing the research.

Administration of Questionnaire

Structured questionnaire was used to source information on clinical status and microscopic analysis associated with Trichomoniasis from the patients sampled. All the patient examined were selected based on their willingness to participate after a dialogue with the researchers.

Sample Collection

The samples were collected between the month of July and august, 2011. A total of 183 urine and 37 swab samples was collected for the purpose of the study. A leak proof universal container was given to the patient to void their urine, high vagina swab were also collected by the clinical staff assistant. The samples were transported to microbiology laboratory of Waziri Umaru Federal Polytechnic for parasitological analysis.

Laboratory Analysis

Wet mount microscopy of a smear of the discharge made on a slide in addition with an air dried smear was used for HVS samples.. The slide smear was fixed with absolute methanol for about one minute. The slide was then placed on the rack and flooded with Giemsa stain solution for 10minutes, the stain was washed off with water. After which, the slides were examined microscopically using the 10x and 40x objectives with the condenser Iris closed to give good contrast as described by Cheesbrough (1998). While wet mount preparation was used for urine specimen as described by Cheesbrough (1998). The urine sample was spun then a wet mount preparation were made on the slide. This was examined microscopically using 10x objective with the condenser iris closed to give a good contrast. The flagellate form of *Trichomonas vaginalis* were searched for and the number of positive and negative slide were recorded.

Data Analysis

The results were analysed using percentage prevalence as described by (Margolis, et. al., 1982). Chi-squire statistical infection was used to compare the prevalence of the infection and various variable.

RESULTS AND DISCUSSION

The results obtained were reported in tabulated form as shown below

Table 1: prevalence of *Trichomonas vaginalis* in sample obtained from S.Y.M.H and V.V.F center.

Hospital	No examined	No Infected	% Infected
S.Y.M.H	183	8	4.4%
V.V.F	37	1	2.7%
Total	**220**	**9**	**4.1%**

Table 2: Prevalence of *T. vaginalis* Infection n Relation To Type of Specimen.

Sample	No examined	No Infected	% Infected
Urine	183	4	2.2%
Swab	37	5	13.5%
Total	**220**	**9**	**4.1%**

Table 3: Prevalence of *T. vaginalis* Infection Relation To Pregnancy Status.

Sample	No examined	No Infected	% Infected
Pregnant women	170	7	4.1%
Non pregnant women	50	2	4.0%
Total	**220**	**9**	**4.1%**

Table 4: Prevalence of *T. vaginalis* Infection in Relation To Age Group.

Age (Years)	No examined	No Infected	% Infected
<20	50	2	4 %
20-29	100	6	6%
30-39	50	1	2%
>40	20	-	-
Total	**220**	**9**	**4.1%**

Table 5: Prevalence of *T. vaginalis* Infection in Relation To Educational Status

Educational Status	No examined	No Infected	% Infected
None	25	1	4 %
Qur'anic	15	-	-
Primary	37	6	16.2%
Secondary	100	1	1%
Tertiary	43	1	2.3%
Total	**220**	**9**	**4.1%**

The total overall prevalence of *Trichomonas vaginalis* infection among 220 female patients examined was 9 (4.1%). The result of this study has demonstrated the prevalence and occurrence of *Trichomonas vaginalis* infection among women in Birnin Kebbi, Kebbi State. Low prevalence encountered in this study is synonymous with previous studies, for example 2.2% 0f 544 women recorded in Lagos, Nigeria (Adeoye and Akande, 2007). 2.0% of 200 male and female reported in Ibadan, Nigeria (Okonko, et al, 2012). However the prevalence of the infection is considerably low when compared with the finding of Jatau et al., (2006) among women attending antenatal clinics in Zaria, Nigeria, 18.66% of 300 prevalence

rate of *T. vaginalis* infection was recorded.

Of the 183 samples collected from S.Y.M.H 8 (4.4%) were positive for *Trichomonas vaginalis* while 1(2.7%) were infected out of the 37 sampled from the V.V.F center (Table 1). The differences in the infection rate among hospital was statistically significant ($p<0.05$). the observed low prevalence in V.V.F center may due to the fact that female attending this hospitals had vescico vaginal fistula syndrome which hinder their sexual activity while most patient recruited for this study at S.Y.M.H were pregnant women which is and evidence of sexual contact hence the tendancy of transmission of *T. vaginalis* infection.

T. vaginalis detection was significantly dependent on the sample used ($p<0.05$) swab samples had 13.5% (5 of 37) than urine 2.2% (4 of 183) (Table 2). It is obvious that the detection of the parasite in high vaginal swab will be higher than urine of female, this is due to the predilection of *T. vaginalis* flagellate to the vaginal tract of female which enhance their survival (Ochei and Kolahaktar, 2000).

In this study, pregnant women were significantly ($p<0.05$) more infected with *Trichomonas vaginalis* 4.1%(7 of 170) than non pregnant women 4.0% (2 of 50 samples). This indicates high risk to the expectant mother and her foetus. Jatau *et al.*(2006), described the risk factors involved in treatment of pregnant women infected with T. vaginalis infection. This include the side effect of the drug of choice for treatment metronidazole, due to its mutagenic and carcinogenic effect detected in rodents negate its usage on pregnant women thus limiting treatment possibilities. Another factor is that pregnant women are more reluctant to take prescribed medication in full dose if at all, this necessitate the incorporation of routine screening for sexually transmitted infection in antenatal care.
Table 4, shows the age specific distribution of *Trichomonas vaginalis* infection among the women in this study. Trichomoniasis is more prevalent among those aged 20-29 years 6 (6%) followed by <20 years age group 2 (4%) while those aged 30-39 years had the lease prevalence rate 1(2%). No infection was recorded among those aged >40. *T. vaginalis* infection is age dependant ($p<0.05$). The result of this study is in agreement with generally observed fact that the incidence of sexually transmitted disease (STDs) including Trichomoniasis, by the number of cases treated each year, is highest among the 15-30 years age group (WHO, 2007). These age group reported by other researchers, Jatau, *et al.* (2006) and Okonko *et al.* (2012), were documented to be persons with the greatest sexual activity and that incidences decreases with age.

Educational status of *Trichomonas vaginalis* infection among the women presented in table 5 showed that. women with primary school certificate has the highest rate of infection 6(16.2%), followed by those with no educational status (Illiterate) 1 (4%), women with higher education had 1 (2.3%) and women with secondary certificate had 1(1%) while no infection with *T. vaginalis* was recorded

among women with Qur'anic education. However, the result of this study shows no relationship in educational status and infection with *T. vaginalis*. Rather it depends on individuals level of both educational, and environmental hygiene.

CONCLUSION

This study has confirmed the existance of *Trichomonas vaginalis* infection among women in Birnin Kebbi, Kebbi State. Low prevalence recorded of 4.1%, suggest the need for control of Trichomoniasis. This can be best accomplished by public health programmes through persistent efforts to educate people on the need to improve on their personal hygiene, screen, diagnose, treat patients and sexual partners and follow up monitory of the infected individuals within communities.

RECOMMENDATIONS

Certain factors such as poor personal hygiene, multiple sex partners, low socio-economic status and under development are also associated with high incidence of infection which should be avoid.

Public health programmes should be organized to educate people on the need to improve on their personal hygiene, screen, diagnose, treat patients and sexual partners and follow up on the high risk individuals within communities.

Patients infected should avoid sex until drug therapy is completed and all symptoms have disappeared. Treatment of the patients partner is crucial to avoid re-infection.

It is also important for the individuals to provide their physicians with all the facts that they think can lead to a better diagnose or treatment, especially for patients seeking medical help for a reoccurring infection.

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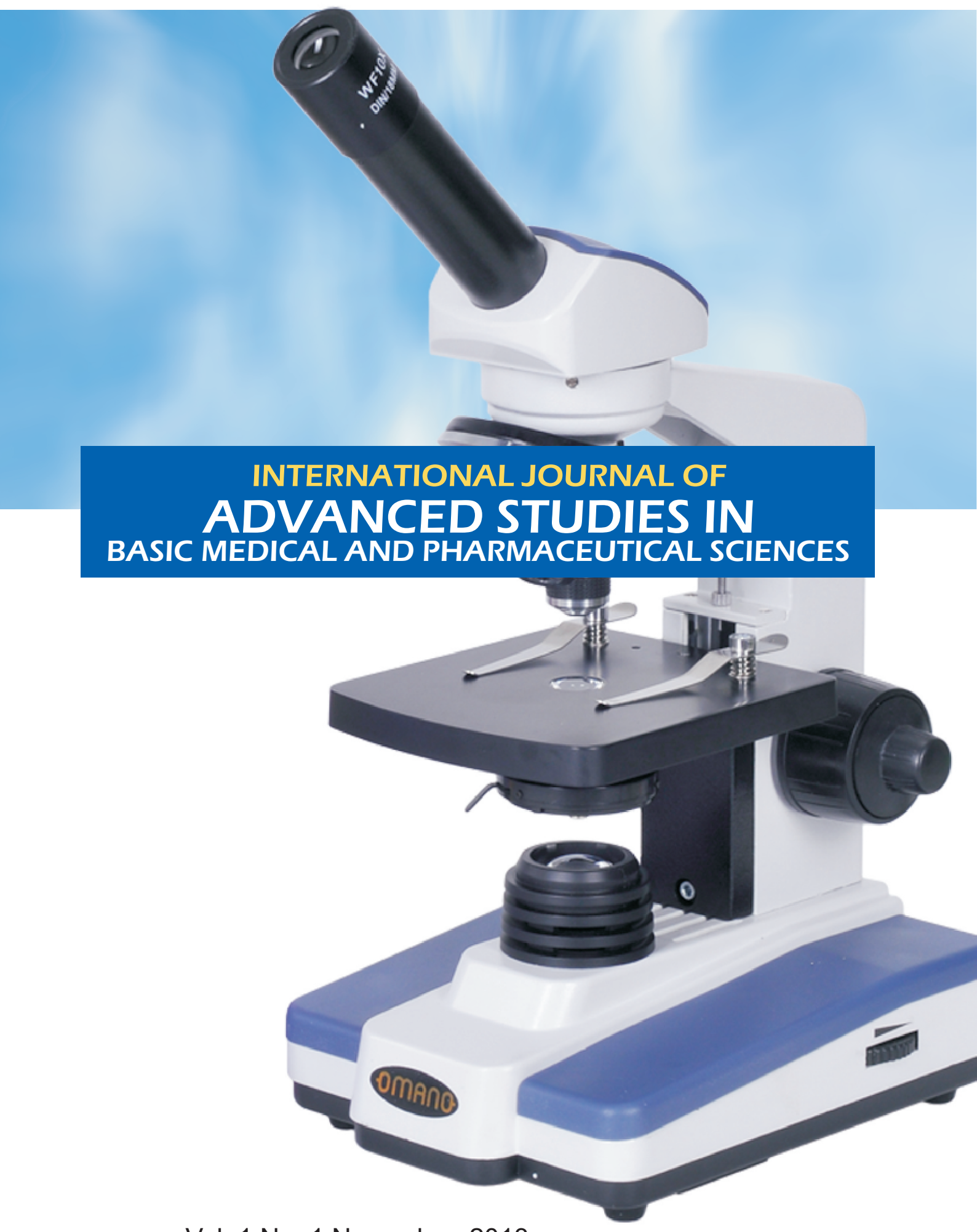

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COMPARATIVE STUDIES ON THE EFFECTS OF CRUDE PITUITARY EXTRACT (CPE) of *Clarias gariepinus*, Toad (*Bufo temporia*) AND SYNTHETIC HORMONE (OVAPRIM) ON INDUCEMENT AND HATCHABILITY OF *Clarias gariepinus* (BURCHELL, 1822)

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ABSTRACT
A research was carried out to determine the effects of the use of Crude Pituitary Extract (CPE) of Clarias gariepinus, Toad and Synthetic hormone (Oraprim) on the hatchability of Clarias gariepinus Fifteen matured female Clarias gariepinus, were induced with three types of hormones, Crude Pituitary Extract (CPE) of Clarias gariepinus, Toad (CPE) and Synthetic Hormone (ovaprim) tagged treatment A, B and C respectively. Treatment A, B, and C were replicated five times. Corresponding number of each replicates, had the same weight of 500gm, 520gm, 540gm, 560gm and 580gm. Treatment A and B were given two of first and decisive doses of 1ml of supernatant at an interval of 6hrs. Treatment C was given one and decisive dose of 0.5ml. of ovaprim. The sacrificed males were injected with 1ml. and final dose of CPE of Clarias gariepinus and Toad and 1ml of ovaprim respectively. The flow through system was used for incubation and the dry-wet system of fertilization was adopted. Hatching commenced after 12hrs. and was completed within 24hrs. Treatment A had a total of 4,127 hatchlings and percentage (%) hatchlings of 44.12, Treatment B, 1711 hatchlings and 18.29% and Treatment C had 3,517 hatchlings and 37.59%. The use of CPE of Clarias gariepinus was significant at both 1% and 5%, because calculated F- value of 10.38 is greater than the F- tab., which are 6.93 and 3.89 respectively. Also the Least Significant Difference (LSD) of 3.70 was obtained. The mean difference between treatment A and B was 4.83, which is > LSD 3.70. Therefore, there is significant difference in the use of CPE of Clarias gariepinus and Toad. The mean difference between Treatment A and C is 0.82, which is < LSD, therefore, there is no significant difference between Treatment A and C. Mean difference between Treatment C and B is 4.01 which is > LSD, showing significant difference between Treatment C and B. Therefore, the use of CPE of Clarias gariepinus, Toad [PE] and synthetic hormone (ovaprim) were effective for inducing fish to spawn, but CPE of Clarias gariepinus and Ovaprim were more effective than Toad. This is aim at improving fish breeding and availability of "fish seed" through artificial propagation.

Key words: *Female Clarias gariepinus, Toad, Synthetic hormone, Ovaprim, Supernatant, Dry-wet, Flow- through, Hatchlings.*

INTRODUCTION

Fish constitutes a major food item in the diet of an average Nigerian, and with the continuous increase in population, fish demand had increased considerably. Fish nutritionally, is equivalent to meat in protein, with a good amino acid profile, high essential minerals and low saturated fatty acid. Thus the culture of fish has become an innovative technology aimed at producing large quantity of food fish for consumers (Idoniboye and Ayinla, 1991).

Nigeria needs approximately 1.5 million metric tones of fish annually, but her total annual domestic production is less than 0.45 million metric tones. Inadequate fingerlings of commercially and culturable species is the major constraint of fish culture (Ayinla, 1991 and Adekoya, 2001). Consequently, the practice of fish breeding (artificial propagation) becomes timely and universally accepted, since most fish can not breed in captivity.

Miller, (2000) and Butler, (2006) opined that fish grow best when they are condition to breed in a seemingly natural condition, that is really healthy, well fed, have no pickers or predators and have good water condition. Ugwu *et al*., (2006) opined that some kind of intervention by man in the course of natural propagation of culturable fishes is unavoidable, for better survival of offspring and for solving the problem of lack of "fish seed" of desirable quality and quantity.

The choice of *Clarias gariepinus*, stems from it's popularity, acceptability, taste, hardiness, disease resistance and adaptability to natural environment which renders it attractive to culturist. A lot of substances had been used to induce fish to spawn. These includes manipulation of the natural environment, use of Crude Pituitary Extracts (CPE) and the use of synthetic hormones (ovaprim). Others include Human Chronic Gonadotropin (HCG), Pituitary Extract from Toad and Bullfrog, pituitary of purified salmon gonadotropin, carp pituitary homogenate mixed with synahorin, Rabbit Pituitary Extract SG – 100 (Housay, 1930; Von Ihering, *et al*., 1937; Rugh, 1937; Gerbilskii, *et al.,* 1937).

Recent reviews on induced fish breeding include, Shehadeh, (1975), Chandhuri, (1976), Fontaine, (1976), Harvey and Hoar, (1979), Aguigwo ,(1991), Nwuba, (1998), Gardner, (2006), FAO,(2006), *Moody et al., (2009) and Ogunsina,(2010.)*

AIMS AND OBJECTIVES:

(a) To improve fish breeding through fish propagation.
(b) To determine the most and best cost effective hormone for catfish breeding
(c) To make necessary recommendations to catfish breeders, for future fish seed propagation.
(d) To ensure that the lack of fish seed of *Clarias gariepinus,* which is a delight to most fish farmers and consumers is a thing of the past.
(e) To ensure sustainability and development of Aquaculture production as a business.

MATERIALS AND METHODS

40 matured *Clarias gariepinus* with weights ranging from 500gm to 580gm, comprising of 15 gravid female *Clarias gariepinus* and 25 male were carefully selected from Aquafish Farm, Awka, Anambra State. The 15 female were divided into three groups, bearing in mind their weight and each female was placed in a 25 litre plastic bowl, half filled with water. The inducing hormones were obtained from the Crude Pituitary Extract (CPE) of *Clarias gariepinus* (Treatment A), Pituitary Extract (PE) of Toad (Treatment B) and synthetic hormone (ovaprim) (Treatment C) imported from China. Each treatment was replicated five times with the corresponding weights of 500gm, 520gm, 540gm, 560gm and 580gm.

Extraction of Pituitary Gland from *clarias gariepinus* and Toad

The selected *Clarias gariepinus,* were sacrifice by cutting the fish spinal cord at the back region between the neck and head to demobilized it. The gap of the mouth was widened by further slitting the lower jaw to the operculum. The mouth was washed with clean water, dried and turned up- side down. The voma bone was carefully cut open to expose the pituitary gland, a creamy globule like organ at the centre of the brain case. The CPE was carefully removed with a spatula and put in a clean small mortar. The some process was used to open the brain case of the Toad to obtaining the Toad (PE).

Injection of 1stDose

The administration of the hormone began by 12 midnight. The Pituitary Extract was thoroughly grinded in a mortar and 1m1. of physiological water (0.9gm of table salt in 1 litre of boiled, cool, water) was added. The hypodermic syringe was used to obtain 1ml. of *Clarias gariepinus* hormone (Trt. A) (CPE) and Toad (PE) (Trt. B) was grinded and 1ml. was also obtained, which were injected according to their group Trts. A and B respectively. 0.5ml. each of ovaprim vial (Trt. C), was injected into the five female of *Clarias gariepinus* of the group. The injection was given at an angle of 45° and neddle between the dorsal fin and lateral line pointing towards the caudal fin. Care was taken not to empty the supernatant into the fish bowel. The point of injection was massage to aid even distribution of the hormone.

2nd and Decisive Dose

After 6hrs., 1ml. of corresponding hormones of treatment A and B were administered to their respective female fish specimens. No second administration of Trt. C. hormone. At the same time the first and decisive dose of 1ml. of hormone of (Trt. A and B) and 0.5ml. of Trt. C, were given to male fish specimens that will provide the milt for fertilization.

Fertilization process started six hours after the final and decisive dose were administered to the male fish specimens.

Procurement of Milt (sperm) from Male *Clarias gariepinus*

15 matured males of *Clarias gariepinus* were sacrificed to obtain the milt for

fertilization of the eggs. One male to one female of equal weight. The milt was obtained 30- 40 minutes before stripping of the female for eggs. The gut of the male fish was cut open with a scissors to expose the two lobe testis. The testis were removed carefully and dried with a blotting paper. Small incisions were made at the tip of the testis and the milt was squeeze out and washed into a container that is dry with a 0.9% saline solution. The stripping of the female continued until trace of blood was seen.Eggs were collected in a clean bowl.

Preparation of Incubation Trough

The method used in this research was the flow through system. The source of water was from a bore hole. The overhead tank let in water into the incubator and excess water was allowed to leave the incubator via the outlet pipe.The outlet pipe was used to regulate water level in such a way that a constant water level covering the eggs was maintained in the incubator.

Procurement of Eggs from the Female Fishes Induced with Treatment A, B and C (Hormone)

The latency and incubation period of this experiment was between 27-28°C, with a latency time of 8hrs. and incubation period of between 22 – 24hrs.

At the end of the latency period by 12noon the next day, the female fish were stripped to obtain the eggs. This was done by catching the female fish with a hand net, and blindfolds it with a wet towel. The head was griped firmly and the belly pressed towards the genital opening. The eggs were collected in a dry bowl. Stripping was stopped when blood was noticed.

Fertilization and Incubation of Eggs

The eggs obtained from each female specimen were fertilized by the milt obtain from a male induced with the same hormone. The milt obtained was poured into the bowl containing the stripped eggs. The bowl was gently shaken to ensure proper mixing of eggs and milt – Dry fertilization. Some quantity of saline solution (0.9%) was added to enhance mixing. Later, enough water to cover the eggs was added (Wet fertilization). This was stirred carefully with a clean feather to ensure maximum fertilization.

The fertilized eggs were poured evenly on the incubation net or substrate. The net was weighted down with clean stones. The incubation tank was well aerated because of the flow through system used. The temperature was maintained between 27–28°C and hatching commenced after 12hrs., and was completed after 24hrs. The healthy larvae clustered at the dark corners of the incubator. The larvae were quickly separated from the dead eggs by removing the incubation net. Care was taken not to remove healthy larvae. The first 3 – 4 days, the larvae fry fed from the yolk sac containing nutrient. Counting was done manually for each replicate.

DATA ANALYSIS

The total hatchlings of all the replicates in Treatment A, B and C were counted manually, and percentage hatchability was also calculated. The mean hatchlings of treatment A, B and C were subjected to Analysis of Variance (ANOVA), for significant difference probability. The Least Significant Difference (LSD) of Treatment A, B and C were calculated.

RESULT AND DISCUSSION

Table 1: No. of Hatchlings in Treatment A, B and C

Treatment Hormone	**I 500gm**	**II 520gm**	**III 540gm**	**IV 560gm**	**V 580gm**	**Total**
CPE *Clarias gariepinus*	630	801	944	901	881	4,127
Toad (PE)	330	225	262	441	453	1,711
Ovaprim (Synthetic)	618	660	745	711	783	3,517
					GRAND TOTAL	**9,355**

Table 1. Shows that the five replicate induced with treatment A (CPE) produced the highest number of hatchlings of 4.127 followed by Trt. C. treated with synthetic hormone (ovaprim) with 3,517 hatch lings and Trt. B. treated with the Toad (PE) 1,711 hatchlings. This experiment also showed that the group induced with *Clarias gariepinus* (CPE), gave the highest percentage (%) hatchlings of 44.12 than those treated with synthetic hormone (ovaprim) 37.6% and Toad (PE) 18.3% respectively.

Jalabert, *et al.*, (1971) observed that the techniques used to preserve the synthetic hormone affect the potency of the extract or hormone. This agrees with the result of this experiment because *Clarias gariepinus* CPE was used in-situ and produced the highest hatchlings than the two other hormones. Peter, *et al.,* (1988) used the method called Limpo method to induce ovulation in female fish by injecting them with a combination of synthetic gonadotropin – releasing hormone analogue (LHRN – A) and the drug doperidone. The hormone stimulate the sex organ of fish, while, the drug inhibits the action of dopermine produced by fish that inhibits ovulation.Unlike the use of CPE, the ovaprim does not require two times injection to induce and the cost implication was said to be cheaper, contrarily to the present experiment, where the cost implication is quite high and ovaprim availability is not assured, because of the place the experiment was carried out.

The fishes used in this experiment were locally available and cheap to procure. Although those injected with pituitary extracts were handled many times than those injected with ovaprim. The use of Toad pituitary extract (PE), induced fish to spawn in this study. Ayinla, *et al.,*(1988) succeeded in using Toad (PE) to successfully induce ovulation in fish, and this agrees with this work, but it produced the lowest hatchlings in this experiment. The cost implication of using toad (PE) is cheapest but the major constraint, is it physical nature and culturist choice, which affects peoples choice of using it.

The three treatments (A, B and C) were subjected to statistical analysis. There is a significant difference ($p < 0.05$) at 1% and 5% levels because the calculated F value of 10.38 is greater than the F-tab which is 6.93 and 3.89 respectively. The Least Significance Difference LSD which is 3.70 showed that there is no significant difference $P > 0.05$ in the use of *Clarias gariepinus* CPE and ovarprim in this experiment. This is because the mean difference between the number of hatchlings of treatment A and C is 0.82 lower than the LSD(3.70). There is significant difference ($P < 0.05$) between treatment A and B with mean difference of 4.83 and significant difference between treatment C and B with mean difference of 4.01.

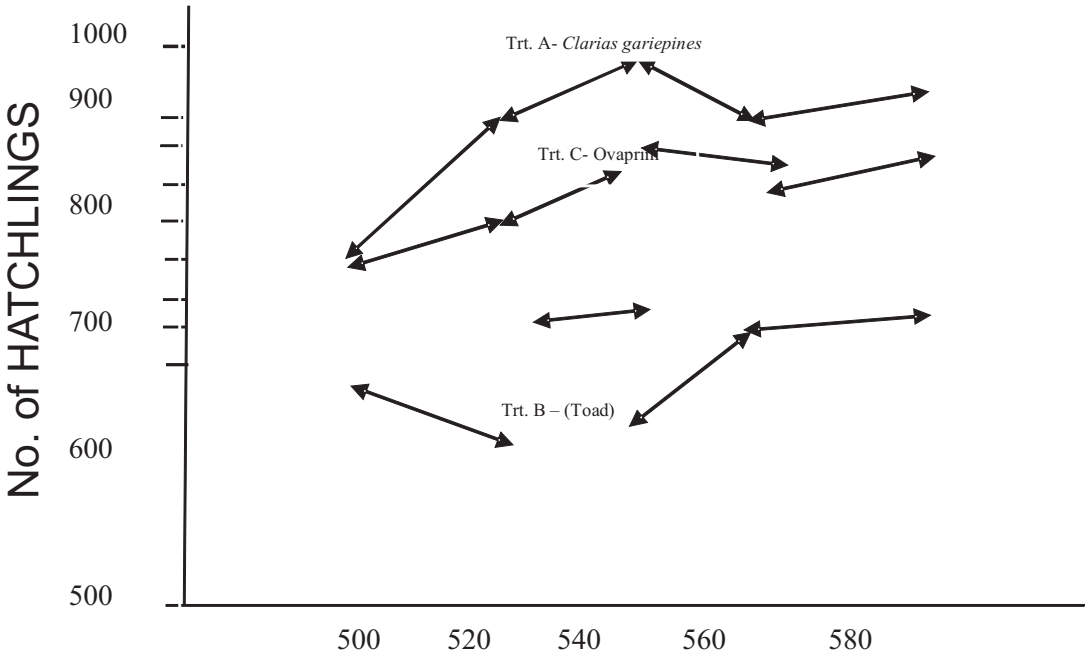

Figure 1: Shows pattern and number of hatchlings of Treatments A, B and C
Treatment A, showed the highest point of hatchlings at the weight of 540gm. Also specimen treated with Trt. C showed, the same pattern of increase hatchlings at the same weight but, not as high as trt. A. Treatment B did not follow the pattern as Trt. A and C, but showed the lowest number of hatchlings in all the treatments.

Many species of fish does not spawn in captivity, breeders have used so many substances to induce ovulation in fish (Marioghae, 1991). Ball, *et al;* (1969) reported that frog pituitary extract has successfully induced final ovulation in *Clarias gariepinus*. Liao *et al;* (1973) used Mullet pituitary homogenate mixed with Synahorin. Shedadeh, *et al;* (1973) used purified Salmon gonadotropin, SE–G 100, Kuo, *et al;* (1973 and 1975) used Human Chrorionic Gonadotropim HCG. Other substances that had been used to induce spawning in fish includes; Follicle Stimulating Hormones (FSH), Lutnfenizing Hormone (LH) and Deoxycorticosterone Accetate (DOCA). Teleost gonadotropins are inactive in most fish bioassays

(Burzawa – Gerard and Fontaine, 1972). Therefore, it is recommended that more research work should continue in this area, in order to dictate easy methods of induce ovulation in other culturable fish species other than Catfish, that does not breed in captivity.

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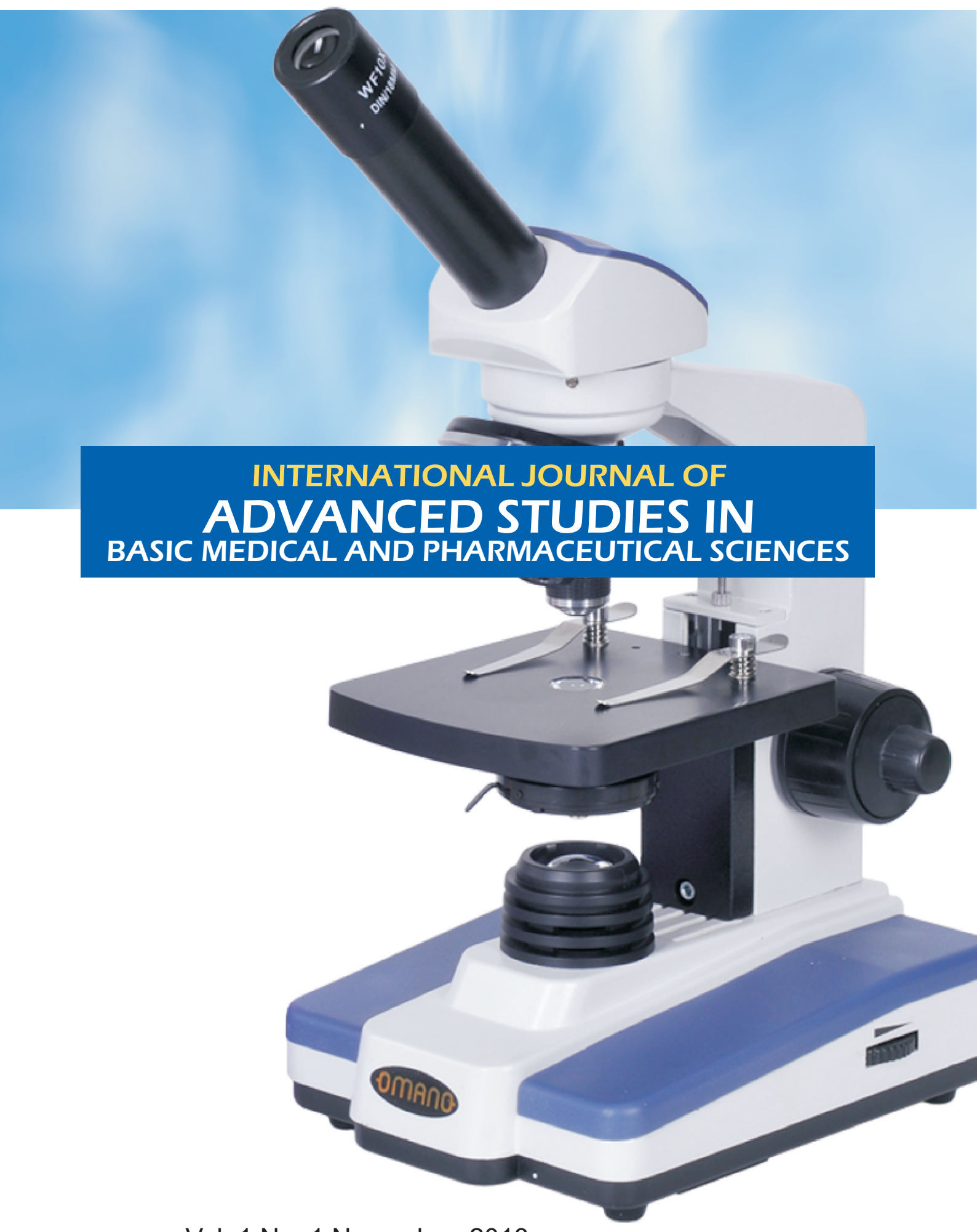

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NUTRITIONAL GENOMICS AND DIABETES: A POLICY PERSPECTIVE

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ABSTRACT
Diabetes mellitus is becoming one of major threats to human health in the 21st century. This could be a resultant effect of technological advancement which continues to encourage unhealthy eating habits, inactivity and sedentary lifestyle. Coupled with a strong genetic involvement in diabetes pathogenesis are underplay of favorable environmental and behavioral factors. In view of this, this research paper reviews an in-depth knowledge of genetic predisposition to diabetes and proffers possible nutrition intervention programme which could be used to improve national policy towards the prevention of this metabolic syndrome. Nutritional genomics (Nutrigenetics and Nutrigenomics) which aims at personalizing or individualizing nutrition based on genetic disposition for optimal health and disease prevention is applied in this diabetes prevention intervention. Social cognitive theory is used to draw out a workable conceptual framework in effecting knowledge and behavioral changes taking cognizance of confounding variables. Policy that encourages and enforces: genetic analysis (at birth) for diabetes susceptibility; inculcating physical exercise (sports) into individual lifestyle; thorough and adequate nutrition education for notable public awareness towards a transforming and transmissible behavioral change for diabetes prevention, would go a long way in building a diabetes-free generation in the foreseeable future. This could be a feasible channel towards achieving one of the Millennium Development Goals globally as well as building a strong, virile and healthy nation in making Vision 20-2020 realizable in Nigeria.

Keywords: Nutrigenetics, nutrigenomics, diabetes, policy, perspective.

INTRODUCTION

Diabetes mellitus, long considered a disease of minor significance to public health, is now taking its place as one of the main threats to human health in the 21st century (Zimmet 2000). The last two decades of the twentieth century witnessed an explosive increase in the prevalence of diabetes mellitus (Amos et al,1997). For Instance in West Africa, specifically Nigeria, diabetes prevalence (among urban population) increased from 1.65% in 1985 to 6.8% in 2000 while in Ghana (in adults ≥25 years) it increased from 0.2% in 1963 to 6.3% in 1998 (Abubakari and Bhopal, 2008). This may be the consequence of changes in work patterns from heavy labour to sedentary, increase in computerization and mechanization, improved transport systems and increasing easy access to fast foods and empty calories (Shafrir 1997; Zimmet 2000). Since technological advancement continues to promote inactivity there is need for appropriate intervention(s) to be put in place in order to modify human lifestyle to prevent obesity.

The two major types of diabetes are Type 1 (which results from the destruction of pancreatic β islet cells by autoimmune response) and Type 2 which is caused by insulin resistance precipitated by inactivity and obesity (for type 2).

Nutritional genomics is the science that plan an individual's diet based on his/her genetic disposition to optimize health and prevent diseases. This can be achieved through nutrigenomics and nutrigenetics. Hence, this is a review of human genetics to identify the genes that have been implicated in the pathogenesis of diabetes mellitus as well as the environmental factors that must be present. This could be used in policy formulation with the sole objective of reducing diabetes prevalence and possibly preventing the disease in future generations.

RESEARCH PROBLEM

The increasing prevalence of diabetes mellitus globally needs to be addressed by all stakeholders through feasible policy formulation and implementation using the knowledge of nutritional genomics, which though not completely new, is yet to be explored fully in individualizing nutrition towards optimizing public health and prevention of diseases.

OBJECTIVES

This research aims at identifying the genes implicated in the etiology of Type 1 and Type 2 diabetes mellitus as well as the foods or nutrients which can be taken to prevent the disease.This work also elucidates feasible protocol which if formulated into policy and implemented could effect a transforming and transmissible changes in behavior and lifestyle towards the prevention of diabetes mellitus.

METHODOLOGY

The search engines used in this research study are HINARI and Googlescholar.

LITERATURE REVIEW

Globally the prevalence of diabetes mellitus had been estimated to increase in year 2000 to 2010 from; 14.2million to 17.5million in North America, 15.6million to 22.5million in South America, 26.5million to 32.9 million in Europe, 9.4 million to 14.1 million in Africa, 84.5 million to 132.2 million in Asia and 1.0 million to 1.3 million in Australia. This gives a total global increase in prevalence from151 million people in 2000 to 221 million in 2010 (Amos et al, 1997). This was projected to increase to 324 million by 2025 (Zimmet et al, 2003) and 366 million by 2030 (Wild et al 2004). In view of this continuous increase in prevalence of diabetes it is imperative to combine efforts in different fields of study to combat this metabolic syndrome. A clear and concise knowledge of the genetic factors in diabetes and the environmental triggers would help in the formulation and implementation of policy towards feasible diabetes prediction and prevention intervention.

Genetic Risk Factors in Diabetes

Type 1

As earlier defined Type 1 diabetes is an autoimmune disorder in which the immune system in the body attacks and destroys the pancreatic β islet cells thus leading to severe insulin deficiency. The pathogenesis of this disease is attributed to both inherited risk (genetic) and environmental triggers such as diet and infections (Yeung et al, 2011; Knip and Simell, 2012).

HLA (Human Leucocyte Antigen) genes encode molecules that are crucial to the immune system. These molecules hold small chains of amino acids o the cell surface so that immune cells can analyze these chains.When immune cells find inappropriate or foreign chains they begin to attack and destroy them. Without HLA genes immune cells cannot detect the chains of viruses, bacteria or tumor cells. On the other hand, inheriting certain versions (alleles) of HLA genes increases the chance of the immune cells attacking and destroying healthy body cells. HLA genes have been found to have the strongest association with thepathogenesis of Type 1 diabetes (Erlich et al, 2008). Specifically in Caucasians HLA genes DRBI*0301-DQA1*05:1-DOB1*02:03:02 and DRB1*04XX-DQA1*03:01-DQB1*03:02 (referred to as DR3 and DR4) are associated with increased risk (Noble and Erlich, 2012. In Asia HLA haplotypes DRB1*04:05-DQB1* 04:01 and DRB1*04:05-DQB1*04:02 denotes a high susceptibility (Erlich et al, 2008). Among Egyptian children the genetic risks identified are HLA-DQB1 alleles *030201, *0202, *0201 while DQQB1*060101 allele was found to be protective (Mosaad et al, 2012). In Finland (>99% of Finnish are Caucasians) HLA –DQB1*02/0302 which denotes high susceptibility risk is commonly occurring (Kukko et al, 2004). There may be racial or geographical variation diabetic risk HLA gene haplotype (Kukko et al, 2004).

High Risk Haplotypes			
DR3	DRB1*0301	DQA1*0501	DQB1*0201
	DRB1*0401	DQA1*0301	DQB1*0302
	DRB1*0402	DQA1*0301	DQB1*0302
	DB1*0405	DQA1*0301	DQB1*0302
Moderate Risk Haplotypes			
DR1	DRB1*01	DQA1*0101	DQB1*0501
DR8	DRB1*0801	DQA1*0401	DQB1*0402
DR9	DRB1*0901	DQA1*0301	DQB1*0303

Table 1: Spectrum of Diabetes Risk HLA Haplotypes

Source- Kantarova and Buc, 2007.

In a summary Table 1 shows the HLA haplotypes which have been identified at different levels of Type 1 diabetes risk.

(**TABLES 1 & 2).** Morestill individuals with the highest risk of type 1 (in Slovakia and Czech Republic) have these two predisposing haplotypes: DQA1*0501-DQB1*0201 (DQ2) /DRB1*0301 (DR3) and DQA1*0301- DQB1*0302 (DQ8) /DRB1*0401 or DRB1*0402 (DR4) (Nepon 2000; Cerna et al, 2003; Buc et al, 2006).There are also some reports on the association between the DP class II HLA alleles and type 1 diabetes. DPB1*0101, DPB1*0301 and DPB1*0202 were reported to have a positive association while DPB1*0402 was protective (Noble et al, 2000; Valdes et al,2001; Stuchlikova et al, 2006). Non HLA genes which may contribute to autoimmune diabetes are; the insulin gene (Concannon et al, 2005) and Cytotoxic T Lymphocyte Antigen-4 (CTLA-4) gene (Bucova 2002).

Table 2: Spectrum of Diabetes Protective HLA haplotypes

Protective haplotypes			
Strong Protection			
DR2	DRB1*1501	DQA1*0102	DQB1*0602
DR6	DRB1*1401	DQA1*0101	DQB1*0503
DR7	DRB1*0701	DQA1*0201	DQB1*0303
Moderate Protection			
DR5	DRB1*1101	DQA1*0501	DQB1*0301
Weak Protection			
DR4	DRB1*0401	DQA1*0301	DQB1*0301
	DRB1*0403	DQA1*0201	DQB1*0302
DR7	DRB1*0701	DQA1*0201	DQB1*0201

Source- Kantarova and Buc, 2007.

The presence of the following auto antibodies are predictive of pre-diabetes and clinical TID (Type I Diabetes): Islet cell autoantibodies (ICA); Insulin autoantibodies (IAA); Glutamic Acid Decarboxylase autoantibodies (GADA) and Islet antigen- 2 molecule autoantibodies (IA-2A) (Siljander et al, 2009). Persistent positivity for two or more autoantibodies is highly predictive of progression to clinical TID (Knip and Siljander, 2008). IA-2A has the highest positive predictive value followed by ICA, GADA and IAA while for sensitivity towards TID ICA has the highest followed by IA-2A, GADA and IAA (Kumala et al, 1998), hence, positivity for ICA can be used as a primary sign of β cell autoimmunity.

Type 2 Diabetes

Single Nucleotide Polymorphism (SNPs) associated with high risk of developing T2D (Type 2 Diabetes) are are two closely-linked SNPs (rs7903146 and rs12255372) in the Transcription Factor 7-like 2 (TCF7L2) GENE (Cho et al, 2012; Cooke et al, 2012). More than 30 studies have replicated this finding in Whites, Asian and African American populations (Tong et al, 2009) as well as in Blacks and Whites (Hivert et al, 2011).TCF7L2 gene is the most strongly associated with the etiology or pathogenesis of T2D in various ethnic groups globally (Cauchi et al, 2007). It is implicated in Danish and US populations (Grant et al, 2006); in non Hispanic Whites and African-American youths (Morgan 2012); Japanese subjects (Yokoi et al 2006; Miyake et al, 2008) as well as in East Asian, European and West African populations (Helgasson et al, 2007).

ENVIRONMENTAL FACTORS IN DIABETES PATHOGENESIS.

TYPE 1

Environmental factors have long been implicated in the etiology of T1D in genetically susceptible individuals (Akerblom et al, 2002; Knip et al, 2005; Peng and Hagopian, 2006). Such factors include: Infection (viral and bacterial) and dietary factors (vitamin D deficiency, early weaning into cow milk at infancy, dietary nitrates and nitrites and Streptomyces toxins) (Knip and Simell, 2012).

Infection: Viral

Some viruses are able to initiate the onset of T1D either by direct cytolytic effect or by triggering the autoimmune process leading gradually to β cell destruction (Tavares et al, 2012). This autoimmune response may be as a result of molecular mimicry between some viruses and β islet cells (Coppieters et al, 2012, Cusick et al, 2012). Enteroviruses have been implicated in the etiology of T1D (Lonnrot et al, 2000; Stene et al 2010; Oikarinen et al, 2011). Specifically Coxsackie virus (Ghazarian et al, 2012), rotavirus (Honeyman et al 2010), cytomegalovirus, mumps, rubella and retrovirus (Knip and Hyoty, 2008) have been implicated.

Bacterial

The normal flora in human gastrointestinal tract was found to have a protective effect agains and autoantibody positivity and clinical T1D (Wen et al, 2008; Giongo et al, 2011;Vaarala, 2012; Beyan et al, 2012).This may be as a result of the activities of the lactate and butyrate-producing normal flora (Brown et al,

2011). Morestill, Clostridium leptum group in human mucosa
improved the activity of regulatory T cells, hence, a reduced Clostridium leptum diversity may reduce the function of regulatory T cells thus initiating autoimmune response (Atarashi et al, 2011).

On the other hand Mycobacterium avium subsp paratuberculosis commonly found in infected pasteurized milk (Ellingson et al, 2005; Hiuska et al, 2005) and contaminated food and water, has been reported to trigger T1D via molecular mimicry (Dow et al, 2012). Helicobacter pylori (Jeon et al, 2012) and Staphylococcus aureus (Gambie et al, 1980) were also implicated though there is limited recent findings to support the latter.

Dietary Factors

Early weaning of infants into cow milk: Some research findings have reported that short duration and/or lack of breasfeeding in new born infants may constitute a risk factor for the development of T1D later in life (Patelaron et al, 2012). Earlier studies had reported an association between early (before 3 months) introduction of bovine-based milk formula and progressive signs of beta cell autoimmunity in genetically susceptible infants (Kimpimaki et al, 2001; Vaarala, 2002) as well as clinical T1D (Megoid et al, 2011, Virtaren et al, 2012). However early weaning into insulin and beta lactoglobulin-free cow milk infant formula was fond to reduce the incidence of diabetes-predictive autoantibodies considerably (Vaarala et al, 2012). The presence of some fairly long amino acid chains, in cow milk formula, which are of similar mimicry (Knip et al, 2010). Hence weaning of infants to highly hydrolyzed formula may reduce the risk of β cell autoimmunity.

Vitamin D deficiency: Both animal and human studies have reported the role of vitamin D deficiency in the etiology of T1D (Glulietti et al, 2004; Mathieu and Badenhoop, 2005),Owing to the presence of vitamin D receptors on islet and immune cells ,vitamin D deficiency may trigger autoimmune response and impaired insulin action thus leading to T1D (Mathieu et al, 2005; Bikle, 2011) and T2D (Pittas et al, 2007).

Increased dietary nitrites and nitrates: Dietary nitrates and nitrites are present in industrially processed, cure and preserved meat and fish products (such as ham, sausage, bacon, canned fish and beef, e.t.c.) as well as in drinking water. High levels of these compounds are toxic to pancreatic β islet cells (Wilson et al, 1983) and have been implicated in the pathogenesis of T1D in humans (Helgason and Jonasson, 1981; Paslow et al, 1997; Myers et al, 2002) especially in male animals because estrogen had an inhibitory effect on these compounds but testosterone did not in mice (Helgasson et al, 1982). Paslow et al, 1997 observed a higher incidence of of T1D in infants living in areas with water nitrate level of 14.9-40mg/L than areas with 3.2mg/L, however WHO standard is 50mg/L (WHO, 1996)

Streptomyces Toxins: Streptomyces is a common soil bacterium that produces toxic compounds (such as bafilomycin, concanamycin, nigericin and streptozotocin) and can affect tubers and roots especially potatoes and sugar beets (Myers et al, 2003).These toxins have been observed to cause T1D in mice via distruption of the pancreatic islet cells (Myers et al, 2001).

TYPE 2- Overweight and Obesity

Overweight and obesity results from inactive or sedentary lifestyle and overly-rich food consumption especially calories.These have been found to be associated with an increased risk of developing insulin resistance and T2D (Maggio and Pi-Sunyer, 2003; Kahn et al, 2006; De wet, 2012).This is because in obese subjects adipose tissue releases increased amount of non esterified fatty acids and glycerol which interfere with the uptake of glucose by insulin receptors on muscles, adipose and liver cells (Kahn et al, 2006).

NUTRITIONAL GENOMICS CONCEPT

Nutritional genomics is the science that applies the knowledge of the genetic disposition of an individual to plan his/her diet towards optimizing health and disease prevention, thus resulting in individualizes or personalized nutrition. This can be achieved through the concepts of Nutrigenetics and Nutrigenomics **(Fig 1).** Nutrigenetics can be defined as the science that applies the effect of genetic variation on dietary needs and responses in optimizing the health of an individual while Nutrigenomics is the science that applies the role of nutrients and bioactive food components in altering gene expression thus optimizing the health of an individual (Ferguson, 2009; Simopoules, 2010). Both are working towards the same goal, that is, individualizing nutrition based on genetic disposition to optimize health and prevent diseases.

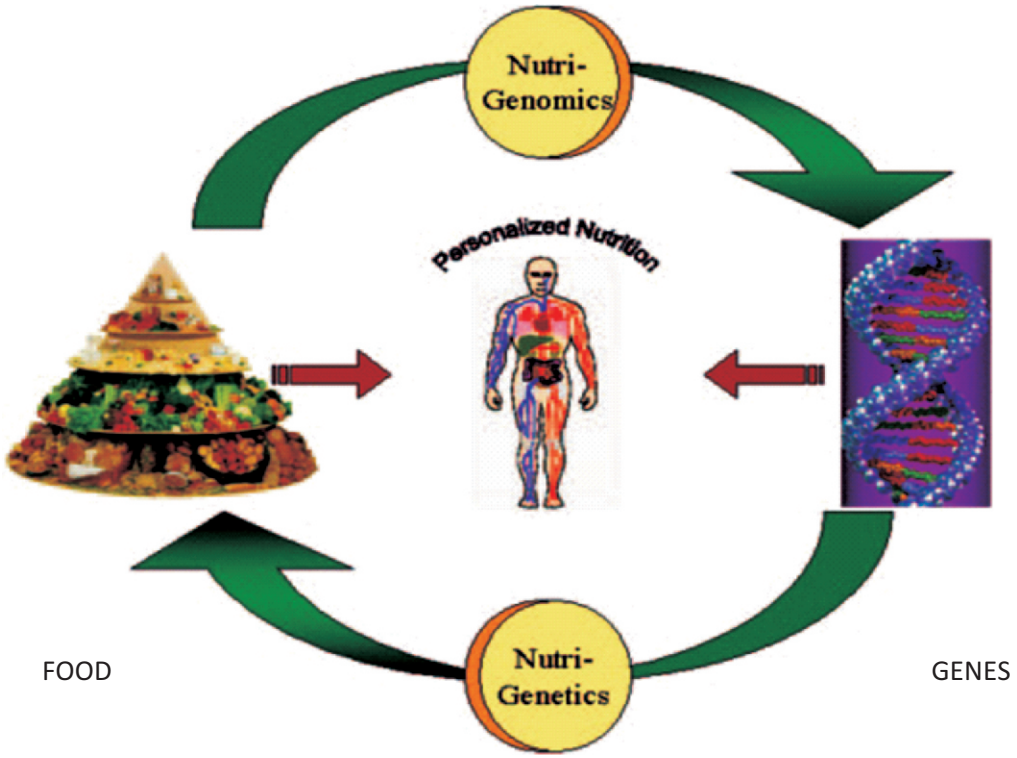

Figure 1: Nutrigenomics and Nutrigenetics (adapted from Mutch et al, 2005)

The fundamental hypotheses underlying the concept of nutrigenomics and nutrigenetics are as follows:

- Some nutrients or foods with bioactive compounds can be applied in nutrition to alter gene expression in order to optimize health and prevent diseases ,for instance, soybeans contains isoflavones which retards and prevents the growth of tumour and cancer (Alfred et al, 2004)
- Better health can be achieved by planning the diet of an individual based on his or her inherited or acquired genetic characteristics depending on physiological state, taste and health status, for instance, a gluten-free meal plan for a celiac disease patient.
- The health effects of nutrients depend on inherited genetic variants that dictate the uptake and metabolism of the nutrients, for instance, partially hydrolyzed cow milk infant formula may trigger T1D in a new born baby who is genetically at risk while in the one who is not genetically at risk the milk is metabolized for growth and development (Fenech et al, 2011).

For proper application of nutrigenetics and nutrigenomics these three scientific rudiments must be understood:

- There is great diversity in inherited genes between ethnic groups and individual which affect or dictates nutrient metabolism (Kukko et al, 2004);
- People differ in their food availability and choices based on cultural, economical, geographical and taste differences;
- Food habit is transferable from parents to children.

Having explained the genetic and environmental factors in the etiology of diabetes and nutritional genomics concept, it is imperative that these are applied in feasible diabetes predictive, preventive and management intervention in policy formulation and implementation.

POLICY PERSPECTIVE

The Nigeria Health policies are in categories and these are grouped as follows:

- Infant and Young Child feeding policy;
- National Child Health policy;
- National policy for Public-Private partnerships for Health;
- Policy on National Health Management Information System;
- National Blood policy. (www.fmh.gov.ng/index.php)

These policies' documents are voluminous and can not be included in this paper but the website can be visited for details.The first four of these policies should be augmented to accommodate the following policy recommendation for the prevention and nutritional management of diabetes as well as overweight and obesity:

- Genetic risk factors to diabetes susceptibility must be identified in every nation;

- Genetic disposition of an infant to diabetes must be determined at birth;
- Babies must be breast fed exclusively for the first 6 months (especially the genetically at risk);
- Good hygiene practices must be maintained to prevent infection;
- Consumption of cured, industrially processed and preserved meat and fish products should be avoided by individuals genetically at risk of diabetes;
- Nitrates in well, tap and table water must not exceed 5mg/L;
- Vitamin D supplements should be given (if possible free) to the genetically at risk infants, youths and adults;
- Consumption of only high quality roots and tubers to prevent the food poisoning;
- Indiscriminate use of antibiotics must be avoided to maintain healthy intestinal micro flora status;
- Consumption of fermented foods to maintain a healthy micro flora status;
- Maintaining an active lifestyle and healthy food habits.

This policy can be strategically implemented using the following protocol:

- Thorough and adequate nutrition education for public awareness;
- Genetic risk identification and testing;
- Specific meal plans for the genetically at risk;
- Training the trainers;
- Inculcating physical exercise into our lifestyle. This can be achieved by;
- attaching satisfactory performance in sports to all benefits,
- upgrading sport facilities in existing stadia and building new ones,
- enforcing the building of sport facilities in housing and industrial estates, commercial centers, shopping malls, schools, e.t.c.

FRAMEWORK FOR POLICY IMPLEMENTATION

This framework emphasizes the roles of self efficacy and suitable motivating factors in achieving health behavioural change based on social cognitive theory (Figure 2)

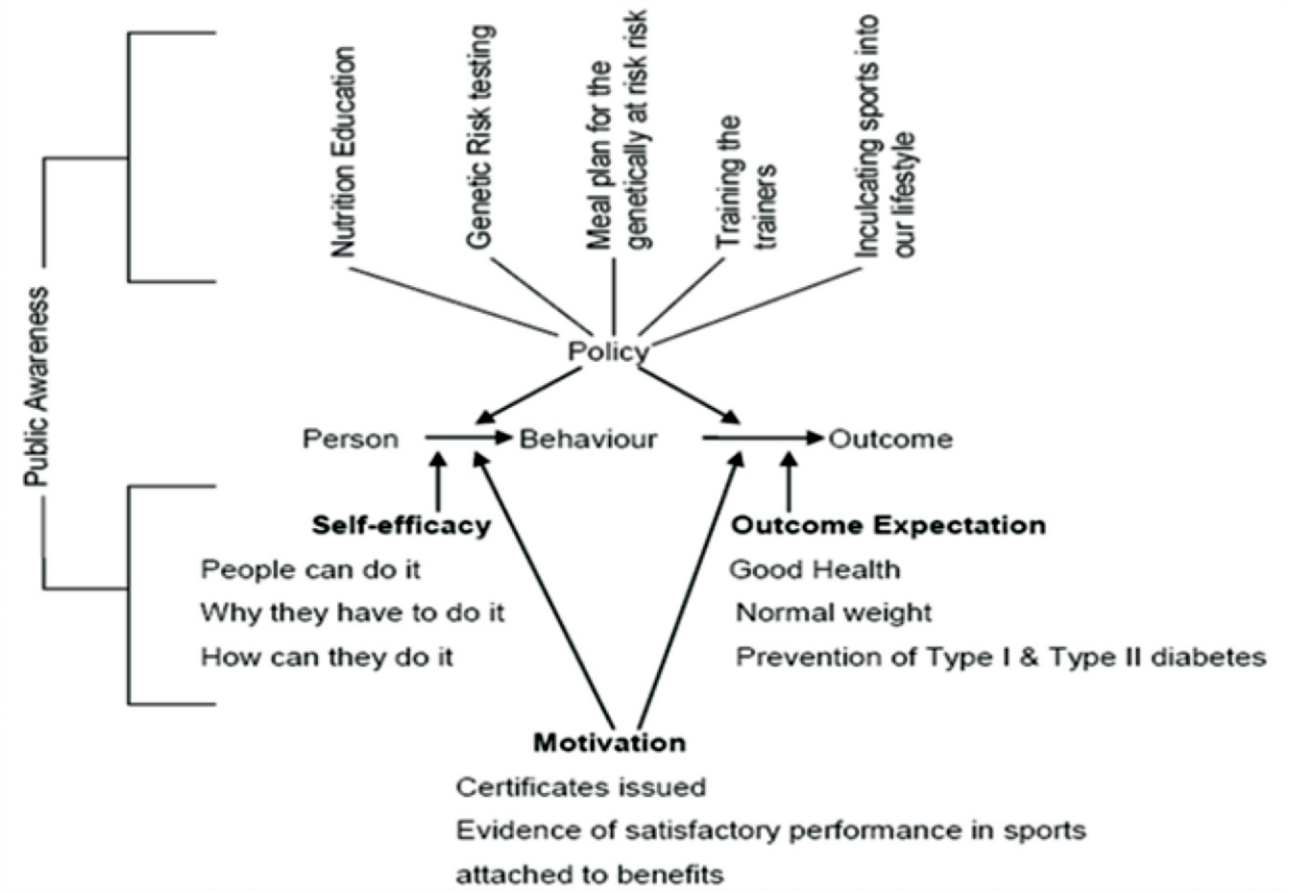

Figure 2: Conceptual framework for health behaviour change based on social cognitive theory as used by Strecher et al., 1986

The policy implementation, if properly strategized, would effect a health behavioural change in the populace thus building a strong, virile, healthy and diabetes-free nation for the realization of Vision 20-2020 in Nigeriaand all-round sustainable development worldwide.

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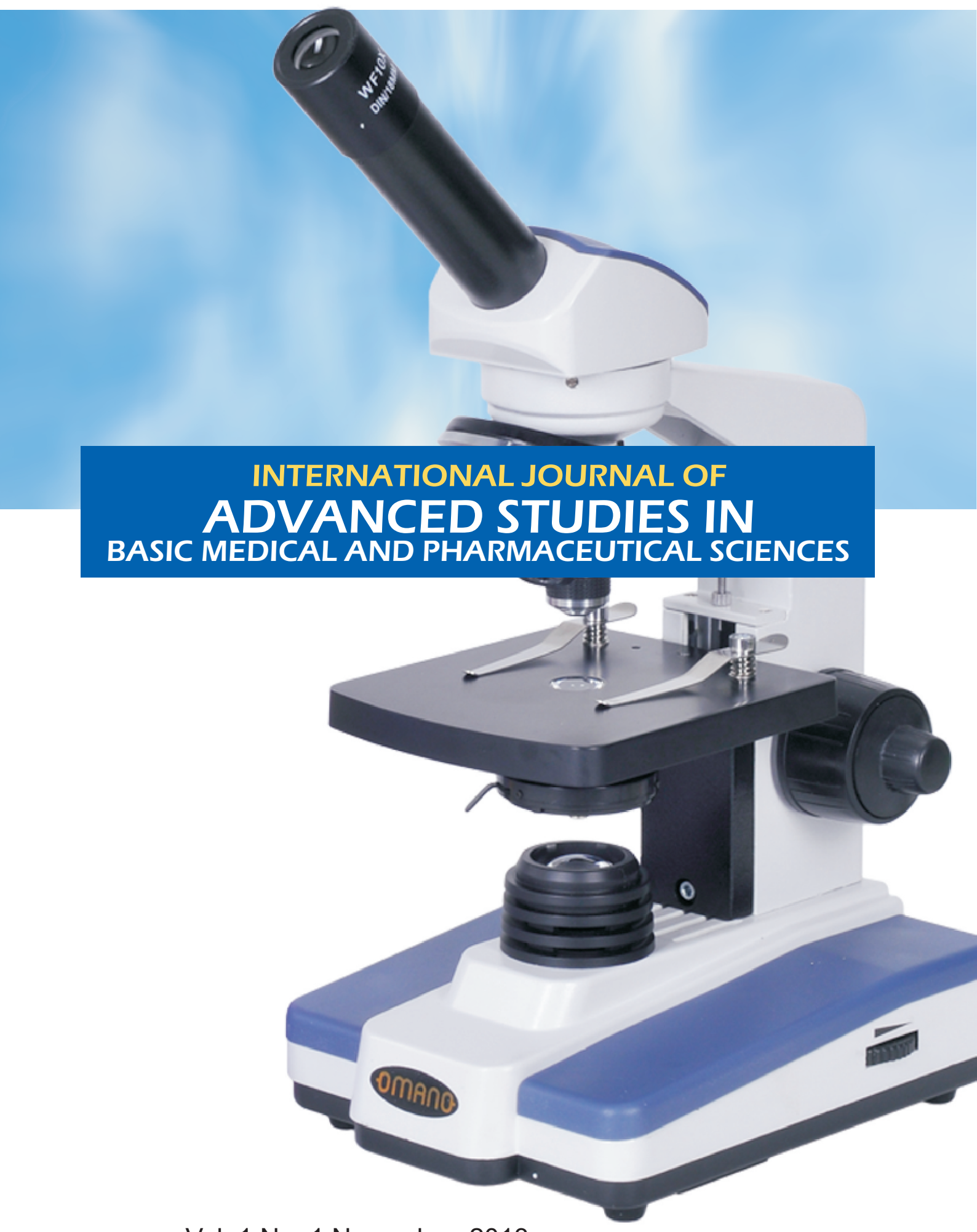

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A STUDY ON THE PREVALENCE OF BURN INJURIES AMONG PATIENTS ADMITTED IN NATIONAL ORTHOPAEDIC HOSPITAL ENUGU, FROM JANUARY 2008 TO DECEMBER 2009

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ABSTRACT
Burn injuries are among the most devastating injuries seen in the emergency unit, ranging from minor to lethal injury. It has been observed as a worldwide problem. The low socioeconomic level of most inhabitants of developing countries, like Nigeria, makes it a devastating injury not only to the patients, but also to overburdened dependents. The knowledge of the prevalence of burn injuries will equip and guide the policy makers and other researchers in planning of preventive programs in this area. Burns occurs when the skin is exposed to excessive heat. Agent-Host-Environment model was as part of the theoretical framework. The agent represents the various causes of burn injuries, the host is the person(s) who may be susceptible to burn injuries, and the host factor is influenced by age, sex, lifestyle and many others. This study is therefore a two years retrospective review of all the patients who presented with acute burn injuries from January 2008 to December 2009. The instrument for data collection was a proforma, which was drawn in line with the objectives of the study. Patients' folders obtained from the medical records department of the hospital were the sources of information. The information obtained includes age, sex, and month of injury, causes and prognosis of the burn injury. A total of 101 patients with burn injuries of various causes were studied. Males were 38.6% while females were 61.1% (ratio, 1:1.5). Flame was the single most common cause of burn injury (60.4%), while hot water was less frequent (25.7%). Majority of burn injuries occurred in the months of January and May (14.9% and 15.8%) respectively. The incidence of burn injury was highest among people within the age group of 0 to 10 years (38.6%). The mortality was 23.8% which is still significant. The researchers therefore suggested a well targeted prevention campaign program to reduce the high incidence and mortality, as most burn injuries are preventable.

KEY WORDS: Prevalence: *the number of cases of a disease existing in a giving population at a specific period of time.*
Burns: *this occurs when the skin is exposed to excessive heat.*
Burns injury: *This is a tissue damage caused by the transfer of heat from a heat source to the tissues of the body.*
Prognosis: *an assessment of the outcome or future course of a patient's disease.*
Mortality: *the incidence of death in a population in a given period.*

INTRODUCTION

Background to the Study:

Burn injuries are among the most devastating injuries seen in the emergency unit. Excluding road traffic accidents, they are the most common cause of accidental deaths in both the developed and developing countries. It is obvious that the past few decades have seen many changes in burn care, aimed at decreasing patients' morbidity and mortality. The depth of the injury relates to the temperature of the source, and the duration of contact (Smeltzer & Bare 2004).

The establishment of improved resuscitation, specialized burn care centers, early surgery, and nutritional support and replacement techniques has decreased morbidity and mortality (Muller, Peg, & Rule, 2001). The cost of managing these injuries are high and most developing countries including Nigeria, cannot afford the high cost of providing modern burn care facilities (Olaitan, & Olaitan, 2005).

Burn often results in severe deformities, disabilities and adverse psychological reactions which affect patients and their relations. There have been cases where people were literally burnt to death in their houses, cars and offices, leaving the family of the deceased battered and shattered. This is because the greater percentages of the population have no or inconsistent electricity supply, thereby compelling people to use glowing fire in the night. Examples include: the use of firewood for cooking, using candle light for illumination in the night, use of kerosene lantern which are sometimes left on while sleeping, poor electrical wires and appliances, and many others.

The prevalence/epidemiology of burn injury varies from one part of the world to another and even in the same environment over a time period. It is a function of civilization, industrialization, culture and societal stability (Olaitan & Olaitan, 2005).

The emphasis of this study will be on people who have experienced various types of burn injury, and this have led to their presenting at the Regional Burn Center, National Orthopaedic hospital, Enugu State, Nigeria, for proper management and prevention of complication(s).

Statement of the Problem

Burn injuries are among the common causes of mortality and morbidity in Nigeria (Dongo, Irekpita, Osegbale, Ogbbebor, & Onuminya, 2009).They have now assumed alarming level with a recurrent state of gasoline explosions from gasoline used for cooking in homes, people pouring strong acids and bases on each other. The harsh economic situations, absence of gainful employment, coupled with greed have contributed to increasing the rate of this incidence. According to Nnabuko, R., Ogbonnaya, Otene., Ogbonna, Amanari, & Opara, 2007; the low socioeconomic level of most inhabitants of developing countries, like Nigeria makes it a devastating injury not only to the patients, but also to overburdened dependents. Where such a man is the breadwinner, the entire family members suffer. The personal tragedies involved in serious burning accidents need no elaboration. The cost to the community is high, no scale of value

can measure the immense suffering endured by patients with extensive burns: prolonged periods during which painful dressings have to be done every second day, blood transfusions accepted, hundreds of litres of high protein feeds swallowed, and extensive surgical procedures undertaken; and often at the end of the illness, the prospects of further long programs of plastic surgery to minimize the disability and disfigurement.

The management of burns remains a challenge in developing countries, like Nigeria. Few data exist to document the extent of the problem. Thus, the need for a study that will provide data, by documenting the prevalence of burn injury, and ascertaining the outcome of the management.

Purpose of the Study

To determine the prevalence of burn injuries among patients admitted in the eastern regional burn centre, National Orthopaedic Hospital Enugu (NOHE), between January, 2008 and December, 2009.

The specific objectives of this study are to:

- Find out the prevalence of burn injury in this centre
- Find out the extent to which gender affects the prevalence of burns.
- Find out the extent to which age affects the prevalence of burns.
- Determine the prevalent causes of burns in this centre.
- Find out which month has the highest prevalence of burn injuries.
- Determine the prognosis of burn injuries in this centre

Significance of the Study

The knowledge of the prevalence of burn injury in this study area will equip and guide the health workers, policy makers and other researchers in the planning of management and preventive programs in this study area.

Every community is encouraged to study the epidemiology of burns, since this problem varies from community to community and even in the same environment over a period of time.

Scope of the Study

This study is delimited to patients who have presented with burn injuries, in National Orthopaedic Hospital Enugu (NOHE), between January, 2008 and December, 2009. Moderator variables such as gender, age, causes of burns, months and prognosis will be covered in this study too.

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METHODOLOGY

This is a two years retrospective study, aimed at determining the prevalence of burn injuries among patients admitted in the eastern regional burn centre, National Orthopaedic Hospital Enugu (NOHE), between January, 2008 and December, 2009. The sources of information were the patients' folders from medical records department of the hospital. The researchers maintained confidentiality in their data collection by not collecting the patients' names and folder numbers.

A total of one hundred and one (101) patients were used as these presented with burn injuries in the study centre within the above stated study period.

Sample and Sampling Technique

Purposive sampling technique was adopted for this study. This implies that only the subjects that presented with burn injuries within the above stated study period were chosen for the study. This agrees with the writings of Polit, Beck & Hungler, 2001, that in purposive sampling technique, the researcher chose subjects that are judged to be typical of the population in question. Thus, the sample population still remains one hundred and one (101) patients.

Instrument for Data collection

The instrument for data collection was a proforma, which was drawn in line with the objectives of the study. It was constructed under the following subunits: prevalence according to age, sex, causes, months and prognosis of burn injuries. The proforma was presented to a validator to vet for face and content validation. Corrections were made based on the recommendations of the validator.

ANALYSIS AND PRESENTATION OF DATA

The data collected were, analyzed in accordance with the research questions. The statistical tools used for the presentation were percentages and frequency tables.bar charts and pie charts.

Research question 1

What is the prevalence of burn injury in this centre between January, 2008 and December, 2009?

Table 1; shows the prevalence of burn injuries.

N=101

Year	Total admissions in the hospital	Percentage (%)	Admissions due to burns Percentage (%)
January to December (2008)	29,792	52.0	42 0.1
January to December (2009)	27,557	48.0	59 0.2
	57,346	100	101 0.3

Result: The prevalence of burn injuries from January 2008 to December 2009 was 0.3%

Research Question 2:

To what extent does gender affect the prevalence of burns?
Table 2 shows the prevalence according to sex

Year	Males cumulative %	percentages %	females	percentages %
January to December (2008)	16 41.5	15.8	26	25.7
January to December (2009)	23 58.2	22.8	36	35.4
	39 100	38.6	62	61.1

Result: the prevalence of burn injuries was higher among females (61.1%) than males (38.6%)

Research Question 3:

To what extent does age affect the prevalence of burns?
Figure 1 shows the prevalence according to age

Result: The figure above shows that children within the ages 0 to10 years had the highest prevalence (38.6%), followed by patients within 21 to 30 years of age (18.8%).

Research Question 4:

What are the prevalent causes of burns in this centre?
Figure2 shows the prevalent causes of burns in this centre.

Result: The figure above shows that flame was the commonest cause of injuries in 61 (60.4%) patients. Hot water was the cause of burn injuries in 26 (25.7%) patients, while chemical caused burn injuries in 2 (1.9% patients). Hot oil and electricity however accounted for burn injuries in 6 (5.9%) patients each.

Research Question 5

Which month has the highest prevalence of burns?
Table 3 shows the prevalence of burn injuries in different months.

Month	2008 Percentage January to December	2009 January to December	Total (%)
January	3 14.9	12	15
February	6 10.9	5	11
March	2 10.9	9	11
April	2 9.9	8	10
May	7 15.8	9	16
June	2 7.9	6	8
July	4 8.9	5	9
August	3 5.0	2	5
September	5 5.9	1	6
October	3 3.0	-	3
November	4 5.0	1	5
December	1 2.0	1	2
	42 100	59	101

Result: Table 5 above shows that the prevalence of burn injuries was highest between the months of January and may. The prevalence in May was 15.8% while that of January was 1.49%

Research Question 6:
What is the prognosis of burn injuries in National Orthopaedic Hospital Enugu (NOHE), between January, 2008 and December, 2009?
Figure 3 shows the prognosis of burn injuries.

Result: Figure 3 above shows that 5% of the patients had a good prognosis, since their wounds were completely healed.53.5% of the patients were to continue visiting the clinic for wound dressing, as their wounds are yet to be completely healed.13.9% of the patients had contractures and other complications of burn wound, such as: keloid ,scar formation, hypertrophies and deformities. 3% of the patients had wound infection, while the outcome was fatal in 23.8% of the patients.

Discussion of Findings
The major findings from the study were discussed with respect to the specific objectives set for the study, and in relation to findings from previous related studies.

Objective 1 was to find out the prevalence of burn injuries in National Orthopaedic Hospital Enugu (NOHE). The analysis of the data revealed that out of the 29,792 patients admitted for various disease conditions in 2008, 42 (0.1%) of them had burn injuries while in 2009, 59 (0.2%) out of 27,554 patients admitted for various disease conditions had burn injury. Thus, the prevalence of burn injury in this centre was 0.3%. This result disagrees with the findings of the research conducted by Asquo, Ekpo, Ngim, & Agbor, (2007) at Calabar. He reported that the prevalence of burn injuries in the area of study was 3.7%. However, this result indicates that the number of burn injuries in 2009 was more than that of 2008, this implies that there is an increase in the number of people who suffer from burns each year, and everybody in the society is at risk of burn injuries and so health professionals, especially nurses, in various rural and urban areas should arise and make the society aware of the burn prevention tips based on the prevalent causes of burn injuries in this area. This can be achieved through health education and the media.

Objective 11 was to find out the extent to which gender affects the prevalence of burns. The analysis of the data revealed that a total of 39 (38.6%) males were admitted for the treatment of burn injuries in National Orthopaedic Hospital Enugu between January, 2008 to December, 2009; while a total of 62 (61.1%) females were admitted in NOHE for the treatment of burn injuries, within the same period. This reveals that the prevalence of burn injuries was higher among females. The reason for these findings can be explained by the findings in

objective iv which reveals that the most prevalent cause of burn injuries was flame, as a result of kerosene explosion during cooking. Also based on the findings of Attia, Sherif, Mandil, massoud, Abou-Nazel, & Arafa, (1997), most burn cases occurred in the home, and there seems to be a greater female population. This contradicts the findings of Dongo et al (2007), who in their five year review of burn injuries in Irrua Specialist Teaching Hospital, Irrua, Edo State, Nigeria, reported that the male to female ratio of the patients admitted for burn injuries was 2.1:1, thereby, stating that the prevalence of burn injuries is higher among the males than females.

Objective 111 was to find out the extent to which age affects the prevalence of burn injuries. The analysis of the data revealed that the highest prevalence of burns for both males and females was within the ages of 0 to 10 years (38.6%), followed by patients within 21 to 30 years of age (18.8%). This result revealed that the incidence of paediatric burns seems to be on the increase in this society as a result of the carelessness of mothers and nannies towards the safety of children. This can be due to scalds from hot water meant for beverages or bath which was kept awaiting mixing with cold water. It can also result from children bumping into adults carrying hot fluids or flames from candle light. This agrees with the findings of Sowemimo, O (1982), who in his eight-year stud on burn injuries among patients admitted in Lagos University Teaching Hospital, Lagos reported that fifty percent of cases (56.2%) occurred in children below 15 years of age.

Objective IV was to determine the prevalent causes of burns. The analysis of the data revealed that flame was the commonest cause of burn injuries seen in 61 (60.4%) patients. The flame was mostly as a result of kerosene explosion in which the greatest number of accidents occurred when patients were attempting a lighted lantern or kerosene stove, thus more females were affected than males. Also, the period of escalation concided with periods of fuel scarcity. together with increased storage and transportation of petrol, and seasons with higher rate of pipeline vandalization. Hot water was the cause of burns in 26 (25.7%) patients. This accounts for the increase in the number of paediatric burns. Hot oil and electricity accounted for burn injuries in 6 (5.9%) patients; while 2 (1.9%) of the burn cases were caused by chemicals. This concurs with the findings of Asquo et al. (2009), who in their retrospective study of burn trauma in adults at the university of Calabar teaching hospital, reported that flame was the commonest cause of injury, and was seen in 48 (81.3%) patients.

Objective V was to find out the month that has the highest prevalence of burn injuries. The analysis of the data reveals that the incidence of burn was highest between the months of January and May. The prevalence in May was 15.8%, while that of January was 14.9%. This can be as a result of the fall in temperature of the environment which occurs in the temperate regions, as the dry season intensifies and then abates to usher in the rainy season. May is the middle of rainy season in the Southern part of Nigeria. During this period people tend to use

various means to restore their normal body temperature and feel warmth, thus, exposing themselves to the risk of burn injuries. This contradicts the findings of Dongo et al. (2007), who reported that over 40% of burn injuries occurred between November and January.

Objective VI was to determine the prognosis of burn injuries. The data analysis reveals that 5.9% of the patients had their wounds completely healed. While 53.5% of the patients were to continue visiting the clinic for wound dressing.13.9% of the patients had contractures and other complications of burn wound, such as keloid, scar formation, hypertrophies and deformities. 3% of the patients had wound infection, while the outcome was fatal in 23.8% of the patients. This contradicts the findings of Asquo et al. (2009), who reported that morbidity included burn wound infection in 13 (22%) patients ,contractures in 6 (10.2%) of patients and death in 15 (25.4%) patients. This result shows that mortality due to burn injury has remained high in this environment; thereby reducing the workforce and productivity of the society and nation. Thus, the need for the government to embark on a well targeted prevention campaign program to reduce this burn mortality rate in this environment.

RECOMMENDATIONS

Based on the result of the study;

- Nurses should include burn prevention tips as one of the topics for health education. This will promote the awareness of people about behaviours and practices that expose a person to the danger of burns.

- Cooking above floor level and closer supervision of children so as to reduce the incidence of domestic burns.

- Strict factory inspection, with religious enforcement of industrial safety laws, so as to reduce the incidence of burns in the working population.

- The government should embark on a well targeted prevention campaign program to reduce the high incidence and mortality in this area.
- The government should put restrictions on sales of chemicals, so as to reduce the incidence of chemical burns.

- Teachers in primary, secondary and tertiary institutions should include burn prevention tips in their curriculum.

- The government should establish well equipped burn centres in every community, so as to reduce the stress and risk of transporting a burn patient to a far distance for expert management.

- More nurses should be trained as burns and plastic nurses, so as to be able to care for the increased number of burn patients.

SUMMARY

The aim of this study was to find out the prevalence of burn injuries among patients admitted in National Orthopaedic Hospital Enugu, from January 2008 to December 2009. The study revealed that the prevalence of burn injury was high in this environment; flame was the commonest cause of burn injuries, the highest prevalence of burns for both males and females was within the ages of 0 to 10 years (38.6%), and that females are more predisposed to the prevalent causes of burn injuries than males.

Limitations were identified as the far distance of the area of study from the researcher. Recommendations were made on the need for promoting the awareness of the public about burn prevention strategies, establishment of more burn centres in every community, training of more nurses on the management of burn patients and the government putting restrictions on the sales of chemicals. Finally, some suggestions were made for further studies.

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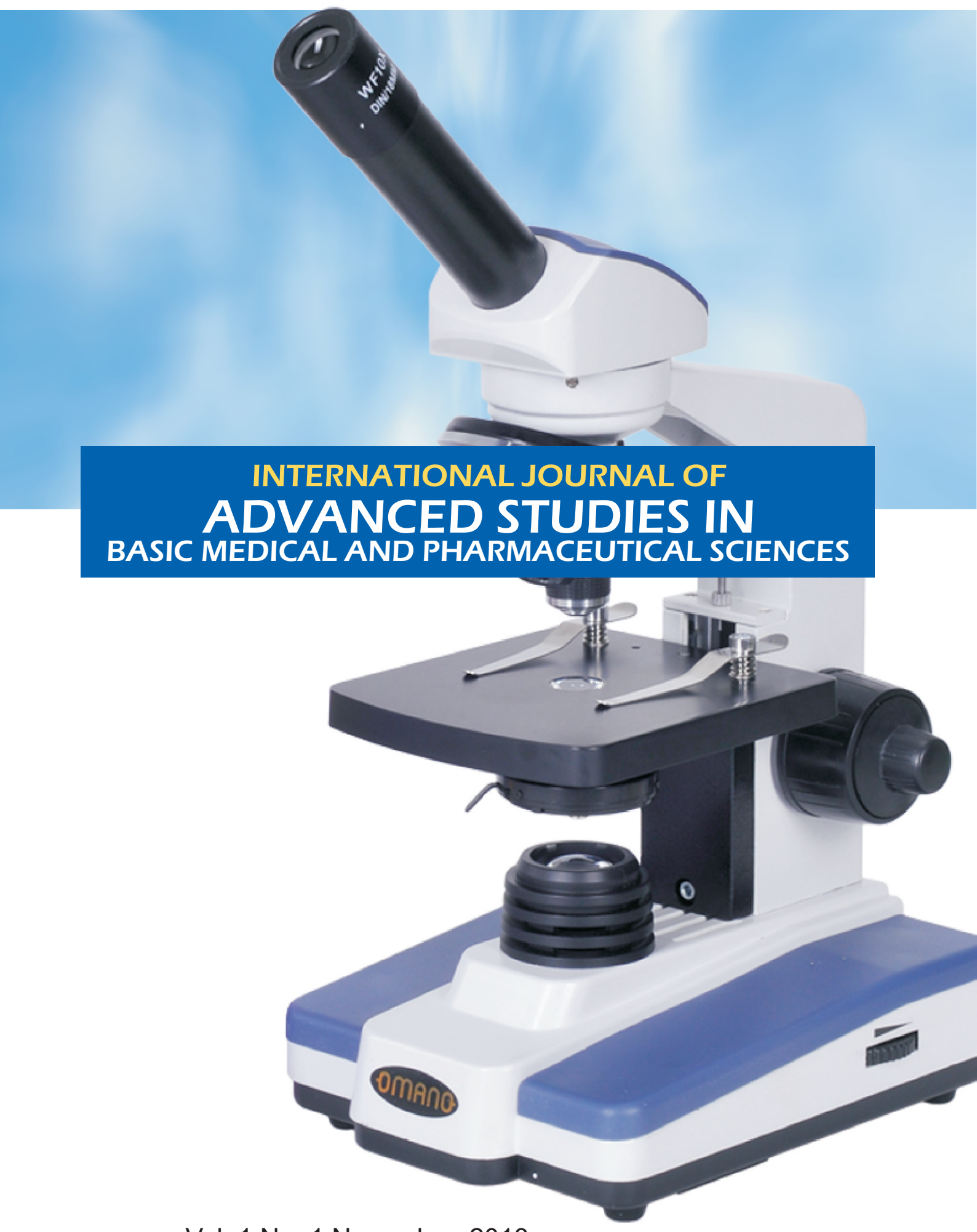

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TRENDS AND PROSPECTS ON THE CURE OF MALARIA

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Abstract

Malaria kills a child somewhere in the world every minute. It infects approximately 219 million people each year (range 154 – 289 million), with an estimated 660,00 deaths, mostly children in Africa. Ninety per cent of malaria deaths occur in Africa, where malaria accounts for about one in six of all childhood deaths. The disease also contributes greatly to anaemia among children — a major cause of poor growth and development. Malaria infection during pregnancy is associated with severe anaemia and other illness in the mother and contributes to low birth weight among newborn infants — one of the leading risk factors for infant mortality and sub-optimal growth and development. Malaria has serious economic impacts in Africa, slowing economic growth and development and perpetuating the vicious cycle of poverty. Malaria is truly a disease of poverty — afflicting primarily the poor who tend to live in malaria-prone rural areas in poorly-constructed dwellings that offer few, if any, barriers against mosquitoes.

Introduction

Malaria is both preventable and treatable, and effective preventive and curative tools have been developed. Sleeping under insecticide treated nets can reduce overall child mortality by 20 per cent. There is evidence that ITNs, when consistently and correctly used, can save six child lives per year for every one thousand children sleeping under them.

Prompt access to effective treatment can further reduce deaths. Intermittent preventive treatment of malaria during pregnancy can significantly reduce the proportion of low birth weight infants and maternal anaemia.

Unfortunately, many children, especially in Africa, continue to die from malaria as they do not sleep under insecticide-treated nets and are unable to access life-saving treatment within 24 hours of onset of symptoms. Due to the efforts of many partners and a focus on sustaining funding, from 2000 to 2010, the proportion of children sleeping under an ITN in sub-Saharan Africa grew from 2 per cent to 39 percent.

Increasing resistance of the malaria parasite to chloroquine and sulphadoxine-pyrimethamine — previously the most widely used antimalarial treatments — has prompted seventy-nine countries and territories (as of 2011) to change their national treatment protocols to incorporate the highly-effective artemisinin-based combination therapies or ACTs.

There is increasing evidence that where they occur together, malaria and HIV infections interact. Malaria worsens HIV by increasing viral load in adults and pregnant women; possibly accelerating progression to AIDS; and potentially increasing the risk of HIV transmission between adults, and between a mother and her child. In adults with low CD4 cell counts and pregnant women, HIV infection appears to make malaria worse.

However great progress has been made in the past decade, it is estimated that over the period 2000-2010, increased advocacy and financing allowed malaria endemic countries to reduce the estimated global malaria mortality rate by over a quarter (25%).

Goals

In accordance with the Millennium Development Goals, the Global Malaria Action Plan (GMAP) from Roll Back Malaria , the goals contained in the outcome document of the UN Special Session on Children: "A World Fit for Children," A Promise Renewed and the universal coverage goal targets voiced by the UN Secretary General in 2008, UNICEF aims to help ensure that:

By 2015:

> malaria morbidity and mortality are reduced by 75 per cent in comparison with 2005, not only by national aggregate but particularly among the poorest groups across all affected countries;

malaria-related Millennium Development Goals are achieved, not only by national aggregate but also among the poorest groups, across all affected countries;

universal and equitable coverage with effective interventions.

How does UNICEF Help?

UNICEF is a founding partner, with the World Health Organization (WHO), the United Nations Development Programme (UNDP), and the World Bank of the Roll Back Malaria (RBM) initiative, a global partnership established in 1998 to catalyze support for malaria control and elimination, and to rally partners around a common plan of action to fight the disease. One of the keys goals of the 2011 revision of the GMAP was to reduce global malaria deaths to near zero by the end of 2015.

In recognition of its role as the third biggest killer of children in Africa, malaria prevention and control interventions form an integral component of a minimum package of UNICEF's high impact maternal and child survival interventions. Integrated programming of this kind utilizes existing systems with relatively high utilization by target groups, including the Expanded Program on Immunization (EPI), Integrated Management of Neonatal and Childhood Illness (IMNCI), child health days for children under five and ante-natal care (ANC) for pregnant women. UNICEF is also focused on scaling-up integrated Community Case Management (iCCM) which targets pneumonia and diarrhea, and in some instances also malnutrition. UNICEF also supports countries to implement at scale including through support to rapid signature of Global Fund to fight AIDs, TB and Malaria grants, technical and implementation support especially in the areas of monitoring and evaluation, procurement and supply chain management, behaviour change communication, health systems strengthening and long-lasting insecticide treated nets (LLIN) distribution to ensure effective implementation.

Insecticide-Treated Nets (ITNs)

From 2008 to 2012, UNICEF procured over 120 million nets and provided support to over 30 countries.

Major recent efforts to scale-up the availability of ITNs in Africa are yielding impressive results. By 2011, 110 countries worldwide had adopted the policy to provide nets to all persons at risk of malaria – " universal coverage", of which 89 have policy of distributing them free of charge to the end user. According to the latest available data, 53% of all households in sub-Saharan Africa own at least one bed net, and 90% of all people who have access to a net use it. AS of 2012, it is estimated that 33% of the population at risk and 41% of children under five, were sleeping under a net in SSA. However variability across Africa is quite high and ranges from as low as less than 30% in some countries to more than 80% in others (based on surveys available in 2012).

Together with its partners, UNICEF distributes ITNs, especially Long Lasting Insecticide Treated Nets (LLINs) using routine health services – particularly at Ante-Natal Care (ANC) and expanded programme on immunization (EPI) contact points - and through mass campaigns – both stand-alone and integrated with other child survival interventions. UNICEF works with Ministries of Health, non-governmental organizations (NGOs) as well as community and village health workers to develop local distribution systems and ensure nets reach their targeted beneficiaries.

UNICEF is also focusing its efforts on scaling-up behavior change communication to ensure that nets are being used effectively each and every night.

Effective malaria case management

Waiting even six hours for treatment can mean life or death to a child sick with malaria. Through integrated child survival programming, UNICEF supports national governments and partners for treatment of malaria with the new and highly effective ACTs through health facilities, and at community level. UNICEF works with governments and communities to improve and promote prompt and effective malaria case management, and to ensure that children have access to medications within 24 hours of the onset of illness.

In 2010, WHO started recommending use of diagnostic testing to confirm malaria infection in all ages groups and apply appropriate treatment based on the results. According to the new guidelines, treatment based solely on clinical diagnosis should only be considered when a parasitological diagnosis - either a rapid diagnostic test (RDT) or microscopy - is not accessible.

In addition to supporting communities directly through distributions and training of practitioners (both at health facility and community level) in appropriate case management, UNICEF also supports countries to access effective anti-malarial medications and diagnostics of assured quality.

UNICEF is supporting the scale up of integrated community-based management (iCCM) of malaria, pneumonia and diarrhea. This integrated package of interventions provides (in any range of combinations): malaria rapid diagnostic test to determine if children are infected with the malaria parasite, timers to check for rapid breathing to determine if the child has pneumonia, treatment for diarrhea, as well as anti-malarials and therapeutic foods to address any underlying malnourishment. Implementation of this package is being supported in over 20 countries to extend the reach of malaria diagnosis and treatment. UNICEF also provides emergency support especially in humanitarian contexts. In 2012, UNICEF supported humanitarian needs and quick response to potential malaria outbreaks in the Sahel and Horn of Africa regions.

Large scale use of RDTs is improving surveillance and providing new information on changing epidemiology of malaria which contributed to updating and fine-tuning future implementation plans to ensure they are better targeted and more cost-effective. By the end of 2012, UNICEF had procured about 25 million ACT treatments for 28 countries. UNICEF also procured 18 million malaria RDTS in 30 countries in seven regions over the course of the last year. However the proportion of children in SSA who receive an ACT is still variable and in many cases too low (range less than 7% to above 90% in a few countries.

Preventive Chemoprophylaxis

UNICEF is also contributing to the scale-up of Intermittent Preventive Treatment during pregnancy (IPTp) this involves providing pregnant women with at least two doses of an anti-malarial drug, currently sulphadoxine-pyrimethamine (SP), at each scheduled antenatal visit after the first trimester, whether they show symptoms of infection with malaria or not. Such preventive treatment has been shown to substantially reduce the risk of anaemia in the mother and low birth weight in the newborn. UNICEF is supporting the scale-up of IPTp through the procurement of SP and training of providers.

In 2012, there was the introduction of new guidance and recommendations on Seasonal Malaria chemoprophylaxis (SMC) which is recommended for areas of highly seasonal malaria transmission such as in the Sahel. UNICEF contributed to the elaboration of the guidance and has already begun to integrate financing and programming towards scaling-up this highly effective intervention.

Research shows that intermittent preventive treatment for infants (IPTi) may be effective in reducing anaemia and clinical malaria in young children. UNICEF is a member of the IPTi Consortium, which is currently concluding research into the feasibility of introducing this additional intervention in Africa.

Malaria and HIV

UNICEF and partners support improved communication on the increased risks from malaria in people with HIV and the need for intensified prevention and treatment, including provision of ITNs through routine services to people living with HIV, especially pregnant women. Recent evidence suggests that co-trimoxazole prophylaxis for all people with HIV as part of a Basic Care Package and alongside ITNs has the potential to reduce mortality and morbidity and to delay the need for anti-retroviral therapy.

Malaria and Nutrition

Undernutrition contributes to a third of all child deaths in developing countries, and can result in stunted growth which causes irreversible damage to a child's development. Lessons learned from the field show that, in order to have maximal

impact on lives saved, it is essential to integrate the nutritional response with other major causes of mortality in the i.e. Diarrhea (through wash package essentially) and malaria (at a minimum).

Severe malnutrition puts children at greater risk for malaria due to reduced immunity. In addition, being infected with the malaria parasite can rapidly push children into dehydration and malnourishment as the anemia caused by the hemolysis quickly depletes children's nutritional reserves. Children are therefore far more likely to die if they are already malnourished and come into contact with the malaria parasite, and vice-versa being infected with the malaria parasite can cause children to become malnourished also leading to higher mortality. Reaching out to communities afflicted with severe or chronic malnourishment provides an optimal opportunity to test children to see if they are infected with the parasite and to treat them with effective drugs as quickly as possible. UNICEF is leading the way on scaling-up integrated community case management including in many countries treatment of severe and acute malnourishment. This comprehensive delivery pathway ensures that children have comprehensive access to all the needed medications to avoid mortality.

Monitoring and Evaluation

UNICEF is a recognized leader in monitoring and evaluation of malaria control activities, notably through the collection of key malaria control intervention coverage data through the UNICEF-supported Multiple Indicator Cluster Surveys (MICS), compilation of malaria data in a series of public-access databases that are used for reporting on global goals and commitments (e.g. reporting on MDG and RBM targets) and preparation of high-level reports providing the most up-to-date information on progress in malaria control. UNICEF also supports countries to do post-intervention evaluations such as in supporting Guinea Bissau and DRC to undertake post LLIN campaign surveys. UNICEF is also a leader in implementing and rolling out innovative reporting technologies such as Rapid SMS using cell phones to submit information and data (including malaria) even from hard to reach areas, under names such as SMS for Life in Nigeria, and mTRAC in Uganda.

Health Systems Strengthening

Limited access to utilization of malaria control services still affects millions of children, especially those that live in hard to reach areas with weak or non-existent health systems which is why UNICEF is prioritizing the “equity approach”. By prioritizing support to reach these underserved children, UNICEF is helping to strengthen management of child illnesses including malaria at health facility and community level. One approach being taken by UNICEF malaria programmes is to deploy thousands Community Health Workers (CHWs) who support net distribution, and diagnose and treat malaria cases with RDTs and ACTs and refer

severe malaria cases to health centres and hospitals for more sophisticated care. In addition, the MoRES initiative is also focused on ensuring that programmes actually reach and achieve results for the most deprived children by: improving knowledge on the underserved groups and deprivations patterns; improving inter-sectoral programming by distilling and elucidating key bottlenecks experienced by deprived groups; institutionalizing high quality Monitoring and Evaluation with feedback loops, allowing for quick action, particularly for emergency response; encouraging strong government ownership and leadership and sharpening programming with clearly defined accountabilities for all levels.

Global Partnerships for Malaria Prevention and Control

UNICEF plays a key role in global, regional and country malaria partnerships. UNICEF spends on average $1.8 billion every year on child survival programming, including funding for malaria control. Key partners funding malaria programming through UNICEF include the Global Fund, the US President's Malaria Initiative (PMI), the World Bank, the UN Foundation, the Canadian International Development Assistance (CIDA), the UK Department for International Development (DfID), the Government of Japan and also through UNICEF's national committees.

UNICEF is a founding partner of the Roll Back Malaria partnership and is a key member of the RBM Board. The RBM partnership includes governments of countries affected by the disease, representatives of the private sector, research institutions, non-governmental organisations and others.

UNICEF supports advocacy and partnership efforts by leveraging its own resources and results to ensure that women and children are placed at the centre of national and international development and funding agendas. UNICEF is partners with the Global Fund and WHO to ensure that malaria programmes benefit children and pregnant women, including supporting the procurement of LLINs, antimalarial medicines, specifically ACTs and diagnostics – especially rapid diagnostic tests (mRDTs). UNICEF is also a partner in the US President's Malaria Initiative (PMI), which was established in June 2005 and pledged to increase funding of malaria prevention and treatment by more than $1.2 billion over five years.

UNICEF also continues to work closely with various partners including the UN special envoy for malaria and the African Leaders Malaria Alliance to accelerate country achievement of universal coverage goals. In addition to leveraging millions of dollars for countries, through supporting the preparation and implementation of proposals to the GFATM, the partnership also helps access World Bank Financing through the International Development Assistance grant mechanism. UNICEF is providing considerable support to GFATM processes through: helping countries elucidate their gaps; strategic and business planning; phase II negotiations and defence; and transitional funding planning.

Throughout sub-Saharan Africa, implementing partners at country level include WHO, WFP and international NGOs such as Population Services International and foundations such as the Clinton Foundation. UNICEF also works closely with civil society and local NGOs in country to ensure efficient and equitable delivery.

Remaining Challenges

It is estimated that US $5.1 billion is required annually to achieve universal coverage and fully scale-up malaria interventions around the world. In addition, 150 million new ITNs are needed to maintain protection for all populations at risk in SSA. Programmatic challenges still remain such as ensuring there is sufficient financing for LLINs to be distributed through all channels but especially routine channels such as ANC and EPI which are often overlooked or their nets plundered in favor of the mass campaigns, financing for Child Health Days and iCCM to ensure integrated delivery, looking at innovative mechanisms such as school-based distributions and sufficient financing to recruit malaria focal points. Many malaria-endemic countries are in the process of developing third generation strategic plans from 2010 to 2015, and beyond. There is therefore high demand for technical assistance to support planning and implementation. In addition with the emphasis on achieving and maintaining universal coverage, many countries are undertaking ambitious LLIN distributions and thus require considerable support with regard to supply management, logistics, and behaviour change communication to ensure efficient, equitable distribution and utilization of the nets. Emergency situations such as humanitarian emergencies and malaria epidemic outbreaks also require a high response from UNICEF which is often the first responder. Procurement and supply management is also often a bottleneck and improving infrastructure and national systems to ensure delivery are also being targeted by UNICEF along with counterparts to ensure that plans are realistic and effective. Demand on all levels of UNICEF to provide technical and managerial assistance is quite high and often last-minute.

Looking Forward

UNICEF Country offices in malaria endemic countries are working closely with partners on the ground to “make the money work”. All levels of UNICEF are working together to ensure a complete “continuum of care” from resource mobilization to implementation – ensuring that those most vulnerable to malaria are the beneficiaries of preventive and curative interventions for malaria. In addition, UNICEF will continue to provide support to countries to move towards malaria elimination, wherever possible.

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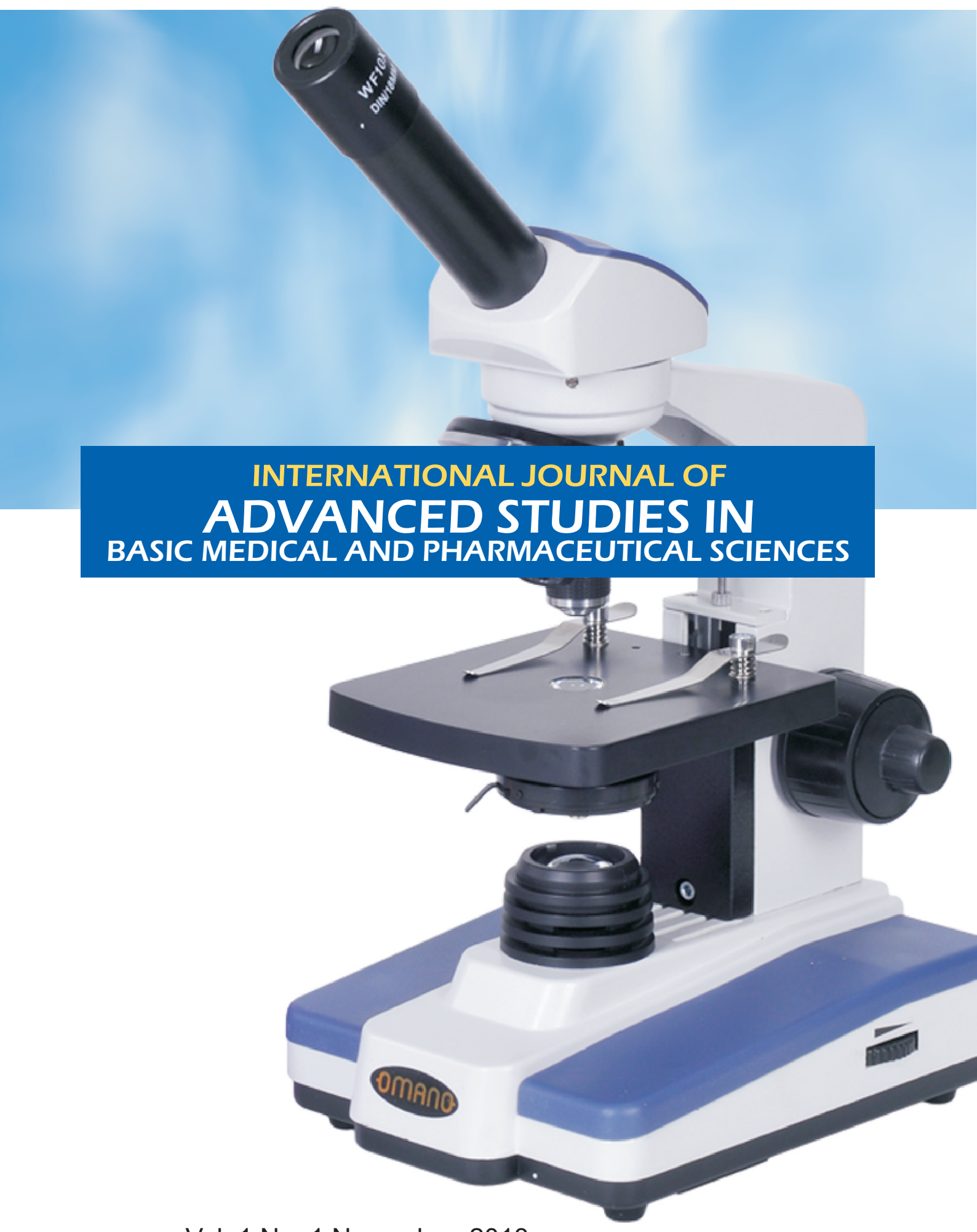

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PERSPECTIVES ON THE ECONOMIC AND SECURITY IMPACTS OF HIV/AIDS IN SUB-SAHARAN AFRICA

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Abstract

The issue of HIV/AIDS in Africa is not as recent as perceived by many rather historical data shows that for about three decades, Africans have battled with HIV/AIDS in various aspects. In the 80's epidemiologists had started to study the disease (Denis 2006) although it was nearly impossible to tell that in many years to come, that 'new' disease would become a challenge to development in Africa. Over the years, the pandemic has threatened the economic and social security of most developing nations especially in Africa. This is explained by existing perspectives captured by this paper. Given this development, the paper highlights the economic and security impacts of this development and further explains the present response systems set in place by governments and international organizations. This paper advocates that much concerted attention is needed to completely save humanity from this rising surge. Publications from national agencies and international organisations forms the secondary source of data used in the study.

Background to the study

The human immunodeficiency virus (HIV) causes acquired immunodeficiency syndrome (AIDS) which was gotten by humans from primates (Whiteside 2008:1). The spread of AIDS became noticeable during the 1970's and was first publicly reported by the Center for Disease Control (CDC) on 5th June 1981. At that time, the only apparent risk group was homosexual men (Chin 2007, Whiteside 2008). Much later, other identifiable groups such as recipients of blood transfusion, intravenous drug users (IDU's) and haemophiliacs were victims of this illness. It was also noticed by 1982 that partners of infected people were also infected. That same year, the name of the illness was coined as well as its acronym (AIDS) and a working definition which perfectly described was given by the CDC. It was said to be an acquired condition which led to a deficiency of the immune system and it was not a single disease rather it was a syndrome (Whiteside 2008, Chin 2007).

International cooperation and sharing of information and specimen across laboratories led to the discovery of the virus in 1983. The *Institut Pasteur* in France made this discovery and named the virus Lymphadenopathy- Associated Virus (LAV), it was renamed HTLV-III in 1984 by the US National Cancer Institute (NCI). The International Committee on Taxonomy of Viruses verified the name: human immunodeficiency virus in 1987. HIV is not the only zoonose that the world has tried to tackle. Other famous examples are: severe acute respiratory syndrome (SARS) which was traced back to civet cats and the bird flu (avian influenza). So far, HIV is the worst of such diseases and has allegedly become the most studied disease in history (Whiteside 2008: 3).

There is no cure for AIDS. It has been over 30 years since the first case of AIDS was publicly reported and the best the world can offer infected people is antiretrovirals (ARV). The other option is prevention which includes: behaviour change, condom use, blood safety and injecting safely (Whiteside 2008:3) and more recently UNAIDS has reported that HIV negative people could reduce their risk of getting infected by up to 73% by taking a daily dose of antiretroviral tablets (2011). HIV is part of a family of viruses called lentiviruses meaning slow to act. The virus attacks CD4 cellsthat would explain the long incubation period of the disease. HIV has mutated into various clades, different clades are predominant in different parts of the world. West and Central Africa has the greatest variety of clades. Mutation could either make the illness more pronounced and easier to transmit or it could make the illness less pronounced and slower to transmit (Whiteside 2008:25), this allows for the possibility of re-infection.

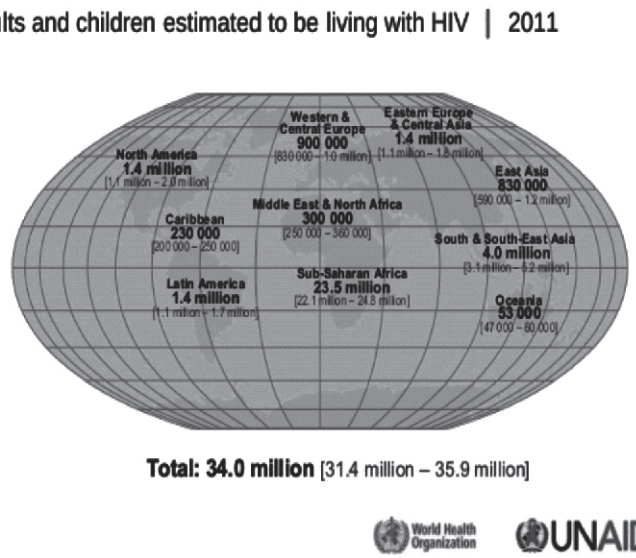
The virus is most commonly transmitted through sexual intercourse which accounts for 75-85% of infections. Mother-to- child transmissions account for up to 25% of infected people although nevirapine could be administered and in cases where it is administered, the percentage goes down to about 8-17% (Whiteside 2008: 29).

Aside from having the most number of people with AIDS in the world, Africa has severally suffered blame when it comes to the origins of AIDS. Chirimuuta and Chirimuuta (1987) argue that while homosexuals were blamed for AIDS as well by the right wing, they had support from the left wing and the liberals but Africans and the black community in general have no such support as only their voices are raised in protest. They are of a radical view as they further argue that the sciences and research involved with HIV/AIDS has been skewed and is racist not scientific. Their views have been supported by some Africans, some of whom are public figures and well respected people in the continent. Nobel Prize winner WangariMaathai and Sam Nujoma the former President of Namibia have aired their beliefs about AIDS being 'concocted' by the West (Flint 2011).

Some researchers and authors refer to HIV/AIDS as an epidemic while some refer to it as a pandemic. I contend that these words are not interchangeable seeing as both words have different meanings. An epidemic refers to a large number of cases of an infectious disease occurring at the same time while a pandemic is an illness or disease that affects the population of a large area. The statistics that will be presented below will clearly show that HIV/AIDS is a pandemic for the simple fact that while it has become burdensome to some countries due to the number of infected people and prevalence rates, other countries simply do not feel the brunt of this disease because they have few cases of HIV/AIDS.HIV/AIDS has impacted on different sectors of development in Africa. In almost all the cases, the impacts have been negative. Perspectives on the economic and security impact of HIV/AIDS form the focus of this.

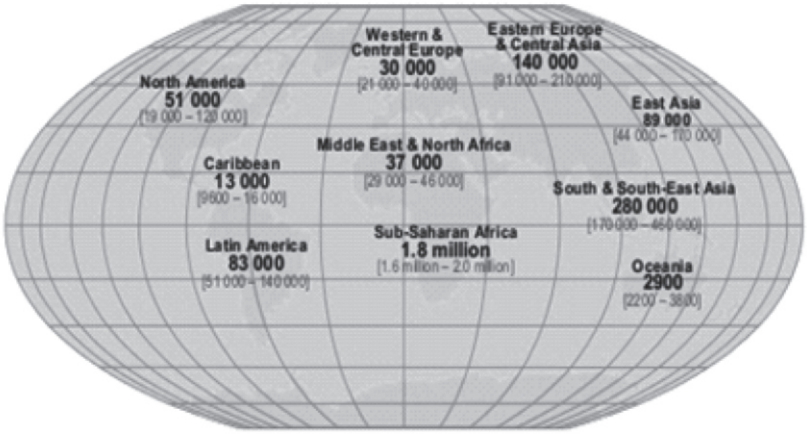
Epidemiology

Presently, 34.0 million people in the world are estimated to be living with HIV/AIDS (UNAIDS 2012a). 69% of these people are living in Sub-Saharan Africa (SSA). This means an estimated 23.5 million people in SSA are living with HIV/AIDS. This explains why it is a pandemic in that part of the world.



Source: UNAIDS 2012

Estimated number of adults and children newly infected with HIV | 2011



Total: 2.5 million [2.2 million – 2.8 million]

Source: UNAIDS 2012

The above map shows that most of the newly infected adults and children are still people in SSA. HIV/AIDS has become an issue of concern for African leaders and the wave of this pandemic in Africa has garnered world attention. World leaders have sat down to discuss this issue over and over again in different capacities. Programs have been planned, policies have been drafted and implemented, Aid has been dispensed, a lot of money has been spent and people have come together just to fight off this deadly disease.

In 2011, 1.7 million people died from AIDS related illnesses. Still, 70% of these deaths occurred in SSA.It is important to note that even in SSA, the prevalence rates differ from country to country. The UNAIDS has reported that in 2011, 5.6 million South African were living with HIV/AIDS followed by 3 million Nigerians living with HIV/AIDS. The report also reflects that, in countries like Senegal, only about 53,000 people are living with HIV/AIDS.

The major mode of transmission of HIV/AIDS in Africa is through heterosexual sex. Other modes of transmission are through: men who have sex with men (MSM), intravenous drug users (IDU).

Methodology and source of data

The statistics on HIV/AIDS and health used in this paper mostly come from UNAIDS, the United States Agency for International Development (USAID), the World Health Organisation (WHO) and the websites of countries used as case studies. In cases where there are discrepancies in data published by international institutions and states, the statistics published by the state overrides. Collecting data on HIV/AIDS is mainly considered by measuring prevalence and incidence. Prevalence refers to the absolute number of people who are infected and the

prevalence rate given in percentages refers to the proportion of a given population(Whiteside 2008). Majority of the statistics on AIDS pick out defined segments of the population: blood donors, most at risk population (MARP), adults between the ages of 15-65, children and ante natal patients. Data on prevalence is gotten by surveys among STI clinic patients, Tuberculosis patients and pregnant women.

Incidence in this context is the term for new infections at a particular period. The incidence rate is measured by a defined unit of a population over a period of time. Because the MARPs vary from state to state and even city to city, measuring incidence is expensive (Whiteside 2008). Perhaps this explains why not all African countries frequently publish and update data on HIV/AIDS in their respective regions.Since this is a library research, conclusions were arrived at by comparing scholarly materials and looking through relevant country materials that were accessible at the time of study.

Perspectives on HIV/AIDS.

There are several perspectives to HIV/AIDS. However, within the scope of this paper, two views will be examined; the economic growth and Security Perspective and the Dissident perspective.

a. **Economic Growth and Security Perspective :**Bloom and Mahal(2007) argued that HIV/AIDS has negative impact on the economy. They maintained that AIDS has a significant effect on growth rate (per capita income). For them, the medical costs of AIDS are higher when compared with the costs of diagnosing and treating other grave illnesses. They rightly mention that when there are mechanisms to spread these costs, the impacts of HIV/AIDS on affected families could be devastating.This negatively affects economic well-being of the people.

   In the work of Russell (2004), the economic costs of illnesses can be further examined from its direct and indirect costs. The direct costs are household expenditure spent on seeking treatment including the non-medical aspects such as transport and special food and indirect costs on the other hand have to do with the loss of labour time (productive labour time by caregivers and patients).

   Also, it has been argued that AIDS has increasingly caused income loss, labour shortage and has given rise to a generation of orphans (Garnett et al 2001).In the long run businesses are bound to collapse because of AIDS due to the high demand for labour (It is assumed that demand will outweigh supply), sickness and death benefits as well as absenteeism. Increase in costs will force companies to move production to a different location.

   This also has a security dimension to it. Security has traditionally been

viewed as involving the military and defence of the state but in modern times, the definition has been extended to accommodate the concept of 'human security' (Fourie and Schonteich 2001). They further argue that the impacts of HIV/AIDS are just as grave as security involves safety for individuals whether in violent or non-violent circumstances.

When dealing with security threats, time and extent are important factors because some threats are 'long run' threats while others are 'short run' threats (Ostergard 2002). His work shows that HIV/AIDS is both a short run threat and long run threat:

i. In the short run, political institutions, the military and its operations are at risk and,

ii. In the long run economic performance and populations are at risk. He mentions that for academics and others who study Africa the answer to whether or not HIV/AIDS constitutes a security threat has an obvious answer however it does raise 'fundamental' questions regarding the nature of security studies (2002).

b. Dissident perspective: The term dissident covers a wide range of opinions (Flint 2011) that contradict the 'mainstream' views. According to Flint, most of the dissidents derive their theories from 'holes' in science with regards to HIV/AIDS and there is the question of whether or not to censor the argument (Flint 2008). Mbeki denied the link between HIV/AIDS consistently and justifiably pointed fingers at pharmaceutical companies from the North (Flint 2011: 69) and the system of inequity they have been part of.

Others like Duesberg have argued that the force behind AIDS is poverty and not sexual looseness, also, that HIV does not cause AIDS (Chin 2007: 3) Duesberg et al (1993:1705) argue that HIV is just an AIDS opportunist and it really cannot be proven otherwise, they further argue that if HIV caused AIDS then there would not be a long incubation period because AIDS would show in the period of primary infection and T cells would drop at that early stage. Celia Farber questioned the use of nevirapine in the prevention of mother- to- child transmission not minding the proven success of the drug; she based a lot of her writings on the errors of science (Moore, Bergman and Wainberg 2007). As Flint point outs, one of the main grey areas surrounding the issue of dissidence is whether or not the right to freedom of speech applies when lives are being lost due to this disease; Also, they keep pointing at the errors in science. Scientific theories should be able to stand up to criticism (Flint 2011).

Roger England has tirelessly voiced the need to reduce spending on HIV/AIDS and channel funds into bed nets, immunisations and family

planning (2007). England has also challenged the 'exceptional' status that HIV/AIDS has been accorded, he is of the view that diabetes has claimed more lives than AIDS has; he further argues that funding for special mother to child transmission programmes are unnecessary as ante natal health care could be strengthened instead (2007, 2008).

Similarly, Malowany (2000) has warned that committing a large part of funds into research for a HIV/AIDS vaccine instead of strengthening health infrastructure in developing countries is a huge mistake. The international community has settled on and encouraged a multi-sectoral response system. Response has to go beyond treatment and care for people who have been infected already; prevention should be a major part of the response to HIV/AIDS (UN Millennium Project 2005).

Economic effects of HIV/AIDS

The pandemic HIV/AIDS has a lot of economic effects on the economy. Some of them are examined below,

1. **HIV/AID has an impact on stock variables**. Stock variables are economic savings that should culminate into investment in the long run. Expenditure on HIV/AIDS affects saving capacities of the household; as money goes towards the costs of treating people who have been infected by HIV/AIDS (Brown 2004).These are mostly medical costs associated with the disease. These medical costs are not limited to the medical bills paid by the infected only; there are also costs borne by the hospitals for example, training and remuneration of medical staff; scientific research as well as spending on relevant infrastructure needed to take care of victims (Courdec&Ventelou 2005).

2. **There is also the issue of poverty trap.** There are several causes of poverty trap some of which are: poor healthcare, environmental degradationand insufficient investment in human capital, inadequate nutrients in food, limited access to financial services among others (Gaffeo, 2003; Russell 2004).

3. **HIV/AIDS has a negative impact on agriculture and agricultural practices.** In SSA women are responsible for farming as they produce between 60- 80 percent of food (Gaffeo, 2003) and research by UNAIDS shows that more women in rural areas have HIV/AIDS when compared with men. This of course affects productivity in agriculture and other related economic activities.

4. **HIV/AIDS affects human capital development.** HIV/AIDS really does affect the future supply of labour and accumulation of human capital not

only because children are forced to drop out of school but because in high prevalence areas teachers have fallen victim to the disease; there is no practical possibility of finding replacements for those who died (Gaffeo, 2003). This affects human capital development in the country.

5. **Finally, HIV/AIDS could be seen as a threat to financial markets and insurance companies**. This is because private health insurance companies have no control over individual sexual behaviour, infected people are likely to buy insurance and this may force the insurance companies to demand higher premiums thereby making insurance only available to the wealthiest people in a society. In many societies in Sub-Saharan Africa, these services are provided by micro-finance institutions, HIV/AIDS diminishes the capacity of clients to settle their debts. This could cause such institutions to fold up (Gaffeo 2003:35). There is also the issue of reduced exports and increased imports. HIV/AIDS could cause lower domestic productivity which reduces exports and this may be catastrophic if strategic sectors are affected; this therefore puts the balance of payment under pressure as well as government budgets (Dixon, McDonald & Roberts 2002). The ultimate outcome of this process will be defaults on debt repayments and assistance from the international community (this is not a new phenomenon for African states).

Health is a means to development and sustainable healthcare is an outcome of good policies in general (Kanji, Kanji and Manji 1991). Since HIV/AIDS has been identified as a health issue (Gavian, Galaty and Kombe 2005) it is important that more concerted effort should be employed to tackle its scourge on the people and economy at large.

Success stories like Senegal and Ivory Coast show that with a coherent strategy HIV/AIDS could be managed. According to Roger England, HIV/AIDS has now become “the emperor's new clothes of public health” (2007). He advocates for health aid to be used in strengthening the health systems in Africa as opposed to spending a large chunk of it on one particular disease (England 2007). Interestingly, while it has been argued that HIV/AIDS puts a strain on the health systems in the developing world, it has also been argued that national spending on HIV/AIDS in present times has further weakened the health systems of developing countries (England 2008). To properly understand England's arguments it is important to identify the enormity of other diseases that affect the region.

According to the 2012 WHO report on Malaria, only 11 SSA countries showed significant decline in Malaria incidence. This is interesting because even Senegal that is a success story for HIV/AIDS has shown limited evidence in malaria decline. Furthermore, the low transmission countries are (South Africa, Namibia, Swaziland, Botswana and Cape Verde). However, 4 of the low transmission

countries have very high HIV/AIDS prevalence rates. Botswana's HIV/AIDS prevalence rate is currently 24.8%, 17.8% in South Africa, 13.1% in Namibia and 25.9% in Swaziland (UNAIDS). What the statistics show ties into England's argument about HIV/AIDS not being a global pandemic and obviously malaria appears to be more of a challenge for certain regions like West Africa. Still, there is no specialized institution dedicated to fighting malaria like the UNAIDS for HIV/AIDS. The closest thing to that is the Roll Back Malaria partnership (RBM). The Stop TB partnership recently published a report that claimed that 'scientific modelling' has shown that the lives of one million PLWHA could be saved if they have access to TB medication and if they are tested for both diseases early (Stop TB Foundation) and the WHO asserts that PLWHA are more likely to get malaria than others.

Security challenges of HIV/AIDS

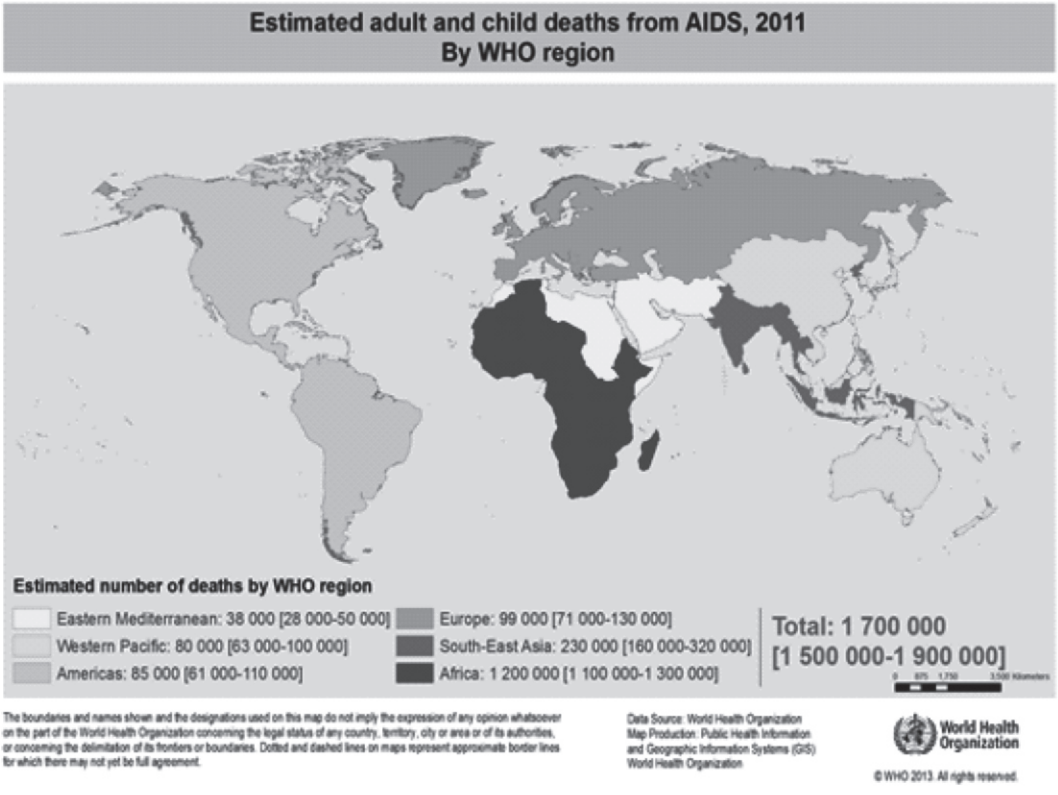
There are continuing debates on the link between HIV/AIDS and security (Mcinnes and Rushton 2010). There are actually links between HIV/AIDS and security but these links are compound, more compound than the world was made to believe and securitising HIV/AIDS has paved way for positive developments many of which do not owe their success to securitisation. Securitising HIV/AIDS included a geo-political motive. It is argued here that the US interest in the region has been engulfed in US engagement in the region and more so, US made Nigeria a target not just for counter- terrorism and energy reasons but as a major location in the 'next wave' of HIV/AIDS (Ingram 2007).

Elbe defines securitisation of HIV/AIDS as a process whereby AIDS is presented as a pressing international security issue which needs immediate measures (2006). Scholars in the economic, development and security fields have been going back and forth on whether or not HIV/AIDS qualifies to be placed in these categories and what the impacts are. The debates on HIV/AIDS have been framed in different ways at different periods in history. In Flint (2011) it is evident that HIV/AIDS was seen as a security issue during the Clinton Administration while the Bush administration saw it as a moral and religious issue (Flint 2011).

HIV/AIDS has attracted international attention as a security threat to humanity. The United Nations Security Council (UNSC) meeting in January 2000 which culminated in the passing of resolution 1308 came right after the CIA reported HIV/AIDS and similar diseases would create complications for US global security over the next two decades (Mcinnes& Rushton 2010, Flint 2011). Before the UNSC passed that resolution, the US government had declared HIV/AIDS (and other diseases like Tuberculosis) a challenge to international health and security; similarly, AIDS was categorised as a 'transnational security threat' by the White House in 1999 (Flint 2011, Mcinnes and Rushton 2010). The Security Council resolution gave HIV/AIDS a high profile and created a sense of urgency in tackling the disease. This move has been scrutinized by some and praised by others.

The concept of human security dates back to the United Nations Development Programme's (UNDP) Human Development Report of 1994 which called for a redirection of resources into development. Specifically, the report stated that human security is not focused on weapons of warfare rather it is concerned with dignity and human life (UNDP 1994). The report showed three key features of human security: Human security is universal in nature, Interdependent in nature because people all around the globe feel the impacts, it is easier to prevent issues pertaining to human security than treating them and lastly, human security is centred around people as it involves choices they make and opportunities they are given (UNDP 1994). According to McRae (2001), the concept of human security refers to 'freedom from fear' and has a lot to do with the quality of human life and he emphasizes that domestic policy is now very much interlocked with international policy.

According to Elbe, securitising HIV/AIDS moves responses away from the civil society to intelligence and military organisations which tends to arch over the liberties of PLWHA; it also encourages states to make HIV/AIDS programs for the military a priority because they are responsible for securing the state although on the other hand 'successful' securitisation of the pandemic could lead to raising the resources required by HIV/AIDS initiatives (2006:120). The theory of securitization does not solve the problem; it raises awareness and provides an avenue for scholars, policy makers and activists to figure out the relationship between HIV/AIDS in a way that minimises the dangers associated with securitisation.



So

Responses to HIV/AIDS and their shortcomings

The response to HIV/AIDS in the 1980's and 1990's by the international community and national governments were generally inadequate (Illiffe 2006) however the response has taken various turns over the years especially because of the threat HIV/AIDS poses to the governments, development and security (Gavian, Galaty and Kombe2005).Most African governments were not strong enough to grasp the magnitude of the problem because as weak regimes they were faced with more imminent and primary problems (Illiffe 2006:65).Senegal was arguably the only country in Africa to prevent a generalised HIV/AIDS situation (Illiffe 2006), this seems valid considering the fact that the current HIV/AIDS prevalence in Senegal is 0.9% (UNAIDS). Many of the HIV/AIDS response initiatives in Africa have been established and backed by the international community.

African states have experienced a significant amount of destabilisation ranging from the slave trade to civil wars (Ronnback 2008, Kaplan 2005). These weaknesses have been reflected in national responses to AIDS, international policies have been drafted and international organisations have sprung up to join the fight against AIDS.In Patterson (2005), It is argued that: the dependence of African states on donors, the fact that African states work with global negotiators who are more powerful, the political and moral dialogue advocated for by the West regarding PLWHA and the link between public health and interdependence has to a large extent shaped the relationship between African states and the international system with regards to HIV/AIDS.

UN RESOLUTIONS

The UN has repeatedly acknowledged the severity of the HIV/AIDS and the need to put a stop to it. Articles 25 and 48(1) of the UN charter stipulate that the UNSC is allowed to adopt resolutions that are binding on member states if they are important in protecting peace and security (Szasz 2002). Long before the Security Council officially recognised HIV/AIDS as a threat, the Economic and Social Council (ECOSOC) of the UN had come up with resolutions that acknowledged the problem caused by HIV/AIDS. In 1993 there was a resolution by ECOSOC on the coordination of UN activities related to HIV/AIDS; the next year, they passed a resolution that called for a joint and co-sponsored UN programme for HIV/AIDS (UNAIDS 1994). The outcome of this resolution was the creation of UNAIDS which became an operational body in 1996 charged with the duty of overseeing the global response to HIV/AIDS (UNAIDS 2006). In 1999 another ECOSOC resolution urging governments, co-sponsors and other donors to intensify their efforts was passed (UNAIDS).

The year 2000 was a special year for the UN and for people involved in the response to HIV/AIDS because the millennium summit gave birth to the MDGs and the sixth goal calls for the halting and reversal of HIV/AIDS by 2015; In the same year the security council securitised HIV/AIDS.

In 2001, there was a special session on HIV/AIDS by the UN general assembly (UNGASS) which led to a declaration of commitments by heads of state on HIV/AIDS. This declaration set out national goals and global efforts to curb the disease. In 2006, members of the UN met to review their efforts towards fighting off HIV/AIDS. This session led to a political declaration on HIV/AIDS which basically was a reaffirmation of the 2001 declaration. The final major declaration on HIV/AIDS took place only 3 months ago. The session was dubbed 'unite for universal access' and marked 30 years since the discovery of AIDS (UNAIDS 2010).

FAITH-BASED ORGANISATIONS

FBOs and CBOs have acted as healthcare providers for PLWHA in WA. In some cases, CBOs and FBOs are one and the same. The severity and complexities associated with prevention and treatment of AIDS has allowed for faith and community leaders to get involved in the AIDS response (Balogun 2010). In Vitillo (2009) it is argued that the non judgmental care for people living with this disease makes them exceptionally sensitive to the tragedy but this view has been widely contested. Others argue that FBOs who are involved in care giving have an agenda. In a speech given in 2008 by DrMagaret Chan, the Executive Director of the WHO she acknowledged the importance of faith based organisations in the HIV/AIDS response. In Africa, Religion allegedly plays a key role in the day to day lives of people as a result they affect the behaviours and attitudes of people (Tiendrebeogo and Buykx 2004 in Vitillo 2009). FBOs in the region have generally focused on three key areas: Prevention campaigns, Spiritual healing and care for people living with HIV/AIDS including kids orphaned by AIDS (Balogun 2010).

FBOs are also crucial in shaping people's perceptions about ARVs.The dominant religions in Africa are Islam, Christianity and Traditional religions. One central theme in these religions is the notion of fatalism. Fatalism can be described as the belief that one's life is pre-set by an external force(s), people of these faiths are fatalistic although the level of fatalism varies among individuals for various reasons such as socio-economic status (Hess and Mbavu 2010). This notion that lives are pre-determined transcends into all aspects of livelihood including health. In a research by Hess and Mbavu, they found that the degree to which people believe in external forces could determine the actions they take when faced with health challenges although their research is not conclusive for the entire region as they did a comparative study between Gabon and Malians living in Gabon; their findings showed that 31% of Gabonese interviewees as opposed 55% of Malian interviewees believed that AIDS is a punishment from God, Only 4% of the interviewees claimed no religious affiliations at all (Hess and Mbavu 2010). It is indeed wise to involve the very organisations who preach about God or spiritual beliefs as providers of health care to victims of AIDS although Boulay, Tweedie and Fiagbey (2008) argue that even if religious leaders are seen to be pivotal in care and treatment (there is little research to prove that their efforts contribute towards stigma reduction.

Islamic scholars see AIDS and other diseases as tests from Allah and that Islam is not in any way opposed to the administration of ARVs and most importantly stressing on the fact that Islam places a burden of care on every Muslim towards the sick (Balogun 2010). In Ghana, A campaign dubbed 'Reach Out, Show Compassion' was launched; 25 Christian religious leaders and 23 Muslim leaders who decided to engage in a united front alongside other stakeholders in the fight against HIV/AIDS, The campaign sought to increase the number of religious organisations involved in the fight against AIDS and also offered training to Imams, clergies and other religious leaders countrywide (USAID 2003, Hess and Mbavu 2010, Patterson 2010: 410). However, the Ghanaian example is proof that engaging in HIV/AIDS programmes require long term commitments, According to Patterson the work of FBOs in Ghana has significantly declined since the end of the compassion campaign in 2003; USAID channelled funds elsewhere when the campaign period expired and the only other source of funds was from the National Ministry of Health (2010).

Traditional healers assume a broad range of activities including *herbalism* and spiritualism as well as divination, faith healers and priests; they are generally referred to as traditional healers (King 2000). Traditional medicine has been recognized by the international community long before the first cases of AIDS were identified in most African countries; in 1978 the WHO and UNICEF approved of the use of local traditional medicine in government sponsored health programmes and in subsequent years (1984, 1989, 1990) more resolutions allowing the incorporation of traditional medicine into health systems and inventories of medicinal plants (King 2000).

In 2004, the government of Burkina Faso urged traditional healers in West Africa to cooperate with scientific researchers in the fight against AIDS by using herbal medicine to treat diseases related to AIDS like diarrhoea and tuberculosis; Wango, the secretary general of the Ministry of Health in Burkina Faso acknowledged that undoubtedly herbal medicine can cure some AIDS related disease but scientific validation is necessary (IRIN 2004). Burkina Faso already hosts an out-patient centre which is supported by the WHO where people living with HIV/AIDS are treated with traditional medicine (IRIN 2004).

Traditional medicine may be an alternative for SSA not only because it is cost effective but because in certain areas people have more faith in traditional medicine than in biomedicine. According to Flint (2011) 80% of people living in Sub-Saharan Africa meet with traditional healers. Associations like the West African Traditional Medicine Association (WATMA) have partnered with World Vision (a western faith based humanitarian organisation) to stop the spread of AIDS (WATMA). Interestingly, research carried out by Castro-Leal showed that there is very little reliance on traditional medicine except in Guinea (2000).

The response to HIV/AIDS by the religious community has been uneven (Tiendrebeongo and Buykx 2004) more so the work of FBOs in the treatment and prevention of AIDS has not gone without criticism. They have been criticized for placing emphasis on behaviour change. It is 'frustratingly' difficult to achieve behaviour change because it is not easy to control the risks associated with HIV exposure (Piot and Coll Sack 2001).

In some cases, FBOs have encouraged PLWHA to abandon biomedicine and rely on their faith. In Northern Nigeria which is predominantly Islamic for example, Balogun's study shows that ARVs have been received with mixed feelings. Although the general consensus is that obedience to the Quran's message of abstinence until marriage and faithfulness in marriage would reduce the spread of HIV/AIDS in the region, the people already living with the disease have varied responses to ARVs (2010).

It is surprising that Balogun does not mention the issue of polygamy in Islam and whether or not it could be a factor in the spread HIV/AIDS. Just like FBOs, CBOs are vital because they are able to frame contents of their messages to meet and conform to certain community characteristics (Poku 2005).

RESPONSE BY NATIONAL GOVERNMENTS

National governments all around Sub-Saharan Africa have created National AIDS councils (NACs) not only to prove their commitment towards fighting AIDS but meets the prerequisite to benefiting from the multi-country AIDS Program (MAPs) created by the World Bank (Gavian, Galaty and Kombe 2005: 225). As at 9 years ago, governments were extremely slow to react to the possible effects of the epidemic (Barnett and Whiteside 2002). In a space of nine years, many partnerships have been entered into by state governments and new initiatives have been created to mitigate the possible effects of the disease. According to Barnett and Whiteside (2002) in order to mitigate the impacts of HIV/AIDS, governments will have to understand how devastating the effects of the disease are and react to them in advance.

Tangwa has argued that traditional values and attitudes need to be taken into consideration a great deal because Africa cannot rely on the market oriented and profit oriented practices (2005). In 2001, the then Nigerian President, General Olusegun Obasanjo called a special meeting for African Heads of State and the agenda was an action plan for HIV/AIDS, tuberculosis and other related infectious diseases (Avert, UN 2001). The most significant regional African instrument which impacts on HIV/AIDS policy the Abuja Declaration of 2001 on HIV/AIDS, Tuberculosis and other related Infectious Diseases. President Olusegun Obasanjo of Nigeria called the special session and some of the recommendations they made were that member countries should: take the lead in the HIV/AIDS response, allocate at least 15% of their annual budgets to the health sector and support the African AIDS Vaccine Program (AAVP) (WAHO 2008:18).

Just a year before he called the special summit, he oversaw the establishment of the National Agency for the Control of AIDS (NACA) to coordinate activities pertaining to HIV/AIDS in the country; these activities include: advocacy, collaboration with relevant sectors, mobilization of resources, monitoring and evaluating the implementation of the Strategic National Plan on HIV/AIDS (NACA). NACA has partnered with multinational corporations like Shell and Exxon Mobil to carry out prevention, treatment and care programs to people in the Niger Delta (USAID 2010a). According UNAIDS (2009) the prevalence rate of HIV/AIDS in Nigeria is put at about 3.6% with an estimated 3.3 million people living with HIV/AIDS. Nigeria has the largest number of people living with AIDS after South Africa (USAID 2010a). The Federal and state ministries of health have also been part of the national response to HIV/AIDS; because Nigeria's federalist system allows for decentralisation in the AIDS response.

The government has also engaged in partnerships with the private sector to tackle AIDS: The Nigeria Business Coalition against HIV/AIDS was created and it is made up of 39 multinational corporations which have supported workers and engaged in general public programs (USAID 2010a). According to USAID telecommunications providers like Zain have supported toll free lines that disseminate information regarding AIDS to subscribers (USAID 2010a).

Ivory Coast is another country with a high prevalence rate, estimated at 3.4%; as at 2009 450,000 people were living with HIV/AIDS out of a total population of 21 million (USAID 2010b). Prevalence rates vary across different regions in the country but generally, the most at risk groups are: sex workers, men who have sex with men and drug users (USAID 2010b). There has been a major decline in prevalence rates over the decade; In 1999, 760,000 reportedly were living with HIV/AIDS and the prevalence was 10.6% (African Development Forum 2000). According to a report by the African Development Forum (ADF), as at the year 2000 although Ivory Coast officially had a national strategic plan on HIV/AIDS that included clearly identified priorities but there was no set aside budget to execute the national strategic plan because at the time the UN was the only sponsor of the plan (non humanitarian aid to Ivory Coast from the US at that time had been suspended because of the coup); the report also showed that there was no system put in place to support a national response, no specific sectoral policies and there were no HIV/AIDS policies even though a strategic plan had been up (ADF 2000).

A ministry was created to fight HIV/AIDS in 2001, the ministry now known as the ministry of AIDS has engaged in a multi-sectoral response to fight off HIV/AIDS (AMICAALL 2006); it has been an especially difficult task for the country because of the series of political unrest that have scarred the country (USAID 2010b) because during periods of protracted conflicts access to healthcare is limited especially in conflict areas (UN-HABITAT). Despite the various challenges, the government created the Alliance of Mayors Initiative for Community Action on

AIDS at the Local Level (AMICAALL) to target people in the rural areas and they were the first country to organize an International conference for mayors aimed at highlighting the roles of the local governments in the response to AIDS.

Not enough has been written on MSM in Africa but USAID reports claim that is common for MSM to have wives and families; In Senegal for example, four- fifths of MSM who were interviewed admitted to also having sex with women. Also the report shows that MSM plays a key role in the spread of HIV/AIDS in the region. In Ghana for example, the highest prevalence of any sub-population is MSM accounting for 9.6%. This area needs to be explored further not just by academics but by the governments because brushing it off may be a factor in fuelling the spread of the disease.

INTERNATIONAL RESPONSE

International institutions and NGOs have shaped and directly contributed to response to HIV/AIDS in Africa. As one would expect, the need to meet the 2015 deadline set by the UN millennium development goals and also the priority given to HIV/AIDS by the UN has played a great role in persuading these organisations to place high priority on HIV/AIDS (UN Millennium Project 2005). Organisations like USAID, DFID, Oxfam, Action Aid, the World Bank as well UN agencies such as UNAIDS, UNDP, UNESCO and WHO to name a few have contributed immensely towards fighting off HIV/AIDS. There have also been initiatives created to specifically look into and support HIV/AIDS programmes in developing countries. Agood example is The United States president's Emergency Plan for AIDS Relief (PEPFAR) which has been criticized for its moralistic approach (Flint 2011, Fogelberg 2005). It is safe to say that some donors have used the AIDS response to push further their ideologies.

The UN resolution on HIV/AIDS which was a manifestation of the UN General Assembly Special Session on HIV/AIDS is one of the most important international reactions to the HIV/AIDS epidemic. The special session came only a year after the UN General Assembly had passed the resolution that created the MDGs which also gave priority to HIV/AIDS. Some international actors have carried out their work by engaging with NACs in the countries they work in (Gavian, Galaty and Kombe 2005).

UNAIDS is one of the most globally recognisedmultisectoral AIDS initiatives, it was created to oversee a global response to AIDS by the WHO and six UN agencies in 1996; UNAIDS has aligned itself with civil society, FBOs, CBOs and other groups that fight off AIDS (Gavian, Galaty and Kombe 2005). They also make information regarding HIV/AIDS generally available to the public; this is something African organisations and governments have failed to do.

UNAIDS has been criticised by Roger England a lot. In an article titled 'The writing is on the wall for UNAIDS', England vehemently argues that he does not understand why there is a special UN agency for AIDS and no other diseases like

pneumonia and diabetes which he says kill more people than AIDS does (England 2008). He argues that the international community has treated HIV/AIDS as an 'economic sector' instead of treating it like the disease it is (England 2008) and he in fact calls it an industry that is getting too big and out of control and of course he disagrees with the notion that HIV/AIDS is a global problem considering the fact that the magnitude of the disease varies from region to region.

Another widely recognised international response to AIDS is the MAPs program created by the World Bank for Africa; this program aims at supporting sub-regional and national AIDS initiatives especially the initiatives that involve local communities and generally a multisectoral approach (Gavian, Galaty and Kombe 2005, World Bank). To benefit from this program, interested countries are required to create national commissions for AIDS (World Bank, Putzel 2004). Putzel argues that coercing these countries to create national commissions is a bad idea because it pushes for an 'organizational template' and establishing the global fund only made things worse for these countries (2004) because they also have a national commission centred approach. The World Bank clearly mistook political leadership for an organisational approach (Putzel 2004); While the successes of Uganda, Thailand and Senegal involved very strong political commitment and while they also carried out programs outside the health sector which involved various actors, the political leadership was still very much involved in the response but the model pushed by the WB tends to obscure the need for reinforcement of the health sector (2004).

The Global Fund to fight HIV/AIDS, Tuberculosis and Malaria (GFATM) was established in 2002 as a follow up to the UN General Assembly Special Session on AIDS in 2001 and their activities in member countries are often coordinated by the NACs (Gavian, Galaty and Kombe 2005).

The Global fund has been criticised for not directing enough funds towards health workers, apparently only 20% of the funds go towards human resources and training of workers (Sanders, Todd and Chopra 2005). it is not enough to direct money towards vaccines and medications when people are needed to administer them more importantly. Perhaps this reiterates Roger England's argument that international initiatives cause fragmentation, misplaced priorities, undermine the efforts of the national governments and to a large extent add to the opportunity costs of already strained ministries of health.

What is interesting is that establishing national commissions was not even an idea initiated by African states in the region. Member states are more influenced by external policies and donor funding as opposed to internally drafted policies.

SUCCESS STORIES

There are two success stories in Africa when it comes to HIV/AIDS. Uganda and Senegal have often been cited as success stories by researchers and scholars

having made significant progress in fighting HIV/AIDS. In Senegal, the number of infected people has consistently remained low while in Uganda, there was a significant turn around and decline in number of new infections (Putzel 2006). Both success stories are credited to the government of those countries.

SENEGAL

The earliest record of HIV/AIDS in Senegal was in 1986. That same year, a commission was set up. The commission called National AIDS Prevention Committee (NAPC) was set up (Meda et al 1999). The committee was tasked with the objective of responding to the epidemic, the response was mainly focused on how to prevent future infections. Senegal has often been cited as an example to other African countries. The government in Senegal has been credited for the prevalence being steadily low. Early intervention in Senegal was a success.

The major at risk population in Senegal are Female sex workers (FSW). The NACP began a surveillance project where FSW, pregnant women and men with symptoms of sexually transmitted diseases, monitoring centres were set up (Meda et al 1999). Senegal's response to HIV/AIDS can be summed up in 6 keynotes:

1. Registered FSW were tested for existing sexually transmitted diseases (STD), those who were positive were immediately treated.
2. There was a huge NGO presence in Senegal, many of them were involved with healthcare provision. They were also a huge part of the response system. They advocated for responsible and safe sexual behaviour mainly through Information, Communication and Education (IEC).
3. A transfusion policy was established; blood had to be screened for HIV/AIDS before being transfused.
4. Existing STD centres and treatment facilities began to counsel and create awareness about HIV/AIDS.
5. The ministry of Education also played a huge role. Sex education was added to the curriculum for children aged 12 and over. The teachers were trained on how to deliver the sex education.
6. International organisationsconducted regular reviews of the national response and emerging trends. This gave the government a focus on where to strengthen and intensify efforts.

To date, the prevalence rate in Senegal remains stable at about 0.7% while the prevalence rate among the FSW who are the highest group at risk is 18.5% in 2011, a decline from 19.8% in 2006 (UNAIDS 2012c).

UGANDA

Uganda's case is very different from Senegal's case. The first case of HIV/AIDS in Uganda was identified in the early 80s in the South-western region and since then it has been a long battle. The spread of the virus was heightened by economic collapse and social dislocation (Putzel 2006). Commercial sex workers were found along major routes, bars and brothels.

According to the Uganda AIDS Commission (2012) As at 1992, the prevalence rate in Uganda was put at about 18.5%, In 2000, it had reduced to 5%; in 2004-2005, the prevalence rate went up to 6.4% and as at 2011, it stood at about 6.7%. The figures show that Uganda had succeeded in halting and reversing the spread of HIV/AIDS. The decline in prevalence rates has been lauded as a success. This decline in prevalence has stirred up curiousity and controversy worldwide.

Uganda's response system involved strong political commitment. The predominant mode of transmission is heterosexual sex which accounts for 80% of infections.
Uganda's response to the pandemic could be summed up into 5 points:

1. The 'ABC' approach: ABC stands for: Abstain, Be Faithful and Condom Use. These were the strategies advocated for by the government and the Faith Based Organisations (FBO). The ABC approach has been heavily criticized for being too moralistic and over emphasized (Stammers 2005). I contend that the successes of this approach are too overwhelming to even be debated on.
2. Government officials including the President were actively involved in creating awareness. President Yoweri Museveni had face to face interactions with the people regarding the need to be safe and prevent new HIV infections (Green et al 2006).

3. National AIDS control program: In 1986, Uganda established an AIDS control commission, it was later revamped to the Uganda AIDS Commission which adopted the multisectoral approach recommended by UNAIDS (Green et al 2006).

4. Behavioural Change: I contend that this was a by-product of the ABC approach. There was a turnaround sexual behaviours and patterns. Individuals were cajoled to reduce casual sex, use condoms and delay sexual debut (. This was a proven success in Uganda (Green et al 2006).

5. Religious Leaders and Faith-Based Organisations: the role(s) played by faith based groups cannot be overemphasized when it comes to Uganda's response to HIV/AIDS. Christian and Islamic FBOs educated their congregations and carried out prevention programs (Green et al 2006).

6. Donor Assistance: Most notably the U.S President's Emergency Plan For AIDS Relief (PEPFAR) established during the Bush administration partnered with community based organizations as well as faith based groups; Within 2009-2011, PEPFAR gave Uganda $896.8 million for HIV/AIDS programs (PEPFAR 2011)

Policy implications

With millions of people still getting infected in Africa, the debates surrounding

HIV/AIDS are far from over. Academicians, policy makers, philanthropists and world leaders will continue to discuss this matter perhaps until a cure is found or until there is enough awareness to reduce the number of new infections.

Here are a few recommendations that may be necessary in order for Africans to reduce the burden of the disease.

1. Embracing the problem: one of the factors that distinguish HIV/AIDS from other deadly diseases is stigma and discrimination. These usually arise from the nature of the disease. Also, because of the sexual nature of the disease especially in Africa, people do not want to talk about it. If no one talks about it, who will make the change? As seen above in the example of Uganda, being ashamed or afraid to talk about it does not help! It only worsens the situation. UNAIDS has pointed out that achieving a hundred percent reduction in stigma and discrimination may require approaching the matter from a human rights context. That is, laws should be put in place to abolish stigma and discrimination (UNAIDS 2012).

2. Research: it is a shame that getting statistics on HIV/AIDS for certain African countries and regions is always a dead end. We have to rely on international organisations for data. Furthermore, resources have to be put into properly researching on the different patterns and dynamics even within countries because of how diverse many African countries are; patterns may vary across different towns, cities and villages.

3. Funding: funding has remained a challenge in the response to HIV/AIDS. It gets confusing because many African states are fragile and not fully developed so they have to prioritise. This is why donor programs and funding for HIV/AIDS are thriving so well in Africa. However, national commitment towards reducing the burden of HIV/AIDS has to increase. Presently, Botswana and South Africa cover 75% of their HIV/AIDS cost while Namibia, Gabon and Mauritius fund over 50% of their HIV/AIDS cost; Within 2006-2010, Kenya, Togo and Rwanda have doubled their domestic funding for HIV/AIDS (UNAIDS 2012b). An estimated 21 African countries rely on external sources to fund their HIV/AIDS response programs.

4. Behaviour Change: this cannot be over emphasized; only a change in practices can lead to a significant decline and even halt the spread of HIV/AIDS. People cannot expect to live the same way and see changes. Awareness campaigns should emphasize behaviour change as prevention is the best way to stop HIV/AIDS (Meda et al 1999).

Conclusion

The nature and complexity of HIV/AIDS requires a complex, overwhelming and dedicated response. Much as existing efforts by stakeholders are commended,

much is still desired. It is important to reiterate that only a change in behavior can lead to a significant change in the fight against this deadly disease. As efforts are being made to combat existing cases, abstinence from indiscriminate from indiscriminate sex, sterilizing hospital equipment, control of cultural practices which can cause vulnerability and so on, should be advocated.

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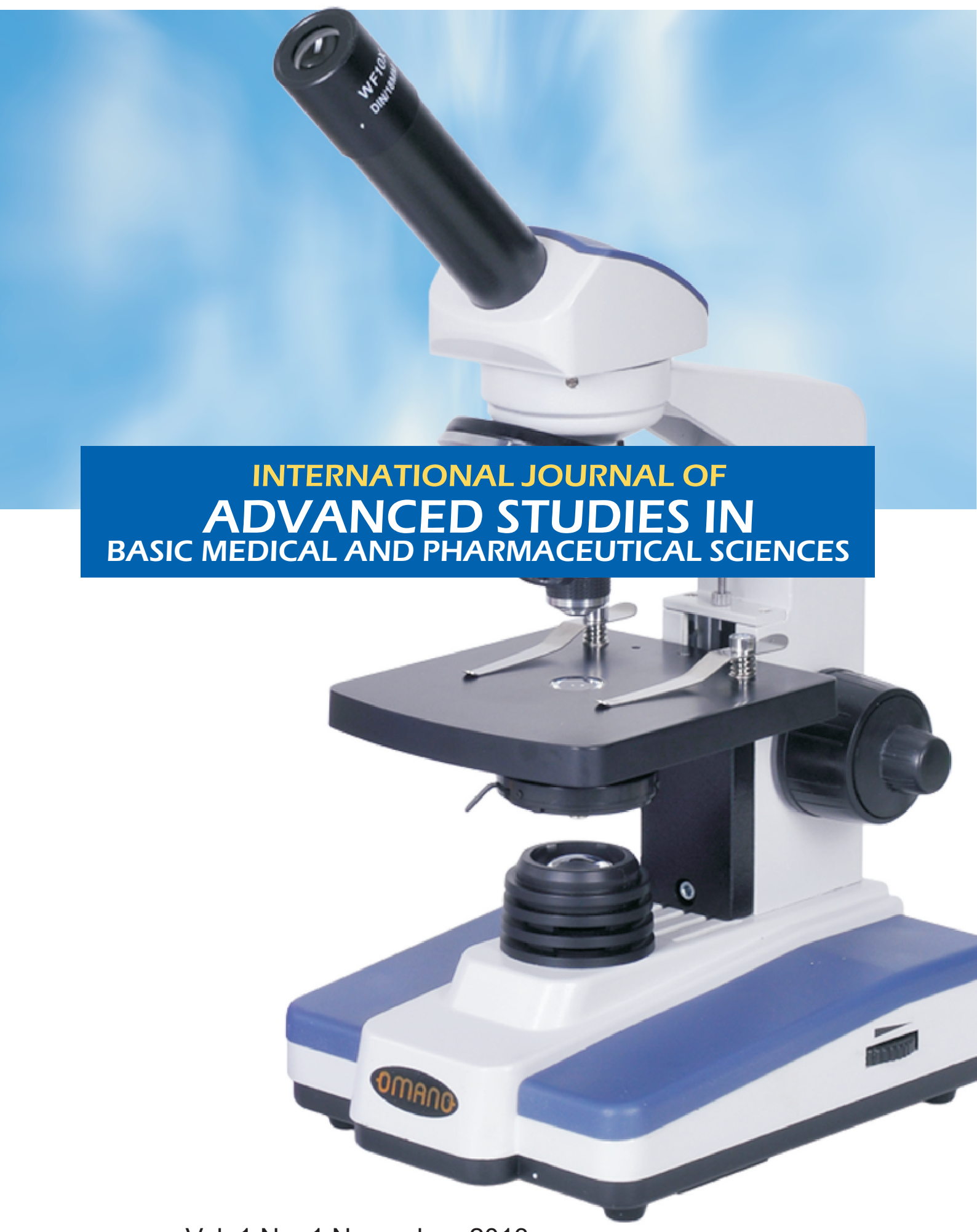

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GENDER AND SANITATION IN JIGAWA STATE, NIGERIA: TOWARDS GENDER MAINSTREAMING IN HEALTH AND HYGIENE PRACTICES

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Abstract

The research explores the sanitation and water related practices employed by four communities in Jigawa State, Nigeria. The major concern of the study is the analysis of the role of gender in the performance of sanitation practices, and specifically the role assigned to women in these vital aspects of hygiene and health related practices. Using the radical strain of feminist theory as a theoretical foundation, the paper analyses how the work of women is organized in the communities' water and sanitation practices, and how it is evaluated by the patriarchal culture of the Nigerian society. The mixed-method approach to data collection and analysis was employed due to the complex traditional nature of the communities studied. Thus, both quantitative and qualitative data were generated using survey questionnaires, focus group discussion and qualitative in-depth interviews. From the findings it is discovered that there is a progressive decline in health and sanitation standards in the research area. It is also revealed that more than 58% of the households do not have water in their toilets. 39.9% said they do not wash hand after defecation, while majority of women (64%) do not wash hand before cooking. Other findings indicate that Hausa women and children are socially assigned the role of ensuring the availability of clean environment and water for domestic use and sanitation. Men in the communities only educate, instruct and/or order women to carry out major sanitation practices. The policy implications raised by this research are centered on a proper evaluation of the work of women in water and sanitation practices, and the efforts that are needed to make women realize their potentials as contributors to and stakeholders in water and sanitation resources of the communities. Another policy implication is the major concern of feminist scholars for women empowerment through giving them responsibilities in decision making and leadership positions.

Key Words: *Feminist theory, Gender, Hausa Women, Hand Washing, Water and Sanitation*

Background to the study

The Hausa rural communities found in northern Nigeria share relatively homogenous socio-cultural practices, religion (Islam) and ethnic (Hausa-Fulani) characteristics (Robson, 2004). Islamic teachings, which are the major anchors of socio-cultural behaviours in these communities, place great emphasis on hygiene practices aimed at maintaining ritual purity. Islamic teachings have emphasized two types of impurities, major and minor, which have been elaborated to the Hausa communities by Muslim scholars. The tenets of Islam have a profound effect on the hygiene practices of the Hausa communities. Directed primarily at maintaining ritual purity, for the most part they provide a sound and culturally acceptable basis for the promotion of improved hygiene practice. According to Stacey (2009) Muslims are required to take care of their personal hygiene by cleaning their bodies, clothing and surroundings. She quotes a verse from The Holy Qu'ran, which says: 'Truly God loves those who turn to him in repentance and those who purify themselves' (Quran 2:222); and a Hadith (teaching of the Prophet), which states that 'cleanliness is half of faith.'

The United Nations (2006) has laid much emphasis on the need to seek for solution to water-related issues by ensuring the participation of women in water-related development efforts. These efforts are particularly crucial in meeting the United Nation's Millennium Development Goals (MDG's). The UN document, which explores the relation between gender, water and sanitation, argues for the adoption of gender mainstreaming in water and sanitation projects in order to attain women's empowerment and participation in project leadership. Water and sanitation are crucial to development because proper sanitation and water provision greatly reduces some diseases and encourage school enrolment, especially among girls. Women are also saved from the onerous daily burden of fetching water. If these conditions are implemented, it may also lead to the promotion of gender equality and boost school enrolment rates; improved access to clean water also reduces diarrhea and other water-born diseases. This study is thus aimed at assessing the extent of the participation of women in the sanitation practices of Hausa communities. The study also attempts an analysis of gender roles and their effects on the health and sanitation practices of the communities studied.

Methodology

This study employs the data set generated by the JUWASS (Jigawa Urban Water and Sanitation Scheme) Formative Research (2005). The research was conducted for the purpose of assessing the water and sanitation practices in five communities of Jigawa State. A total of 203 respondents were surveyed in the study using a purposive sampling technique in the five communities, comprising of Gumel which has 57, followed by Kazaure with 48, Birnin Kudu 37, Auyo 32 and Genjin Gebi 29. In each community focus groups were conducted with women, men, children, and teachers. These groups discussed extensively the role of men, women and children in regard to water and sanitation. The discussions focused on

diseases and their prevalence, hand washing, toilet practices, hygiene, water and sanitation practices. The survey was conducted in five communities in Jigawa State. The population comprises mostly Hausa speaking Muslims with a small minority group of Fulani pastoralists in Birnin Kudu. In Ganjin Gebi there are a number of mixed households including Fulani and Kanuri people incorporated by marriage. In Gumel, there is a small Ibo community. The predominant religion is Islam with both Sunni and Shiite elements represented. The communities studied are characterized by significant class differences with regards to wealth, ownership of animals, clothing, housing construction and floor coverings. Specifically, floor covering, and animal and TV ownership are markers of high social status. Latrine ownership is also a marker of status. Sanitation and other health related domestic practices in any Hausa community are primarily delineated as major roles that women should perform as part of their duties in matrimonial arrangements.

Theoretical Framework

The main theoretical assumption used in this study is he Feminist theory.

Feminist Theory

In feminist discourse, these definitions have led to assertions about how patriarchal values are imposed on society and how this has led to the exploitation and oppression of women. The view often held is that women receive less pay, less access to productive resources, and less attention or participation in decision-making. Women are treated this way, so the argument goes, because patriarchal values assume that they are biologically different and, therefore, inevitably inferior to men. This is why most feminist scholars are also advocates of women's rights to financial independence, education, and entry into the professions (Ruth, 1985). In developing societies (e.g. Nigeria), feminist scholars and activists are also interested in fighting harmful practices such as female genital mutilation (FGM), women trafficking, and child labor.

Feminist theories that emerge from the western world appear to have undergone changes or local transformations at different levels and periods. For example, black women in the United States were involved in the search for an alternative theory that addresses fully the peculiar problems facing black women. In this way, the emergence of black feminism somehow led to the birth of “womanism,” which became involved in the struggles against racial and class oppression (Adeleke, 1996, p. 32). Womanism as an ideology of African women's liberation contains both woman-consciousness and race- or color-consciousness. This ideology marks a breaking away from a separatist concept of feminism, which disregards colored women's peculiar oppressions. This perspective represents the concern of female writers who see no reason to hate their men. It is a kind of black feminism that is concerned with both women and men (Adeleke, 1996 and Adebayo, 1996).

The basic characteristics of women in Hausa rural communities include lower levels of literacy, lower purchasing power, poorer health status, and lower participation

in formal employment-generation sector. Gender disparity and discrimination are also pervasive in the rural areas, where women are disadvantaged both at home and in society. The large majority of women work longer hours, contributing substantially to the viability of the household economy and the welfare of the family. In some societies women have little or no control over household assets or means of production even where they own these in a formal sense. Their control **over household resources often depends on their husbands' goodwill (Lahiri-Dutt and Samanta 2002, 138). In Hausa communities, women depend on their husband's decision before undertaking major social and economic activities (Mohammed, 2004, 2007). In India rural women tend to face more intense difficulties than their urban counterparts. Some of these problems include lack of access to better education, health, nutrition, water and sanitation, burdensome and time-consuming domestic chores such as fodder and fuel wood collection, and fewer opportunities of formal employment (Lahiri-Dutt and Samanta 2002, 138).**

Gender differences are created out of social norms of behavior which assign different roles to men and women in the society. These differences and divisions often lead to inequality in the distribution of resources, and particularly in the power relations between men and women. According to feminist theory the basis of this inequality in power relations is patriarchy, which reflects a social setting where men retain control over women's lives and their daily activities. According to radical feminist theory, the concepts of patriarchy and sex class are key ideas in explaining women's situation in all societies. Thus, patriarchal relationships are considered as the foundation of sexual inequality (Ward, 1995).

Literature review

Some studies have discovered gendered distribution of work in both domestic and public spaces of Hausa society. In one of these studies, Robson (2004) examined the myriad of tasks that make up the domestic work of daily reproduction in Zarewa, a Hausa village in Kano State that lacks basic amenities, and boasts of only a defunct electrification scheme and an intermittently functioning piped water supply. Robson's study found that women perform most of these tasks, but children also do some of them. According to her observations:

> Children help women with many domestic tasks, by performing domestic chores both inside and outside the household compound… Most water for domestic work is drawn by women from wells within the compound, and children … frequently report doing this work too (Robson, 2004, 204).

Field notes by the researchers also indicated that there is a clear gendered

division of household labour in Hausa society with women responsible for the domestic sphere and men paying attention to farming and the public sphere. Children's contribution to farm labour is significant and school holidays in July and August are important in facilitating children's participation in farming during the sowing and growing season. In Zarewa boys reported doing agricultural work, and they were frequently observed collecting fodder for household animals from the fields or uncultivated bushland. It is also a common theme that boys are likely to undertake more livestock care than girls. Girls in Zarewa, on the other hand, participate in the work of childcare that includes: feeding children and infants, bathing them, platting girls' hair, playing with or watching over children. Robson's study of rural Hausaland shows how children's work is regarded as low status, "not least because much of it is alongside or associated with women's work in the private sphere, but also because the market economy needs cheap sources of agricultural or market place labour" (Robson, 2004, 207).

Callaway's (1987) study of Hausa women in Kano also discovered that during the socialization process a girl is made aware of her second-class status. She is assigned childcare responsibilities in addition to housework or domestic responsibilities. Girls are constantly, and very early in their life, reminded of their inferior status vis-à-vis their brothers, father, or male kin. A girl is told *ki dingayin abu kamarmace*, "to behave like a woman" as she grows up in Hausa society (1987, 29-31). This socialization pattern has remained in practice in both rural and urban communities of Hausaland. In addition to household responsibilities girls are sent out to hawk wares for their mothers. This study found that in the villages girls also fetch water outside the compound, and sweep animal dung for boys to carry to the farms.

BASELINE DATA

Table 1: Occupation

Project Towns												
lion	**Auyo**		**Birnin Kudu**		**Ganjin Gebi**		**Gumel**		**Kazaure**		**Total**	
	n	**%**	**n**	**%**	**N**	**%**	**n**	**%**	**N**	**%**	**n**	**%**
Labourer	3	9.4	12	32.4	9	31.0	13	22.8	19	39.6	56	27.6
Farmer with land	28	87.5	4	10.8	12	41.4	12	21.1	06	12.5	62	30.5
Trader	_	_	1	2.7	5	17.2	5	8.8	5	10.4	16	7.9
Professional	_	_	_	_	_	_	8	14.0	1	2.1	9	4.4
Other (specify)	1	3.1	20	54.1	3	10.3	19	33.3	17	35.4	60	29.6
Total	32	100	37	100	29	100	57	100	48	100	203	100

Source: JUWASS Formative Research, 2005

The breakdown of the distribution on Table 1 indicates that there are variations in the concentration of people in certain occupations for each town. The distribution also shows that Auyo respondents are preponderantly farmers (87.5%). This confirms its characteristics as a rural area. Both Birnin-Kudu and Kazaure have fewer farmers on the sample (10.8% and 12.5% respectively) indicating a periurban status. More than half of the respondents (54%) of Birnin Kudu are found in other (informal sector) occupations, and about 32% of them are laborers. This can be explained by looking at the status of Birnin Kudu as an urban settlement (Birni implies urban). This town also comprises several immigrant peoples. Ganjin Gebi has more farmers and labourers (41.4% and 31% respectively) on the sample, which is also another characteristic of a rural settlement. Gumel respondents are spread across all occupations, but majority are either engaged in other (informal) occupations (33.3%) or employed as labourers (22.8%). This is another explanation for a periurban settlement. Majority of Kazaure respondents are also employed as labourers (39.6%) or found in other informal sector jobs (35.4%). This town also shares the same characteristics with Birnin-kudu. The occupational patterns explained above are likely to vary on seasonal basis as some people are likely to practice a number of trades, including farming, or move to other places as migrants. Survey data on the five towns studied indicated a variety of occupations for the respondents. Out of a total of 203 people studied in these towns, 56 (27.6%) are labourers, 62 (30.5%) are farmers with land, 16 (7.9%) are traders, 9 (4.4%) are professionals, while 60 (29.6) are found in other occupations which include street vending (petty-trade), service providers and several informal sector occupations.

Gender roles and Sanitation

The qualitative data reveal that women are generally expected to play important roles in improving the health and sanitation of the household. Several activities were mentioned as part of the roles of women. The most frequently mentioned as part of the roles of women in the entire sample are: bathing (*wanka*) and washing of clothes (*wanki*), washing of kitchen utensils (*wanke-wanke*), and cleaning the environment (*shara*). These activities have been assigned to women in Hausa communities for ages. Other activities mentioned are related to overall bodily hygiene, which include: Taking bath, washing hand, bathing the children, clipping of fingernails, cleaning the teeth, and plaiting the hair.

Some women also mentioned activities like using uncontaminated water, washing foodstuffs and cleaning the beddings. When asked where they learnt these activities, majority mentioned schools (*a makaranta*), parents (*iyaye da kakanni*) and husbands (*a wajen mijina*). This has been confirmed in the FGD'S where women reported being saddled with several roles in hygiene and family health which include: bathing with water, washing clothes and plates, sweeping the house, covering food, using clean water, provide husband with water to bathe, and provide clean water for drinking.

Women in Hausaland, as in other Nigerian communities, are generally responsible for taking care of their households by sweeping, washing plates, and taking care

of the food before cooking. Women also use both plastic and Randa to store water and they are always covered. They put the moda (*drinking cup*) on top of it. "We do not normally keep the moda where children can play with it." If there is house-help she is the one who will sweep the room and put the rubbish in the dustbin. *Asked whether their husbands are involved in taking care of the health of thefamily, the women answered that:* "We are fully responsible. This is because the children are mostly at home with us. The husbands are out to find food" (JUWASS, 2005, FGD Informants). In addition in some places the husband hires housemaids to do the cleaning and sweeping and in that case they contribute to the health of the household because they pay the cleaners. So basically apart from hiring housemaids the men do not contribute much toward family health unless the children are to be taken to hospital. It is primarily the responsibility of the women. They buy things that are needed in the household like soap, detergent and mosquito nets.

They mentioned that if there was no light then the water would not run. If there is constant of power supply then there is adequate supply of water, but without power supply, there is a shortage of water. That is when the husband will buy the water from the water vendors. In terms of refuse disposal it is the woman that is responsible because the husband is out. The woman is responsible for anything around the house. The rich men mentioned, "Women sweep the rooms, compound, toilets, and bathrooms…. It is true that in our community, women used to do general cleaning for the health of the family" (emphasis added). In the poor families, the responsibilities of women in regard to family health include bathing, provision of good food, covering of food, sweeping, washing of clothes and plates. Among the rich women several responsibilities regarding family health were identified. Some of the recurring ones explain the tasks of women for taking care of the welfare of the family as shown below:

1. Bathing with warm water and toweling after bath
2. Washing of clothes
3. Sweeping of house, putting dirt at the refuse dump
4. Covering food
5. Using clean water
6. Husband informed them on how to take care of family health
7. Women provide husband with warm water to bathe in the morning
8. They get their water from the well inside the compound

They do their toilet normally in their compound. The type of toilet they need is the concrete one that will last a long time as their own gets easily spoilt. Girls mentioned *hand washing in relation to the following:*

1. After eating,
2. Before eating
3. In the night (da daddare) before sleep

Rich women in Auyo see their roles in regard to family health and cleanliness in this context:

"We cook good food three times a day, boil water for our family to drink. We wash dishes after each meal and sweep the compound". Poor men discussed that "I give my family food and purified water, and if any member falls sick, I rush them to the hospital". Auyo rich men discussed that "men and women join their efforts together in order to ensure the cleanliness of the household compound. We also educate our women that if we buy water from water vendors, we insist that they boil it before drinking". The poor women accept all these responsibilities in addition to "taking water to the bathroom for our husbands to take bath" (*kai ruwan wanka*). *This* is a major responsibility of women for their husbands, as we have seen above. They also keep water in *Randa*, as majority of them do not own tap. The responsibility of their men is "to bring food to the house and supply other household needs" (JUWASS, 2005, FGD Informants).

The African Development Bank (2009) has confirmed these features of African communities. The argument is that cultural and social settings determine power, status, prestige, rights and obligations. Women's access to productive resources is also conditioned by these settings. Thus women and girls are assigned the chores of water fetching, transport, storage and usage. At the same time, they are also responsible for keeping public and private areas clean. In spite of these enormous responsibilities, women and youth are still not involved in managing and developing these resources due to social constraints that hamper their participation in decision-making bodies.

Auyo Boys discussed that "everyday we take our baths, wash our clothes, and sweep the environment both at home and at school. We also fetch water for domestic use". These words have been re-echoed in Robson's (2004) data on Zarewa village examined above. They sweep and take animal dung to the farm sometime before or after burning it. "We wash our hands after visiting the toilets, taking the animal feaces or after playing with sands," as one of them testifies. For their place of defecation they visit the latrine at their homes or in the bush and they "prefer local latrine because we are familiar with it." The special roles the girls discussed include: washing dishes, sweeping their compounds, and when their mothers are busy they also help with cooking. They also bath and prepare their younger ones for school, as well as fetch water, some within their compounds and others outside the compound. Girls wash their hands before and after eating. Auyo girls observed: "We get our water from taps, hand pumps and local wells. We prefer tap from the rest. The ward head is responsible for repairing of the hand pump. We also use local well and it is the responsibility of the people within the ward (to undertake repairs through self-help efforts) or a rich person can volunteer to pay either half or all of the cost (JUWASS, 2005, FGD Informant). The roles that women perform in the domestic sphere of the target communities were seen as the foundation of the health and sanitation practices of these communities.

Some of the observed defaults which have hampered the realization of correct sanitation practices are assessed to be the result of the total reliance on women to implement and oversee all health related domestic activities. As a result the poor and low level of sanitation practices found in these Hausa communities have proved that women in the communities are overburdened with a multiplicity of domestic roles. Thus in poorer households sanitation practices would remain on the low level due to absence of resources needed to achieve sound sanitation.

Sanitation

Table 2: Place of Defecation

	Project Towns											
Place of Defecation	**Auyo**		**B/K**		**G/Kebe**		**Gumel**		**Kazaure**		**Total**	
	N	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Bush	1	3.1	30	81.1	10	34.5	43	75.4	23	47.9	107	52.7
In a Hole (latrine)	30	93.8	7	18.9	8	27.6	13	22.8	13	27.1	71	35
Toilet							1	1.8			1	0.5
No response	1	3.1			11	37.9			12	25	24	11.8
Total	32	100	37	100	29	100	57	100	48	100	203	100

Source: JUWASS Formative Research, 2005

Historically it was common practice for digging a small hole in the sand and then to defecate into it, finally covering the faeces with the earth. Most men and boys now use the bush to defecate without bothering to cover it with the earth, as was the practice. The survey data reveals that in some towns this is still a common practice. Table 2 shows 81% of respondents in Birnin Kudu, 75% in Gumel and 47.9% in Kazaure, and about 35% in G/Kebe reportedly using the bush as the major place of defecation. More than 27% of the sampled respondents in Ganjin Gebi and Kazaure use the latrine. One of the major findings, however, is that more than half of the sample (52.7) actually reported using the bush to defecate. Only about 36% use the latrine, and just one percent uses the toilet facility, as a place for defecation. About 12% did not respond to the question. The category of 'No response' (37%) in Ganjin Gebi and Kazure (25%) probably hides some of those who use the bush, as the question might appear embarrassing. Auyo respondents preponderantly use the latrine (94%), while in the other towns less than 30% use the latrine. Auyo respondents (not surprisingly) are least in regard to going to the bush for defecation –just under 4% due mainly to the availability of water in their toilets. Over 70% of the respondents said that their toilets are covered with mud,

while 27% have toilets that are covered with sticks. Only 1% of the toilets are covered with cement as revealed by the survey data.

Water and Sanitation

In discussing their toilet habits, some rich men discussed that they have modern toilet facility, but their family use the local latrine. The poor men use the latrine or if they are in the fields they dig a hole in the sand and cover it later. One poor man said, "We normally take water along with us. After defecation we first use sticks then use stone, and then use water to wash the anus. If there is no water, we first use stick to clean three times, and then use different stones to clean three times" (JUWASS, 2005, FGD Informant). The practice of using stick or stone to wipe faeces (*katse kashi)* after defecation is widely adopted especially in rural communities where the bush is a major place of defecation. In some cases there is no water to clean so the tendency to adopt *katsewa (wiping up with sticks or stone)* becomes higher. The discussant, however adds, "then whenever you get water you can correct it." Only the hygienic would bother washing up, especially with soap, when he or she finds water. Rich women use concrete latrine, which they prefer in Auyo, Birnin Kudu and Kazaure.

HAND WASHING

Table 3: Washing Hand before Eating

Project Town	Washing Hand Before Eating		
	Yes	No	Total
Auyo	28 87.5%	4 12.5%	32 100.0%
Birnin Kudu	25 67.6%	12 32.4%	37 100.0%
Ganjin Gebe	24 82.8%	5 17.2%	29 100.0%
Gumel	55 96.5%	2 3.5%	57 100.0%
Kazaure	46 95.8%	2 4.2%	48 100.0%
Tatal	178 87.7%	25 12.3%	203 100.0%

Source: JUWASS Formative Research, 2005

TABLE 4: Washing Hand after Defecation

Project Towns	Washing hand after Defecating		
	Yes	No.	Total
Auyo	18 56.3%	14 43.7%	32 100.0%
Birnin Kudu	19 51.4%	18 48.6%	37 100.0%
Ganjin Gebe	8 27.6%	21 72.4%	29 100.%
Gumel	34 75.4%	14 24.6%	57 100.1%
Kazaure	34 70.8%	14 29.2%	48 100.0%
Tatal	122 60.1	81 39.9%	203 100.%

Source: JUWASS Formative Research, 2005

The majority of respondents in all the communities (87.7%) said that they wash their hands before eating. Table 3 indicates that 32% of Birnin Kudu respondents do not bother to wash their hands before eating. 12.5% and 17.2% (of respondents) in Auyo and Gebi answered that they also do not

wash their hands before eating. One of the major findings of this study (shown on Table 4) is that a significant percentage of the sample (39.9%) does not wash hand after defecating. When this distribution is broken down, we see that over 72% of the respondents in Ganjin Gebi, 45% of those in Birnin Kudu and forty-four percent in Auyo never bother to wash their hand after defecating. The table also shows that over 75% of Gumel and 70% of Kazaure respondents wash their hands after defecating.

Table 5: Washing Hand After cleaning Children's Buttocks

Local Government Areas	Washing hand after cleaning Children's Buttocks (Counts within each local government area)		Total
	Yes	No	
Auyo	14 43.8%	18 56.2%	32 100.0%
Birnin Kudu	12 32.4%	25 67.6%	37 100.0%
Ganjin Gebe	5 17.2%	24 82.8%	29 100.%
Gumel	39 68.4%	18 31.6%	57 100.1%
Kazaure	28 59.6%	19 40.4%	47 100.0%
Total	98 48.5%	104 51.5%	202 100.%

Source: JUWASS Formative Research, 2005

Table 5 also shows a similar distribution that contains the characteristics of the sample (that of poor sanitation standard) in regard to role of women in hygienic practices of washing hands on some occasions. Majority (51.5%) of the sampled respondents said women do not wash their hands after cleaning their children's

buttocks, which is mostly the responsibility of women in Hausa society and many other African communities. In Ganjin Gebi, Birnin Kudu and Auyo majority of the women also do not bother with hand washing after cleaning their children's buttocks.

Table 6: Washing hand before cooking

		Washing hand before cooking food		
		Yes	No	Total
Local government Area	Auyo	5 15.6%	27 84.4%	32 100.0%
	Birnin Kudu	9 24.3%	28 75.7%	37 100.0%
	Ganjin Gebi	2 6.9%	27 93.1%	29 100.0%
	Gumel	38 66.7%	19 33.3%	57 100.0%
	Kazaure	18 37.5%	30 62.5%	48 100.0%
Total		72 35.5%	131 64.5%	203 100.0%

Source: JUWASS Formative Research, 2005

Table 6 seals this finding and confirms that Ganjin Gebi people are least hygienic in terms of hand washing. They are followed by Birnin Kudu and Auyo in their peculiar practices. Gumel and Kazaure respondents on the other hand have reported consistently that they have bothered with hand washing whenever they come out of the toilet or after cleaning their children's buttocks, or before cooking food; the last two have comprised mainly female roles. These revelations have

been demonstrated in the distribution on Tables 7 through 9.

Table 7: Method of Storing Water

		Method of storing water					
		Tank	Bucket	Randa/Tulo	Jerrycan	Others	Total
Local government area	Auyo	2 6.3%	1 3.1%	29 90.6%			32 100%
	Birnin Kudu	2 6.8%	1 3.4%	21 72.4%	5 17.2%		29 100%
	Ganjin Gebe	2 6.9%	6 20.7%	21 72.4%			29 100%
	Gumel	2 3.55	5 8.8%	42 73.7%	6 10.5%	2 3.5%	57 100%
	Kazaure	8 16.7%	5 10.4%	24 50.0%	11 22.9%		48 100%
Total		16 7.9%	18 8.9%	138 68.0%	29 14.3%	3 1.0%	20 100%

Source: JUWASS Formative Research, 2005

Water Related Practices

There is a variety of water provisions in the households studied. Similarly water is stored in several types of containers. However, the most favorite of water storage in all the communities studied is the Randa or Tulu, the earthenware pot kept by women in their household. Table 7 shows that 68% of the total respondents use the Randa for water storage. When broken down we see that between 50 -90% of all households in the town, studied employ the Randa or Tulu for water storage. In Kazaure there is a variation where 50% of the sample use jerry cans, buckets or tank to store their water. The survey respondents believe that clean water should be used to control diarrhea. Birnin Kudu, Ganjin Gebi and Gumel respondents' overwhelmingly accepted that clean water could be used to control diarrhea. However, Auyo respondents do not accept that clean water could be used to control diarrhea.

The qualitative data reveals that boys will continue with prayers to God for solution; they also call for the repair and increase in "the number of our taps". They

also desire the water in the tap to be purified. Women who are poor in Kazaure said, "We want taps and hand pumps". Those that have taps or have been enjoying them say they are not running. Water is for those with power. Rich women need help with regard to mosquitoes. Women also requested for adequate water supply and drugs in the hospital.

Table 8: Availability of Water in the Toilet

		Is Water available in the Toilet		Total
		Yes	**No**	
Local Govt Area	Auyo	12 37.5%	20 62.5%	37 100%
	Birnin Kudu	19 51.4%	18 48.6%	37 100%
	Ganjin Gebe	6 20.7%	23 79.3%	29 100%
	Gumel	16 28.1%	41 71.9%	57 100%
	Kazaure	28 58.3%	20 41.7%	48 100%
Total		**81** **39.6%**	**122** **60.4%**	**203** **100%**

Source: JUWASS Formative Research, 2005

As indicated on Table 8, majority of the respondents have no water in their toilets. More than 60% claimed that they do not have water available. Over 51% of Birnin Kudu households and 58.3% of Kazaure households said they have water in their toilets. More than half of the households (59%) also have no soaps in their toilets, which indicates a level of hygiene similar to that explained on tables 7, 8 and 9 above.

Health Habits

In these communities girls use the toilet if it is available. "If we do not have them in our house then we go to the bush". Individuals who break the rules of family health are reported to the authority. However, "because of politics, things have changed. If an individual is reported for polluting water the authority hardly does anything". One of the rich discussant in Birnin-kudu reported, "I told you about animal faeces in front of my house; if you report someone there will be open conflict with them. Thus you allow this type of things for God to judge" (JUWASS, 2005, FGD Informant).

Teachers in Ganjin Gebi made insightful observations regarding the sanitation habits of their pupils with the following comments:

1. Children go to the bush to pass their stool while they eat at the same time.
2. They also take a lot of mangoes during the mango season. You see them walking with a lot of flies on the mango while they suck the mango indifferently. This also leads to diarrhea.
3. Because the village is rural in nature some people without latrines have to go to the bush to defecate.
4. Even near the houses in the village there are lots of faeces. For example, if you go the village and observe early in the morning you will see the villagers come out both men women and children going or coming from the bush to defecate.

On whether every house has a latrine, the head teacher mentioned that:

> "It is not true. You can send your representative to the entire houses to check, you will see *that only houses of the well do to have latrines or the village head's; they are those that do not go out to the bush to defecate, or the young educated ones and their wives, who do not go to the bush to defecate. Otherwise most of the families that are not well to do, go to the bush*" (JUWASS, 2005, FGD Informant).

The surveyed towns have also reported recent cases of diarrhea, malaria, vomiting, typhoid and measles. Majority of survey and FGD respondents accept that these diseases are common to the area as a result of poor hygiene and sanitation habits. The survey data also indicate that water supply, which was not hygienically treated, appear to be a major variable associated with incidence of diarrhea. Households on the sample have been found to neglect basic teachings of hygiene like washing hands with soap after going to the toilet, before eating or after washing their baby's buttocks. The cleanliness, and hygiene and water related activities are poorly handled in almost all households in the communities surveyed. This is because women have been saddled with the major role of looking after hygiene, sanitation and water related activities. They are expected to clean the household environment, wash the dishes, cook meals, keep the water clean, prepare their children for school and generally make their husbands happy. There is a clear gendered division of household labour with women responsible for the domestic sphere and men paying attention to farming and the public sphere. While the women have all these chores to attend to, they rely heavily on their husbands or parents for learning what is required of them with regards to hygiene, sanitation and water supply. A discrepancy may occur, therefore, where the men (or parents) are not adequately informed on the required knowledge.

Radical feminist theory has contributed towards an understanding of the gendered division of household chores in which women are predominantly saddled with the major chores that include water and sanitation practices. Radical feminists often view

the woman in terms of her sex roles where she is expected to remain submissive and passive to male desire and authority. These socially constructed female sex roles have "political significance because they operate to deprive women of equality in all spheres of life – social, economic, political and legal" (Ward, 1995, 874).

Role of men in water and sanitation

One of the rich men said that they used to educate their women to wash the clay pots. Also "we use to educate them (women) that if we buy from water vendors if it is meant for drinking,*we used to insist that they boil it before drinking should it contains germs which can lead to diarrhea"* (JUWASS, 2005, FGD Informant). Men also instruct women to sweep and wash the areas affected by animal's excreta because of mosquitoes and other related germs that can breed there. In Ganjin Gebi, one discussant observes that "there are speculations that this thing is all confusion; the authorities will introduce something in order to attract you so that you pay. Majority of the people assumed that the mission was just to get people to pay (JUWASS, 2005, FGD Informant). This observation reflects the level of apathy in some communities regarding any new projects that are not clearly explained to the communities

Conclusion and Policy Implications

Gender inequality is often manifested at the domestic sphere where household chores, including hygiene and sanitation work are principally assigned to women. Within the communities studied in this research a gendered distribution of domestic work is responsible for giving women the role of keeping their households clean and ensuring that safe and clean water is available for domestic use. Alongside children women in these communities undertake various chores that ensure the health and sanitation standards are kept within required expectations. This is in addition to taking care of other chores such as cooking, childcare and serving their husbands and other family members. Despite performing these multiple tasks, women have very little control over the decision making process regarding water and sanitation practices. They have to wait for their husbands to take major decisions, and issue instructions on how to perform these onerous tasks. It is the contention of this paper that giving women more roles in decision making and leadership is a major requirement for lifting the health and sanitation standards of these communities from their dismal levels. If the Millennium Development Goals are to be achieved in these communities, then women must be made part of the decision making processes that address issues of hygiene, health and sanitation.

Some policy implications are apparent from the findings of this study.

1. First of all there is an urgent need for an empirical verification of the patterns of decision making and allocation of resources within the households prior to the design of intervention programs that address water and sanitation practices. This is essential because, as Quisumbing and McClafferty (2006) argue, detailed gender-disaggregated databases

are rarely available in most project and policy contexts. For these databases to be generated further qualitative studies with key informants and participant observation are necessary. In water and hygiene related issues these databases are key to successful implementation of gender mainstreaming in resource allocation, and decision making processes.

2. Secondly, because of the cultural constraints placed on women in most Nigerian communities, the views of men and women must be solicited separately. This is also required for making women to identify the major obstacles to their participation in sanitation work and other community development projects without fear of the consequences. In this context several distinctions should be captured regarding the prevalent stratification patterns in the community, such as age, social position, ethnic stratification, and urban versus rural locations.

3. Finally, a needs assessment enquiry should be considered regarding the types of organization and institutions that are currently available for both men and women. These assessments may also consider the structure and roles of existing institutions in order to determine the kind of mix that may enhance project rate of success with regards to hygiene, water and sanitation practices with women as major stakeholders and key participants. This is why gender mainstreaming as advocated for by the United Nations is considered as a vital policy framework for gender and sanitation activities in this study.

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