Original Article

Developing Cohorts For HIV Vaccine Trials in a Rural Area of Cameroon: Case Study of Lebialem Division

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ABSTRACT

Identifying an appropriate population for HIV Vaccine clinical trials is currently a major challenge to HIV vaccine clinical site preparedness. A cross sectional hospital-based HIV prevalence survey was carried out in four clinics in Lebialem Division, to ascertain the suitability of this population for HIV vaccine trials. A questionnaire was administered to 1037 participants (age >15), and 5 ml of blood collected, sera separated and screened against HIV-1 and HIV-2 using a parallel testing algorithm with Determine and STAP-PAK as main test kits and Oraquick as tie-breaker.

The prevalence of HIV varied in the four clinics with Lewoh health unit having the highest HIV prevalence (13.8%), followed by Mary Health of Africa (11.2%), Menji (8.4%) and lastly Azi (3.0). HIV prevalence among women in general was 11.4%, while men and pregnant women had 10.2% and 5% respectively. Of the 108 sero-positive samples, 34 (31%) were from the 18-27 and 36 (33.3%) from the 28-37 age groups. It decreased with increase in age as only 2 samples were positive for those who were > 68 years old. There was a significant difference in HIV prevalence by occupation. The prevalence was significantly higher (P<0.001) among traders (48.60%), and civil servants (22.82%) compared with the farming population (4.30%), and students (8.60%).

Though the HIV prevalence in Lebialem Division is high, making it a suitable population to explore for developing cohorts for vaccine trials, further studies that should look at HIV incidence among this population are recommendation.

Keywords: HIV Seroprevalence, rural area, Cameroon.

RESUME

L'identification d'une population convenable pour un essai de vaccination en masse au VIH est le plus souvent une difficulté majeure pour la mise sur pieds de la vaccination au VIH sur site. Un suivi transversale de la prévalence au VIH basé sur les donnés hospitaliers mené dans quatre cliniques dans le département du Libialem a été effectué, afin de déterminer la convenance de cette population à une vaccination de masse contre le VIH. 1037 participants (âge >15) ont fait l'objet de notre étude. Le sérum obtenu à partir de 5ml de sang, de chacun des participants, était analysé pour le VIH-1 et VIH-2, en utilisant un algorithme parallèle avec les Kits Détermine et STAP-PAK comme test principale et le test Oraquick comme test de confirmation.

La prévalence au VIH variait dans les quatre sites d'études avec la plus haute à Lewoh (13,80%), suivi de Mary Health of Africa (11,20%), de Menji (8,40%) et enfin Azi (3,00). Cette prévalence était de 11.40% chez les femmes, de 10,20% et 5,00% respectivement chez les homes et les femmes enceintes. Des 108 séropositifs, 34 (31,00%) étaient âgés de 18-27ans et 36 (33,30%) de 28-37 ans). La prévalence diminuait avec l'âge d'autant plus que deux séropositifs seulement étaient enregistrés des personnes de plus de 68 ans. La prévalence variait également de façon significative en fonction du métier; elle était plus élevée chez les chauffeurs (48,60%) et les fonctionnaires (22,82%) comparée aux cultivateurs (4,30%), et les étudiants (8,60%).

La prévalence élevée au VIH au département de Lebialem fait de cette localité une cible adéquate pour un essai de vaccination en masse. Des études se rapportant à l incidence au VIH au sein de cette population sont recommandées.

Mots clés: Prévalence au VIH, population rurale, Cameroun

INTRODUCTION

Twenty years into the HIV/AIDS pandemic the number of new infections continues to rise and an adequate response to the problem is still lacking. Sub-Saharan Africa, with just over 10% of the World's population, is home to close to two-thirds of all people living with HIV/AIDS; some 25 million (range: 23.1 – 27.9 million). In 2010 there were an estimated 22.9 million people living with HIV in Sub-Saharan Africa.[1] This has increased since 2009, when an estimated 22.5 million people were living with HIV, including 2.3 million children.[2]

The increase in people living with HIV could be partly due to a decrease in AIDS-related deaths in the region. There were 1.2 million deaths due to HIV/AIDS in 2010 compared to 1.3 million in 2009. Almost 90% of the 16.6 million children orphaned by AIDS live in sub-Saharan Africa.[5]

In 2010 about 610,000 people in Cameroon were living with HIV, an adult (15-49 years) prevalence rate of 5.3%, with about 320,000 women infected, 54,000 children, 330,000 orphans, and 37,000 AIDS deaths.

In Cameroon an estimated 5.5% of the adult population (15 -49 years) is currently HIV-positive [2]. This data shows that women, with an overall HIV prevalence of 6.8%, were more likely to become infected than men (4.1%). The South West province, where Lebialem Division is located, is one of the most affected provinces in the country with a prevalence rate of 5.8%[3].

Rural populations in Cameroon are becoming increasingly infected with HIV/AIDS[3]. This could be ascribed to a number of socio-cultural factors such as early marriages, polygamy, unorthodox traditional medical practices, low education and fragile health infrastructure. All these factors prevail in Lebialem Division, a typical rural area. Unpublished hospital records within this community show a high HIV sero-prevalence of over 21%. There has been a recent up surged in social and economic activities such as occasional markets, public drinking places, and a more sexually active population within this community particularly when it was upgraded to a fully divisional status. This division is also located a long the major highway that links Cameroon to Nigeria. These activities should translate to a higher HIV incidence within the environment; in fact a recent government response to this change has been the creation of an HIV/AIDS treatment center within the community. Valid data on HIV prevalence within this population is lacking.

Appropriate cohorts for HIV vaccine trials are critically needed in Africa in the global effort to find an efficacious vaccine. Because, the prevalence of HIV in the general population in Cameroon is relatively low (about 5%), most investigators believe this low prevalence can not provide a reasonable incidence for phase III vaccine trials. However, very limited studies have been conducted in targeted rural settings to ascertain their suitability for vaccine trials. The Cameroon Ministry of Public Health is in active partnership with international bodies in order to determine the best population that could be used for eventual HIV vaccine clinical trials. Initial focused on its urban population has been discouraged because of an unstable nature of urban populations, thus making it difficult for an eventual follow-up. The present HIV prevalent study is an initial step towards identifying the suitability of this rural population for an eventual HIV vaccine clinical trial.

MATERIALS AND METHODS

Between August 2006 and June 2007, a hospital based HIV survey was carried out in four major health units in Lebialem Divison, South-West Province of the Republic of Cameroon, namely; Mary Health of Africa Hospital and Menji, Azi and Lewoh health units. This locality was specifically selected for this exercise based on its observed socio-cultural and demographic characteristics that are likely to be associated with increased HIV infection such as polygamy, wife inheritance with unknown HIV status, scarification, occasional markets and location on major road network linking Cameroon and Nigeria with regular stop over by travelers. It is also a typical remote area with very limited accessibility to health infrastructure, hence inadequate information on STI/HIV/AIDS prevention. The National Ethics Committee of the Ministry of Public Health of Cameroon approved the study. After informed consent, all people attending the outpatient clinics of these services were interviewed using structured questions that solicited information on their socio-demographic status. About 5ml blood samples were further collected from participants into EDTA tubes for HIV diagnosis. HIV parallel testing algorithm incorporating two

rapid HIV test kits (Determine (Abbot Diagnostics) and Statpak (CHEMBIO Diagnostics Systems) was used. All discordant samples were confirmed using Oraquick (orasure) as tiebreaker. Discordant samples were further tested using a tiebreaker; Oraquick (Orasure). All samples that were further confirmed to be positive with Oraquick were considered positive while those confirmed negative were considered negative.

RESULTS

The overall prevalence of HIV among this population was 10.4%. There was variation in the relative HIV prevalence from the four clinics from where samples were collected. Lewoh clinic was highest with a prevalence of 13.8% followed by Mary Health of Africa, Menji and Azi, with HIV prevalence of 11.2%, 8.4%, and 3.0%, respectively. The relative prevalence among women (11.41%) was higher than for men (10.2%), while that for pregnant women was 5% (Table 1). Most seropositive samples were detected within two age groups, 18-27 (34) and 28-37 (36) (Table 2). The seropositivity decreased with increase in age and only 2 positive cases were recorded above the age of 68 years. There was a significant difference in the prevalence of HIV by occupation. The prevalence was high among traders (48.6% of the group samples tested), and civil servants (22.82%) compared with that among the farming population (4.30%) and 8.60% among students (P =0.001) (Table.3).

DISCUSSION

Among the health units involved in this study only Mary Health of Africa has the status of a hospital, hence the highest sample size from there. An overall HIV prevalence of 10.4% reported for this population is higher than the national HIV prevalence of the country (5.5%). Being a hospital-based study, there are likely chances that most people that were recruited in this study where sick and already had other underlying risk factors for HIV. The high HIV prevalence of 11.20% documented at the Mary Health of Africa with sample size (77) confirms this: either already HIV positives are referred from other places for confirmation and significantly high prevalence rates were noted in the Lewoh and Mary Health of Africa health units, despite their great disparity in sample size. This may be related to the fact that patients who consult at the Mary Health Hospital come from various parts of this division, and sometimes referred from the other three health units.

The difference in relative prevalence of HIV between men and women is in line with earlier reports on Cameroon that the prevalence rate of the virus is higher in women than in men [1.] However, the differences seem slight in the case of this rural population. The seropositive pregnant women being mainly married have a far-reaching implication to the family as well as the socioeconomic life of the people.

Young adults are reportedly at higher risk for HIV infection than older people, due to their higher levels of sexual experimentation and unsafe sexual practices [4,5].

Earlier reports showed that HIV prevalence was not associated with occupation of participants in rural areas of Cameroon [3].

This information suggest that HIV/AIDS is an important public health problem in the Division, and calls for an urgent need for a sensitization campaign on the nature, causes and prevention of HIV/AIDS. It contributes to the much-needed knowledge on the prevalence, geographical distribution and circulating sub types of HIV, necessary for program implementation within the region. However, there is still no published information on the prevalence of this pandemic in the Division.

CONCLUSION

This cross-sectional study shows a high prevalence of HIV infection a rural area of Cameroon. That the prevalence in this population is almost two-fold that of the general population in Cameroon, suggest that the incidence may also be higher making it a suitable population to explore for developing cohorts for vaccine trials. We are in the process of extending to study to a large student population to assess their readiness to participate in HIV vaccine trials as well as set up a prospective study to determine HIV incidence in this population

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Table 1: HIV seroprevalence rate according to health units, sex and pregnant women among people attending outpatient clinics in Lebialem Division

	MARY HEALTH	AZI	LEWOH	MENJI	TOTAL
No of samples collected and tested	777	97	80	83	1037
No of women	481 (61.9%)	71 (73.2%)	43 (53.7%)	62 (74.7%)	657 (63.4%)
No of pregnant women	142 (29.5%)	2 (2.8%)	00	01 (1.3%)	145 (22.1%)
No of men	296 (38.1%)	26 (26.8%)	37 (46.3%)	21 (25.3%)	322 (36.7%)
No of reactive samples	87(11.2%)	3(3.1%)	11(13.8%)	7(8.4%)	108(10.4%)
No of reactive women	57 (11.85%)	3 (4.23%)	09 (20.98%)	06 (9.67%)	75 (11.42%)
No of reactive pregnant women	7 (5.0%)	0	00	00	7.0(5.0%)
No of reactive men	30 (10.1%)	0	02 (5.4%)	01 (4.7%)	33 (10.2%)
No of non reactive samples	690 (88.8%)	94 (97%)	69 (86.3%)	76 (91.6%)	929 (89.6%)

Table 2: The number of samples tested and percentage reactive samples among people attending outpatient clinics in Lebialem Division, according to age groupings

	Number of Samples	Number of reactive samples	% of Reactive samples
18-27	343	34	9.9
28-37	167	36	21.6
38-47	119	18	15.1
48-57	136	12	8.8
58-67	174	6	3.4
≥68	98	2	2.0

Table 3: Occupational prevalence of HIV among people attending outpatient clinics in Lebialem Division

Occupation	**No of samples tested**	**No of reactive samples**	**% prevalence**	**Relative % prevalence among reactive samples**
Farming	530	23	4.34	21.30
Student	343	29	8.60	26.85
Trading	72	35	48.60	35.19
Civil servants	92	21	22.82	19.44