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ABSTRACT This study aimed to determine the sociodemographic predictors of willingness of pregnant women in Sudan to accept HIV testing. A random sample of 500 pregnant women attending antenatal care clinics in Omdurman maternity hospital in 2010 were interviewed. Significant predictors of women's tendency to accept HIV testing were: age

Facteurs sociodémographiques prédictifs de l'acceptation d'un dépistage volontaire du VIH chez des femmes enceintes dans une grande maternité hospitalière à Omdurman

(Soudan)

RÉSUMÉ La présente étude visait à déterminer les facteurs sociodémographiques prédictifs de la volonté des femmes enceintes au Soudan d'accepter un dépistage du VIH. Un échantillon aléatoire de 500 femmes enceintes consultant dans le service de soins prénatals de la maternité hospitalière d'Omdourman en 2010 a été interrogé. Les facteurs prédictifs importants de la tendance des femmes à accepter un dépistage du VIH étaient les suivants : un âge inférieur à 30 ans (OR 3,5 ; IC à 95 % : 2,2–5,8), un statut de primigeste (OR 1,5 ; IC à 95 % : 1,0–2,3), un niveau d'études supérieur à la moyenne (OR 3,4 ; IC à 95 % : 1,7–6,7), la possession d'une radio (OR 2,1 ; IC à 95 % : 1,3–3,4),

l'occupation d'un emploi (OR 2,5 ; IC à 95 %: 1,2–5,0) et au moins deux visites de soins prénatals (OR 1,9 ; IC à 95 % : 1,2–2,9). Le fait d'avoir un mari d'un âge supérieur ou égal à 35 ans (OR 3,2 ; IC à 95 % : 2,0–5,2), et d'être de confession chrétienne (OR 3,8 ; un IC à 95 % : 1,4–10,7) étaient des variables importantes, toutefois avec un grand intervalle de confiance. Ces facteurs prédictifs doivent être pris en compte dans les stratégies visant à augmenter le niveau d'acceptation du dépistage du VIH et le recours aux services de conseil.

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Introduction

The probability of an HIV-positive mother transmitting the infection to her child is estimated to be 20–45%, in different populations. However, with certain interventions and high coverage, the risk of transmission can be reduced to 5% and 2% in breastfed and non-breastfed babies respectively (1,2). Collectively, these interventions are termed prevention of mother-to-child transmission (PMTCT) of HIV, and they all start by identifying the mother's HIV status through testing.

The percentage of pregnant women from low- and middle-income African countries who received an HIV test increased from 21% in 2008 to 26% in 2010. However, many barriers to acceptability of HIV testing still prevail (3,4). Some studies reported that low educational level (5,6), lack of knowledge about mother-to-child transmission (MTCT) (7,8), and HIV-related stigma (9) are factors that negatively affected acceptance of testing. The national average fertility rate for Sudan is 5.6 (10). It is estimated that 74% of pregnant women made at least one antenatal care (ANC) visit in 2010 (11). The estimated HIV prevalence among pregnant women attending ANC was 0.16%, with 5095 pregnant women in need of PMTCT services in the same year (12).

Following a 6-month pilot project in 2005, the PMTCT programme in Sudan started during 2007 in 7 maternity facilities and had expanded to reach 29 maternity facilities by the end of 2010 [Sudan National AIDS Programme (SNAP) report, unpublished, 2011]. It was accompanied by mass media advocacy that aimed to increase the demand among women by increasing their awareness about the services (SNAP report, 2011). This expansion resulted in a national increase of pregnant women counselled for HIV from 25 606 in 2007 to 37 055 in 2010, and of mothers tested from 1608 in 2007 to 20 729 in 2010 (12). Although the numbers have increased, these statistics indicate that the majority of pregnant women are still not reached for counselling to get tested for HIV. Initially, HIV counselling and testing was only offered to pregnant women who requested it (opt in), which consequently failed to capture all pregnant women. Accordingly, a provider-initiated HIV testing and counselling approach was introduced in 2009 (SNAP guidelines, unpublished, 2012). The right of pregnant women to refuse testing was preserved (opts out). This approach aimed to encourage pregnant women to be counselled and tested for HIV in the country, as recommended by the World Health Organization (13). By the end of 2010, provider-initiated HIV testing and counselling was offered in all 29 facilities as part of ANC in the country (SNAP report, 2011).

Khartoum State, one of the 17 states in Sudan and also the capital, is inhabited by more than 6 million people. An HIV testing and counselling service was offered in 5 maternity facilities in the year 2010 (SNAP report, 2011; SNAP guidelines, 2012). Omdurman maternity hospital, the largest of its kind in Sudan, was one of these facilities, and was also one of the PMTCT pilot project sites in 2005 (SNAP report, 2011; Omdurman maternity hospital report, unpublished, 2010). Unpublished data in the year 2010 showed that Omdurman maternity hospital was visited by 43 000 pregnant women from diverse socioeconomic backgrounds, from Khartoum and other States, and of these 15 662 pregnant women were counselled for HIV and 4225 were tested (Omdurman maternity hospital report, 2010).

There are many factors that influence the acceptance of HIV testing among pregnant women (5,7). Such factors may include, but are not limited to, HIV-related stigma as well as various sociodemographic characteristics (12,14). There is limited information on the effects of these

factors. This study aimed to investigate the influence of sociodemographic characteristics on willingness to take an HIV test among pregnant women attending ANC clinics in Omdurman maternity hospital.

Methods

Study setting

Ethical approval was obtained from the research ethics committee and official permission from Omdurman maternity hospital. The hospital is the main government facility that offers maternal and gynaecological services for Khartoum State and neighbouring states, receiving an estimated average annual number of 50 000 pregnant women (SNAP report, 2011; Omdurman maternity hospital report, 2010). The hospital offers ANC 5 days a week in ANC clinics.

Sampling

The sample size was calculated using a standard random sample formula for estimating a single proportion based on a proportion (prevalence) of 5% of pregnant women tested during ANC at Omdurman maternity hospital (unpublished data, 2009). Around 53 000 mothers attended the hospital, just over 13 000 were counselled and 2656 mothers were tested in that year. The margin of acceptable error was set at 2%. This gave a rounded sample size of 500 pregnant women. Based on this we obtained a sufficient statistical power (90%) to detect a relative increase in HIV testing acceptance of at least 60% as statistically significant, assuming a willingness to accept HIV testing in the women's education reference group (no formal education) of 30%.

Data collection

Data were collected between August 2010 and March 2011. We randomly selected 3 clinic days (Sunday, Tuesday and Thursday) when we conducted an interview with every 5th pregnant women who accepted, up to a maximum of 8 women per clinic day, until the estimated sample size was completed. About 65 mothers did not agree to be interviewed (12%) and each was replaced by the immediate next pregnant woman.

Participants were informed about the study objectives and confidentiality of the data. All participants (or their husbands) signed a written consent in Arabic before participating in the study. A standard structured questionnaire was used to gather the needed information which included age, marital status, education, gravidity and other relevant sociodemographic variables. The questionnaire was pre-tested and amended as needed. During data collection all the questionnaires were revised for errors and completeness to ensure that all needed data was captured.

Data analysis

The data were entered, cleaned and analysed using SPSS software, version 21. The dependent variable, acceptance of testing, was used in a dichotomous manner as yes or no. The woman's and husband's education were categorized into 3 groups (no formal education as reference) and rural was the reference for urban and suburban residence. Age, marital status, religion, employment status, gravidity, radio and television ownership were used in a dichotomous manner. In bivariate analysis, the crude odds ratio (OR) and 95% confidence interval (CI) were computed for the association between the dependent variable and the different sociodemographic factors of the pregnant women. A stepdown, multivariate logistic regression analysis was carried to control for confounding and estimate the adjusted ORs and 95% CIs of the sociodemographic predictors of acceptance of HIV testing.

Results

Background characteristics

The descriptive statistics of 500 pregnant women enrolled in the study are displayed in Table 1 . Their age ranged between 18 and 45 years, with a mean age of 28.2 years (standard deviation 6.1); 154 (30.8%) were aged ≥ 30 years. Demographic data showed that 26.4% of the women resided in rural areas, 88.4% were non-working housewives and 14.0% had no formal education. A high proportion of women (41.8%) were primigravidae and 69.2% had attended ANC more than twice. Among the husbands 40.8% earned from manual labour and 7.8% had no formal education. Most of the households owned a radio and/or television (78.4%).

Willingness to be tested for HIV

Out of the total number of women 269 (53.8%) expressed their willingness to be tested for HIV infection. The top reasons cited by the 231 pregnant women who expressed unwillingness to be tested for HIV infection in the study were as follows: 93 (40.3%) needed their husband's approval beforehand, 79 (34.2%) feared HIV-related stigma and 59 (25.0%) believed that they had no risk of HIV infection.

Factors associated with acceptance of testing

Bivariate analysis was carried out to estimate the crude association between pregnant women's sociodemographic characteristics and their willingness to accept HIV testing during ANC visits (Table 1). Willingness to be tested was associated with age

A multiple logistic regression model with stepdown procedure was fitted to control for confounding variables and estimate the adjusted measures of association between the sociodemographic variables and willingness to be tested for HIV during pregnancy (Table 2). Most of the variables in Table 1 continued to be significant predictors of willingness to test, with

similar or larger ORs. Women

Discussion

In this study we attempted to explore the influence of some sociodemographic factors on the rate of acceptance of HIV testing among pregnant women in Omdurman maternity hospital, Khartoum. The general descriptive characteristics of the sample of 500 pregnant women in the study was quite similar to the general population of women of child-bearing age in Khartoum state (SNAP report, unpublished, 2011). Among the women who agreed to participate in our survey, 269 (53.8%) expressed their willingness to be tested for HIV.

The results show that the willingness of pregnant women to accept HIV testing offered as part of ANC was significantly influenced by their sociodemographic characteristics. Pregnant women aged

Pregnant women who had received basic or secondary and higher education had 3.4- and 3.7-fold higher acceptance rates respectively for HIV testing during their ANC visits in comparison with those with no formal education. Perhaps the current education curricula exposed their generation to health information regarding HIV and PMTCT. In Uganda, studies have shown that educated mothers (primary school educated and above) were approximately 3-fold more likely to agree to taking an HIV test compared with those who did not complete primary school or had not been educated at all (6–16). These results are also supported by studies in Ethiopia (17), in Nigeria (18) and also in Sudan (14), which found that educated mothers were more knowledgeable about HIV and PMTCT and they had higher acceptance rates for HIV screening than mothers who were not educated. In contrast, a study conducted in Ethiopia in 2009 revealed no association between education status and the rate of HIV testing acceptance (8). We believe that education, which is currently better among younger women in Sudan, explains the strong association between young age and acceptance of testing detected in our study.

A significant association was found between willingness to get an HIV test and number of ANC visits. Pregnant women who had ≥ 2 ANC visits were 1.9 times more likely to accept HIV testing than their counterparts. At ANC visits pregnant mothers have access to HIV information from health-care personnel and so they have a better understanding of the MTCT and PMTCT opportunities. Supporting results were found in the Ethiopian case–control study which showed that mothers who attended ≥ 2 ANC visits were 2.7 times more likely to be tested than those who had

Primigravidae were 1.5 times more likely to accept testing for HIV compared with multigravidas. Supporting our findings is the Ethiopian study in which approximately 59% of primigravidae

were ready to get tested for HIV compared with 36% of multigravida women (20). In Sudan, a previous study also revealed the association between first pregnancy and high acceptance rates for HIV screening (14).

This study showed that pregnant working women were more willing to get HIV tested than were unemployed mothers (OR 2.5). A significant association between employment and rates of HIV screening acceptance was similarly concluded from others studies conducted in Ethiopia (8,20). In our study, these 4 variables are closely related and characterize the current generation of young women who have basic or more education, are employed and are in their first pregnancy. These factors were all associated with the tendency to accept HIV testing.

A statistically significant association was observed between willingness to have HIV testing and ownership of a radio (OR 2.1). Unlike television, the radio is commonly used by Sudanese woman around the home and is also accessible via mobile telephones. It would have been better to investigate listening to the radio rather than merely ownership of one. Inconclusive results were reported from Uganda where Muzoora et al. stated that women who listened to the radio expressed more willingness to be tested for HIV, but their results were not significant (16). The radio remains an inexpensive household commodity and a medium that can be utilized by health educators to encourage HIV counselling and testing.

Pregnant women whose husbands were aged ≥ 35 years had higher acceptance rates of HIV testing than those with younger husbands. However, 40.3% of the 231 women who expressed unwillingness to be tested said they needed their husband's approval first. It would have been more informative if we had assessed the influence of husband's agreement to HIV testing on both groups. In Ghana, a study showed that women who thought their husbands would approve were approximately 6 times more likely to report a willingness to be tested compared with those who thought their husbands would not approve (21). Many of these women also expressed unwillingness to get tested before obtaining their husband's approval (16,20). Women of the Christian faith (almost all of them from South Sudan) had higher acceptance rates. This was expected, as women from South Sudan have been shown to have greater knowledge of HIV prevention compared with the rest of Sudan (22).

There were some limitations to the study. The study population, pregnant women attending ANC, are a health-seeking group, who may be keener to accept testing than those not attending ANC clinics. Also 12% refused participation and this may have led to possible bias due to the fact that women who agreed to participate in the study 'were likely to accept HIV testing compared with women who refused participation. However, we assumed that the distribution of the sociodemographic characteristics may not differ much between the 2 groups. The study

would have been more stable if the sample size were larger to reduce the variance. Variables such as Christian faith and second marriage had a large variance and wide CIs because of the small number of women in them and were only significant because of the magnitude of the estimated ORs. The role of husbands was not studied in this research and we expect that in Sudan the husband may be instrumental in the tendency to accept or reject testing for HIV infection. Listening to the radio would have been more informative as a predictor than ownership of a radio.

Conclusion

This study showed that pregnant women’s sociodemographic characteristics were closely associated with their willingness to accept HIV testing offered by ANC services. Education at school about HIV and PMTCT could be central in influencing later acceptability and removing the stigma. The media, especially the radio, would be an inexpensive means of reaching husbands and wives. Maximizing efforts to inform women during ANC visits reduces the lost opportunities of reaching pregnant women with relevant PMTCT advocacy. These, however, would not be of a real value without true expansion of ANC services.

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Competing interests: None declared

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