

## SHORT REPORT

# HIV prevalence and related risk behaviours in female seasonal farm workers in Souss Massa Draa, Morocco: results from a cross-sectional survey using cluster-based sampling

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## ABSTRACT

**Objectives** To determine prevalence of HIV and HIV-related behaviours in female seasonal farm workers (FSFWs) in two provinces of Souss Massa Draa (SMD) region in Morocco. SMD has a higher burden of HIV compared with other parts of Morocco and is characterised by a substantial aggregation of FSFW.

**Methods** We carried out a cross-sectional HIV biobehavioural survey using cluster-based sampling of farms in the provinces Chtouka Aït Baha and Taroudant Ouled Teïma in 2014. HIV testing was done using the Determine HIV-1/2 rapid test and reactive specimens were tested using ELISA and western blot. Collected data were post hoc weighted for region-based stratification and adjusted for clustering effects using complex survey functions of SPSS (V.21).

**Results** Among those eligible to participate, the response rate was 92.8%. HIV prevalence was 0.9% (95% CI 0.4% to 2.4%) among 520 recruited participants. A high proportion of respondents (67.7%) had no education. Ever having sex was reported by 79.8% and among these, 12.7% ever exchanged sex for money or goods. Sixty-one per cent reported condom use at most recent commercial vaginal sex in the past 12 months. STI symptom recognition was found to be low because 62.4% and 46.8% of FSFW could not report any STI symptoms in men and women, respectively. Twenty-seven per cent of respondents had an HIV test in the past 12 months. In multivariable analysis, those with primary or higher education (adjusted OR (aOR)=2.38, 95% CI 1.33 to 4.27) and those who participated in an HIV educational session at their workplace (aOR=11.00, 95% CI 3.99 to 30.31) had higher odds of ever been tested for HIV.

**Conclusions** Although we found a relatively low HIV prevalence among FSFW in SMD, HIV interventions should be intensified, in particular, in a subgroup of women who are involved in sex work.

## INTRODUCTION

An estimated 28 740 (20 000–37 000) people were living with HIV in Morocco in 2014, with the estimated HIV prevalence of 0.14% (0.10%–0.18%).<sup>1</sup> The HIV epidemic is concentrated in key populations.<sup>1</sup> According to the mode of transmission

analysis, clients of female sex workers and men who have sex with men are the largest drivers of HIV epidemics as they contribute with 24.7% and 22.4%, respectively, to incident HIV infections.<sup>2</sup> Souss Massa Draa (SMD) region in south Morocco has higher HIV prevalence in several population groups compared with the rest of Morocco.<sup>3</sup> Among a total of 10 017 reported HIV cases in the period 1984–2014, 24% were from SMD.<sup>1</sup> The total population of SMD was 2.671 933 in 2014, while the whole Morocco had 33.762 036 inhabitants.<sup>4</sup>

The SMD region has a substantial aggregation of female seasonal farm workers (FSFWs), whose estimated population size is approximately 50 000.<sup>5</sup> Qualitative evidence indicates that there might be considerable HIV-related vulnerability in FSFW due to poor socioeconomic status and involvement in sex work.<sup>6</sup>

The objectives of this study were to determine the prevalence of HIV and HIV-related risk behaviours in FSFW in SMD and to explore the correlates of ever being tested for HIV.

## METHODS

We implemented an HIV biobehavioural survey using cross-sectional design with cluster-based sampling in the provinces Chtouka Aït Baha (CHT) and Taroudant Ouled Teïma (TAR) in SMD due to the high concentration of farms in these provinces. We calculated the sample size based on the estimated prevalence of condom use at last sex of 60%, the width of the 95% confidence interval of 6% and the design effect of two. This yielded the sample size of 520. Reliable information about the size of farms (maximum number of FSFW per farm) was not available during the study planning, so a similar number of farms were randomly chosen from a list of all farms (17 in CHT and 20 in TAR). In the next stage, a fixed proportion of participants were selected applying systematic random sampling from daily list of workers. Given that all the sampled farms routinely listed and all their workers on a daily basis, we used these lists as sampling frame. After the first number was randomly selected from a list of workers as the starting point, systematic random sampling was carried out



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by applying the appropriate interval until 10% of workers per site were selected in the study. Data collection on the farms was done during March and April 2014 by field teams from local non-governmental organisations. Eligibility criteria for participation in the survey included a female aged 18–55 years who worked as a seasonal farm worker in SMD for at least a month before the survey and was willing to give blood for HIV testing, complete a behavioural questionnaire and give a verbal informed consent. To minimise selection bias due to low literacy, participants completed a questionnaire in a face-to-face interview.

The questionnaire explored domains of sociodemographic information, knowledge of STIs, knowledge about modes of HIV transmission assessed according to the Global AIDS Response Progress Reporting indicators, use of alcohol and drugs, sexual behaviours, access to condoms, HIV testing and use of HIV prevention services.<sup>7</sup> Participants were tested for HIV using the Determine HIV-1/2 rapid test (Abbott Laboratories, Santa Clara, USA) and received pretest and post-test counselling. Reactive specimens were tested using ELISA and western blot. Ethical Committee of the Faculty of Medicine in Casablanca approved the study protocol.

To analyse the data we applied post hoc weighting for unequal population sizes of seasonal workers in TAR and CHT.

Region-specific weights were computed by dividing a region-specific proportion of migrant workers (0.15 for Taroudant and 0.85 for Chtouka) in the estimated population of migrant workers employed in both regions by the region-specific proportion of migrant workers in the pooled sample (0.5 and 0.5). In addition, SEs were adjusted for cluster sampling-based intraclass correlation using complex survey function in IBM-SPSS 21 statistical software package. Population proportions were calculated with 95% CIs applying bootstrapping with 2000 resamplings.

Next, bivariable and multivariable logistic regression using complex survey function was used to explore correlates of ever being tested for HIV among sexually active participants. The selection of variables included in the regression model was guided by the literature and by our study aim. Along with age (as a confounder), level of education, marital status and income variables that were in the bivariable analysis associated with the outcome at the level of  $p < 0.20$  were included in the multivariable assessment. The cut-off for considering an association to be statistically significant in multivariable analysis was set up at  $p < 0.05$ . Participants with missing values were excluded from the analysis.

## RESULTS

Among those eligible to participate the response rate was 92.8%. The main reasons for non-participation were refusals to

**Table 1** Bivariable and multivariable logistic regression analysis of correlates of ever being tested for HIV among female seasonal farm workers who reported ever having sex

|  | n/N*    | Weighted estimates ( $N_{(\text{weighted model})}=407$ ) |         |                       |         |
|--|---------|--|---------|-----------------------|---------|
|  |         | OR (95% CI)  | p Value | aOR (95% CI)          | p Value |
| Age (years)  |         |  |         |                       |         |
| 18–24  | 11/38   | 1  |         | 1                     |         |
| 25–34  | 41/121  | 1.24 (0.54 to 2.85)                                      | 0.60    | 1.51 (0.58 to 3.94)   | 0.51    |
| ≥35  | 69/253  | 0.90 (0.34 to 2.42)                                      | 0.83    | 1.42 (0.49 to 4.15)   | 0.46    |
| Education  |         |  |         |                       |         |
| No education   | 78/310  | 1  | 0.01    | 1                     |         |
| Primary and higher   | 44/99   | 2.38 (1.27 to 4.48)                                      |         | 2.38 (1.33 to 4.27)   | <0.01   |
| Marital status   |         |  |         |                       |         |
| Single   | 26/69   | 1  |         | 1                     |         |
| Married  | 64/236  | 0.62 (0.30 to 1.29)                                      | 0.20    | 1.08 (0.40 to 2.94)   | 0.88    |
| Divorced   | 26/77   | 0.87 (0.40 to 1.89)                                      | 0.71    | 1.10 (0.43 to 2.83)   | 0.84    |
| Widowed  | 5/30    | 0.35 (0.06 to 2.04)                                      | 0.24    | 0.61 (0.09 to 4.20)   | 0.61    |
| Income earned in the past 3 months (in Moroccan Dirhams)†      |         |  |         |                       |         |
| 0–3000   | 41/131  | 1  |         | 1                     |         |
| 3001–5000  | 65/240  | 0.83 (0.29 to 2.39)                                      | 0.73    | 0.73 (0.24 to 2.22)   | 0.57    |
| ≥5001  | 15/39   | 1.46 (0.53 to 4.04)                                      | 0.45    | 0.80 (0.31 to 2.12)   | 0.65    |
| Ever participated in an HIV educational session at a workplace |         |  |         |                       |         |
| No   | 105/390 | 1  |         | 1                     |         |
| Yes  | 16/20   | 10.38 (4.15 to 25.93)                                    | <0.001  | 11.00 (3.99 to 30.31) | <0.001  |
| Ever been pregnant   |         |  |         |                       |         |
| No   | 38/104  | 1  | 0.12    | 1                     |         |
| Yes  | 84/308  | 0.65 (0.37 to 1.13)                                      |         | 0.78 (0.42 to 1.44)   | 0.41    |
| Ever sold sex  |         |  |         |                       |         |
| No   | 98/359  | 1  |         | 1                     |         |
| Yes  | 24/53   | 2.28 (0.91 to 5.71)                                      | 0.08    | 1.9 (0.61 to 5.92)    | 0.26    |
| HIV knowledge‡   |         |  |         |                       |         |
| Score 0–4  | 94/317  | 1  |         | –                     |         |
| Score 5  | 17/51   | 1.19 (0.56 to 2.50)                                      | 0.64    | –                     |         |

\*Estimation of number of participants in bivariable analysis adjusted for weights.

†Ten Moroccan Dirhams equal to US\$1.03; Income was categorised according to the distribution of the variable in the sample: (1) 0–25 percentile, (2) 26–75 percentile and (3) 76–100 percentile.

‡HIV knowledge was assessed according to the Global AIDS Response Progress Reporting for the year 2016.<sup>7</sup>

aOR, adjusted OR.

answer questions on sexual behaviours and test for HIV. Among 520 included participants, the estimated HIV prevalence was 0.9% (95% CI 0.4% to 2.4%; 1.2%, unadjusted). Mean age was 35.2 (35.5, unadjusted) years and the mean income earned in the past 3 months was 4318 (4372, unadjusted) Moroccan Dirhams (equivalent to US\$445). Slightly less than a half of participants were married, one-third were single and 15.1% (17.1%, unadjusted) were divorced. As high as 67.7% (64.0%, unadjusted) had no education. Ever having sex was reported by 79.8% (77.5%, unadjusted) and a minority (7.9%; 8.0%, unadjusted) reported two or more partners in the past 12 months. Among those sexually experienced, 12.7% (14.6%, unadjusted) reported ever exchanging sex for money or goods. Condom use at most recent commercial vaginal sex in the past 12 months was reported by 61.2% (67.4%, unadjusted). The most frequently mentioned reason for not using a condom was trust in client and non-availability of condoms. Clients of women who engaged in sex work were most commonly reported to be farm workers, truck and taxi drivers. No respondent reported injecting drug use while alcohol consumption in the past 12 months was reported by 1.5% (2.3%, unadjusted).

Sixty-two per cent (62.4%, unadjusted) and 46.8% (41.2%, unadjusted) of participants could not recognise any STI symptoms in men and women, respectively. Only 11.0% (11.0%, unadjusted) of participants correctly identified both ways of preventing the sexual transmission of HIV and rejected major misconceptions about HIV transmission. About half of participants knew where HIV testing can be done, whereas only 29.7% (35.5%, unadjusted) and 26.5% (27.3%, unadjusted) were ever tested and tested in the past 12 months and knew the result, respectively. Six per cent participated at HIV educational sessions at farms.

Table 1 shows correlates of ever being tested for HIV using weighted bivariable and multivariable regression analysis (results of the unweighted analysis are shown in table 1A in the online supplementary material). Participants with primary or higher education (adjusted OR (aOR) 2.38, 95% CI 1.33 to 4.27) and those who participated in an HIV educational session at their workplace (aOR=11.00 95% CI 3.99 to 30.31) had higher odds of having been tested for HIV.

## DISCUSSION

We found a relatively low HIV prevalence among FSFW in SMD. A sizeable proportion of women reported ever being involved in sex work, which in the context of the population size of FSFW indicates the need to intensify HIV prevention efforts and carry out similar studies in other parts of Morocco with a high concentration of farm workers.

Compared with other populations at higher risk of HIV, FSFW can be relatively easily reached with prevention efforts at their workplace, which should include raising knowledge about HIV and STIs, provision of condoms and HIV testing and referral to treatment for those who test positive.<sup>8</sup> Involvement of male farm workers in HIV interventions is crucial because they were the most commonly mentioned category of clients of FSFW who reported selling sex. Our results are consistent with those from other studies that report increased susceptibility of risk of HIV among farm workers.<sup>9 10</sup>

The key limitation is due to the fact that the behavioural questionnaire was completed in a face-to-face interview, so respondents might not have reported certain practices and behaviours accurately because of social desirability bias. A small number of women refused to participate because they

did not want to be tested for HIV, but it is not known whether they were more likely to be HIV positive. Among the presented variables, refusals to answer ranged from 1% to 3%. However, 13.7% refused to answer the question on ever selling sex, which could have led to underestimation of this indicator. As the study was carried out in two out of six provinces of SMD, the generalisability of the findings at the regional level is limited.

In conclusion, this was the first biobehavioural survey in FSFW in Morocco. It demonstrated the feasibility of recruiting FSFW into an HIV survey and collecting sensitive behavioural and bio-marker data. The findings point to a need to scale up HIV interventions and prevent further transmission in this rather large and socially vulnerable population group, particularly focusing on a subset of FSFW who engage in sex work. Future studies should aim to understand what circumstances lead FSFW to engage in sex work and factors that affect preventive behaviours, such as condom use, and uptake of services, such as HIV testing.

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**Data sharing statement** Data are available for further publications and for planning of HIV interventions, primarily for the Ministry of Health of Morocco.

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