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Decreased workforce participation among persons living with HIV/AIDS in France in the era of highly active antiretroviral therapy: differences according to socioeconomic status

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Summary (178 words)

Objectives: This study aimed to measure the differential in employment rates between HIV-seropositive versus –seronegative persons and to establish whether this differential varied according to HIV-infected persons' socioeconomic position as defined by educational level.

Methods: We used data from the ANRS-EN12-VESPA study, a large cross-sectional survey conducted among a nationally representative sample of 2932 HIV-infected patients in France. Age, gender, nationality and education-standardized employment rates were estimated using the French general population as reference. The differentials in employment rates with the general population were computed overall and according to educational level.

Findings: Compared to the general population, overall employment rate was 25% lower (95% confidence interval [16%; 32%]) among patients diagnosed HIV-infected before 1994 and 9% lower [5%; 16%] among those diagnosed HIV-infected from 1994 onwards. The differential in employment rates with the general population was significantly higher among patients with a low education. The employment rate of highly educated patients diagnosed HIV-infected from 1994 onwards did not differ from that of the general population.

Conclusions: HIV infection is associated with decreased workforce participation among the low- but not the high-educated individuals.

Introduction

Employment is a major factor in maintaining income levels and living conditions, especially among patients with long-lasting chronic diseases [1]. Moreover, unemployment has been shown to be an independent predictor of morbidity [2] and mortality from suicide and external causes [3-5] in the general population, thus contributing to social health inequalities in the general population [6].

Studies have shown evidence for the existence of an impact of different chronic conditions on employment status: rheumatoid arthritis [7, 8], diabetes [9-11], impaired cardiac function [12] and limiting longstanding illness [13, 14]. This harmful effect of chronic illness on employment has been shown to be higher among the groups with the lowest position in the labour market, i.e. women, low-educated persons, manual workers and those with the most physically demanding work [15].

In Western countries, since 1996 and the wide-scale diffusion of highly active antiretroviral therapies (HAART), HIV infection has become a chronic disease; moreover, the epidemic has shifted towards more socially vulnerable populations, especially migrants [16-19]. In this context, social aspects of HIV infection have emerged as key factors for the management and progress of the disease. Stable partnership and temporary employment have been shown to constitute independent predictors of health status during the course of the disease as measured by the risk of progression towards AIDS or death [20] or the risk of all-cause hospitalisation or death [21]. Moreover, since HIV infection mostly affects young adults, patients' social situation at the time of diagnosis is still largely in evolution, making it likely to be influenced by the disease. The deleterious social impact of HIV infection is

likely to be amplified among patients who have the least favourable socioeconomic position at disease outset [22].

Studies have reported persistent high unemployment rates among persons living with HIV/AIDS in the era of HAART, ranging from 45 to 65% [23-28]. Such unemployment rates are likely to be the result of a debilitating effect of HIV disease on workforce participation, but they may also at least partly reflect sociodemographic or behavioural disadvantages regarding workforce participation (i.e., female gender, advanced age, low educational level, manual occupation, foreign-nativity, low educational level, manual occupation, intravenous drug use) existing prior to HIV infection.

The present study aimed to measure the differential in employment rates between the population of persons living with HIV/AIDS in France in 2003 and the French general population, while taking into account differences in the socio-demographic and educational structure of these two populations. Our secondary objective was to establish whether this differential varied according to HIV-infected persons' socioeconomic position as measured by educational level.

We used data from a French national representative sample of HIV-infected hospital outpatients. In France, access to care for HIV infection is universal and, since antiretroviral treatments are provided exclusively through hospital physicians' prescription, HIV infection is mostly managed through hospital outpatient clinics, regardless of disease severity [29]. The sample we used has been constituted specifically with the concern for reflecting the diversity of the HIV epidemic in terms both of individuals' and disease management characteristics, thus allowing us to account for the great heterogeneity in the situations encountered at the country level.

Material and Methods

We used data from the ANRS-EN12-VESPA study, a large cross-sectional survey aimed at studying the social situation and living conditions of HIV-infected persons in France. The study design has been detailed elsewhere [30]. The study was conducted between December 2002 and September 2003 among a random stratified sample of 4,963 HIV-infected outpatients recruited in 102 French hospital departments delivering HIV care. The stratification criteria were departments' geographic location and size of HIV caseload. Eligible patients were those diagnosed as being HIV1-infected for ≥6 months, either French or living in France for ≥6 months, and aged ≥18. Patients with very poor understanding of the French language were excluded.

Patients who agreed to participate signed an informed consent and answered a face-to-face standardized questionnaire administered by a trained interviewer. Information on HIV disease and health status characteristics was documented from medical records.

Non response rate was 41% of the randomized patients overall, with substantial differences according to patients' HIV transmission category, employment status and immunological status. Major socio-demographic and health-related characteristics were collected both among respondents and non-respondents, allowing for a weighting procedure to take into account this participation bias. This weighting procedure included two steps: first, considering the unequal probability of enrolment related to the heterogeneous frequency of patients' hospital visits, a weight was attributed to each individual corresponding to the inverse number of hospital visits he(she) had reported for the preceding year; second, to account for non-response, an additional weight was computed using a method of calibration adjustment [31], in such a way that the weighted distribution of the participants regarding transmission group, employment status and immunological status was comparable to that of the entire eligible population.

Information on the French general population was obtained from the National Institute for Statistics and Economic Studies (Institut National de la Statistique et des Etudes Economiques, INSEE). Each year, the 'Labour Force Survey' is conducted in France as in each country of the European Union among a nationally representative sample of persons aged 16-64 years living in private households in order to produce information on the labour force in Europe [32]. Employment rates are computed according to age, gender, nationality (documentation of ethnicity is not allowed in such studies in France) and educational level. For the present analyses, we used data from the 2002 survey (N=38,164).

For each subject, information was available on the employment status at the time of the study and on major socio-demographic characteristics: gender, age and nationality; educational level, dichotomized as low (pre-primary, primary and secondary education) and high (post-secondary education), was used as an indicator of individuals' socioeconomic position. Moreover, information on past or current intravenous drug use was available for participants of the ANRS-EN12-VESPA study.

Analyses were restricted to participants of working age (<60 years). Given that HIV-infected persons diagnosed from 1994 onwards have benefited from HAART advent much more than those diagnosed earlier, our analyses were performed separately according to the period of HIV diagnosis [before 1994 / from 1994 onwards]. Direct standardization was used to estimate age, gender, nationality and education-standardized employment rates among HIV-infected individuals, using the sample of the general population as reference. That is, we calculated the employment rates expected among HIV-infected participants stratified by period of HIV diagnosis, assuming they had the same distribution as the general population

regarding socio-demographic characteristics, i.e. gender, age (categorized as <35 / 35-49 / ≥50 years), nationality (French / others), and socioeconomic position measured by educational level. The differentials in employment rates between HIV-infected persons and the general population were computed overall and separately according to educational level. These differentials were calculated using the difference between 100% and the ratio of each standardized employment rate to the reference one. Confidence intervals of the standardized rates and of the rates differentials were computed using bootstrap, which allowed accounting for data weighting.

Given that in the analysis described above: 1) to avoid empty strata, nationality was dichotomized rather than categorized according to the country of origin and 2) information on intravenous drug use could not be accounted for because it was missing for the reference population, we considered that this analysis may fail to account for all differences potentially associated with employment rate between HIV-infected individuals and the general population. Thus, a complementary analysis restricted to French citizens and non drug users HIV-infected individuals was performed to check the reproducibility of our results in a more homogeneous sub-sample.

All statistical analyses were performed using Stata 7.0® (Stata Corporation, College Station, TX).

Results

Study population

Among 4,963 eligible patients, 2,932 participants were included in the ANRS-EN12-VESPA study (global response rate 59%). Two hundred and sixty four were not solicited because of major cognitive impairment or health problems, while 1,767 patients declined to participate. Patients who refused most frequently cited a lack of time. Non-respondents were more likely than respondents to be employed at the study time and to have been HIV-infected through a way other than homo/bisexual contacts.

For the present analysis, we considered the 2,750 participants of the ANRS-EN12-VESPA study aged <60 at the time of data collection. Median time since HIV diagnosis at the time of the study was 10 years (range: 6 months to 21 years): 1,442 had been diagnosed as being HIV-infected before 1994 and 1,308 from 1994 onwards. Of the participants, 592 were past or current intravenous drug users (454 diagnosed before 1994 and 138 diagnosed later). The sample of the general population included 35,423 individuals aged <60. In comparison to the general population, HIV-infected participants were more frequently males (respectively, 73.2% of those diagnosed before 1994 and 68.1% of those diagnosed from 1994 vs. 49.6% of the general population), aged between 35 and 49 years (respectively, 77.6% and 53.2% vs. 35.4%) and non-French citizens (respectively, 9.6% and 29.0% vs. 6.6%); this latter difference being almost exclusively related to a much higher proportion of individuals originating from sub-Saharan Africa among the HIV-infected population (respectively, 2.5% and 19.6% vs. 0.8%) (Table 1).

Employment rates

As shown in Figure 1, crude employment rates reached 53.9% among patients diagnosed as being HIV-infected before 1994 and 59.3% among those diagnosed as being HIV-infected from 1994 onwards. Substantial differences were observed according to individuals' socio-demographic and educational characteristics with lower rates of employment among females (respectively, 44.6% among HIV-infected females diagnosed before 1994 and 46.9% among those diagnosed later vs. respectively, 57.3% and 65.1% among males), non-French citizens (49.5% and 47.0% vs. respectively, 54.3% and 64.3% among the French), and low educated individuals (48.5% and 53.4% vs. respectively, 66.5% and 72.7% among the high educated). After standardization for characteristics of individuals' socio-demographic and educational situation, estimated employment rates were 49.0% (95% confidence interval: [44.7%; 55.1%]) among HIV-infected individuals diagnosed before 1994 and 59.3% [55.0%; 61.9%] among those diagnosed later. Overall employment rate reached 65.3% in the general population, with lower rates among females, non-French citizens, persons aged below 35 and those with a low education.

Differential in employment rates between HIV-infected persons and the general population

As shown in Figure 2, by comparison to the general population, overall standardized employment rate was estimated to be 25% lower [16%; 32%] for HIV-infected patients diagnosed before 1994 and 9% lower [5%; 16%] for those diagnosed later.

The differential in employment rates between HIV-infected participants and the general population varied according to individuals' socioeconomic position. For HIV-infected individuals diagnosed from 1994 onwards, the employment rate differential with the general population was significantly greater among those with a low education (differential of 14% [7%; 20%]) than among those with a high education, whose employment rate was comparable to that of the general population of same socio-demographic and educational characteristics

(differential of -1% [-8%; 8%]). Among HIV-infected individuals diagnosed before 1994, the difference was less marked although a similar trend was observed (differentials of 29% [22%; 39%] and 17% [-2%; 30%], respectively).

Results remained unchanged when analyses were performed excluding non-French citizens and the HIV-infected injecting drug users.

Discussion

As HIV infection is moving towards population sub-groups with poor socioeconomic status, estimating the social impact of the disease appears to be a key issue. To our knowledge, this study is the first to compare a large and diverse sample of HIV-infected persons with the general population regarding a major aspect of patients' living conditions, i.e. employment, allowing us to provide original information on this question.

The ANRS-EN12-VESPA study, thanks to its large randomized sample of HIV-infected hospital outpatients from all over France, provides a unique dataset to study the social aspects of HIV infection in their diversity at the level of a country. Non response reached 41% of the patients randomized for the study, with higher rates of refusal among those employed, mostly attributed to a lack of time for answering the questionnaire. However, the information on employment status was collected both for respondents and non-respondents, allowing for a weighting procedure to account for this participation bias. Thus, employment rates reported in this study are likely to be generalizable to the whole population of persons living with HIV/AIDS and followed at hospital in France in 2002-2003 and allow comparisons with data from the French general population.

Both data on HIV-infected individuals and the general population were collected between 2002 and 2003, a period over which labour market characteristics did not encounter major changes in France, thus allowing for appropriate comparisons between the two datasets. In Western countries, HIV infection preferentially reaches selected groups of the population with specific socio-demographic and behavioural characteristics which may themselves be associated with employment rate. Indeed, the frequency of drug use is particularly high among HIV-infected persons (20% of the participants of the ANRS-EN12-VESPA study were

past or current drug users, versus <1% in the French general population [33]). Moreover, non-French HIV-infected persons are characterized by a recent date of immigration (median time since immigration at the time of HIV diagnosis was 1 year among migrants of the ANRS-EN12-VESPA study) and a high frequency of migration from regions of high HIV prevalence, especially sub-Saharan Africa (55% of the migrants of the ANRS-EN12-VESPA study were born in sub-Saharan Africa versus 9% in the French general population) [19]. However, results were similar when non-French citizens and HIV-infected drug users were excluded from the analyses, suggesting that our findings are not explained by these differences.

Our results show that in France, the overall differential in employment rates between persons living with HIV/AIDS in the HAART era and the general population persists after accounting for the socio-demographic and educational differences between these populations. Logically, the differential in employment rates with the general population appears to be more marked among patients whose HIV infection has been diagnosed before 1994, i.e. those whose disease has had the time to progress before they could benefit from HAART. However, our results show that even among patients who have had access to effective therapies from the early times of their HIV infection, employment rate in 2003 is significantly lower than in the general population.

Although the present study precludes from drawing any conclusion on a causal relation between HIV infection and workforce participation, the persisting differential in employment rates we have shown is likely to reflect an independent influence of HIV disease on employment status. First, HIV infection may constitute a barrier to access (or return) to work for those unemployed: studies have reported that although large proportions of unemployed HIV-infected persons have contemplated work re-entry as efficient treatments have emerged,

few have actually done so [28, 34-37]. Moreover, HIV disease may constitute a cause of employment loss. The existence of a phenomenon of employment loss during HIV infection has been reported in several studies: among the 319 patients followed in the French PRIMO prospective cohort from 1996, almost one patient in employment out of five (18%) had lost his job after a median time of 2.5 years since HIV infection [38]. In a representative sample of US HIV-infected patients, 6% of those employed had lost their job within the first 6 months of HAART [27]. Additionally, data on employment trajectory since HIV diagnosis collected retrospectively in the ANRS-EN12-VESPA study indicate that 28% of the 647 patients HIV-diagnosed since 1996 and employed at the time of diagnosis had lost their job in 2003; HIV was reported to have played an important role in employment loss by 52% of them (data available on request). Both low access/return to work and employment loss may result from the functional consequences of HIV disease. However, in the HAART era the level of HIV-related physical disability is limited, suggesting that additional phenomena are likely to be involved. In particular, HIV-related discrimination from employers may impair individuals' chances of both being recruited and maintaining in employment. Stigma associated with HIV has been shown to be greater than for other chronic conditions including hypertension, diabetes or depression [39]. Among those participants of the ANRS-EN12-VESPA study who were employed in 2003, a large majority (70%) had kept their HIV status secret from their employer and colleagues, probably for fear of stigma, and only 6% reported that they had experienced HIV-related discrimination at workplace. By comparison, this rate reached 13% among those who had lost their employment during the course of the disease (data available on request), suggesting that HIV-related discrimination may have played a role in these employment losses.

Moreover, we have found that the differential in employment rates with the general population is not homogeneous according to the socioeconomic position of HIV-infected patients as defined by educational level. Among high educated patients diagnosed as being HIV-infected from 1994 onwards, employment rate appears to be comparable to that observed in the general population of same socio-demographic and educational level, suggesting that in the HAART era, HIV disease does not impair employment among the socially privileged persons. Nonetheless, our results show marked differences in employment rates with the general population among those who have classically the most disadvantages regarding workforce participation in France [40], i.e. those with a low educational level. As a result, inequalities regarding employment status are likely to be wider among HIV-infected persons compared to the general population. This finding is consistent with studies reporting a socially differentiated impact of HIV infection [38] and various chronic conditions including rheumatoid arthritis [7, 8], impaired cardiac function [12] and limiting longstanding illness [13, 14, 41, 42] on employment status.

Such inequalities may be related to various factors. First, these inequalities may be explained by a poorer health status, i.e. a more severe HIV infection and/or a higher comorbidity among patients of the least advantaged social classes compared to those more privileged. Indeed, we have previously shown the existence of social inequalities in HIV-infected patients' health status in France, despite equal access to care and treatment for the disease [21]. However, a recent study has shown that among HIV-infected patients followed in the French PRIMO prospective cohort, employment loss occurred more frequently among those with adverse socio-economic conditions regardless of markers of HIV severity and comorbidity [38], suggesting that health status does not explain on its own the social inequalities in the consequences of HIV infection on employment. Second, because they have to face adverse working conditions (e.g., low control over work pace and scheduling, high

level of physical demand) and work insecurity (non permanent employment) more often than the others, subjects of the least advantaged social classes are likely to encounter more difficulties in maintaining work once they have to manage their chronic condition. Third, HIV-related stigma has been shown to strengthen the class inequalities that pre-exist in society [43], suggesting that patients who have the most disadvantaged social position may experience more workplace discrimination than the others. Lastly, in France as in other countries HIV-infected persons may receive disability benefits in relation to their disease. For patients qualified only for insecure or casual jobs, workforce (re)entry may jeopardise these benefits and thus the overall financial situation of those receiving them; such benefits may therefore act as a poverty trap among these patients [44]. Further studies with longitudinal design and detailed data both on HIV-infected patients' health status and living conditions (e.g., working conditions, discriminations, resources) are needed to discriminate among the possible mechanisms of such inequalities.

Our findings have important social and public health implications. First, since HIV infection mostly affects adults of prime working age, among whom a substantial and increasing proportion belong to socially vulnerable populations, the influence of HIV disease on employment suggested by our data is likely to translate to a high socio-economic burden in France as in other Western countries. Thus, social interventions are needed to assist HIV-infected persons in accessing employment or in maintaining their work from the earliest times of the disease. Such interventions should include adjustment of working conditions for HIV-infected persons in employment, actions of work incentive for those inactive and the implementation of measures aimed at fighting HIV-related discriminations, especially at the workplace. Second, our finding of an increased level of inequalities regarding employment among persons living with HIV compared to the general population is likely to have public

health consequences. Indeed, given previous analyses showing that unfavourable employment status was predictive of poor health status among HIV-infected patients [21], one can think that such an increase in the level of employment inequalities may result in increased social health disparities among persons living with HIV compared to what occurs in the general population. Since social inequalities in health have been shown to be persistently marked among the general population of various Western countries [45], tackling the inequalities in the social consequences of HIV infection appears to be of importance. Thus, social interventions should focus preferentially on the most socially vulnerable populations. In order to design such interventions, further studies should provide a better understanding of the mechanisms of employment loss and should identify barriers to access/return to work during the course of chronic HIV infection.

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Table 1. Characteristics (%*) of the general population and of HIV-infected individuals according to the period of HIV diagnosis.

		General population (N=35423)	HIV diagnosis before 1994 (N=1442)	HIV diagnosis from 1994 (N=1308)
Gender	Male	49.6	73.2	68.1
	Female	50.4	26.8	31.9
Age in 2003 (years)	<35	43.5	7.2	31.4
	35-49	35.4	77.6	53.2
	≥50	21.1	15.2	15.4
Nationality	France	93.4	90.4	71.0
	Other European country	2.9	3.7	4.1
	North Africa	2.2	1.9	2.5
	Sub-Saharan Africa	0.8	2.5	19.6
	Other	0.7	1.5	2.8
Educational level	High	29.0	29.6	30.4
	Low	71.0	70.4	69.6
Past or current intravenous drug use	No	NA	68.1	90.0
	Yes	NA	31.9	10.0

* Data concerning HIV-infected individuals are weighted
NA: data non available

Figure 1. Crude and standardized employment rates (and 95% confidence interval) among persons HIV-diagnosed before 1994 and from 1994 onwards, and employment rate among the French general population.

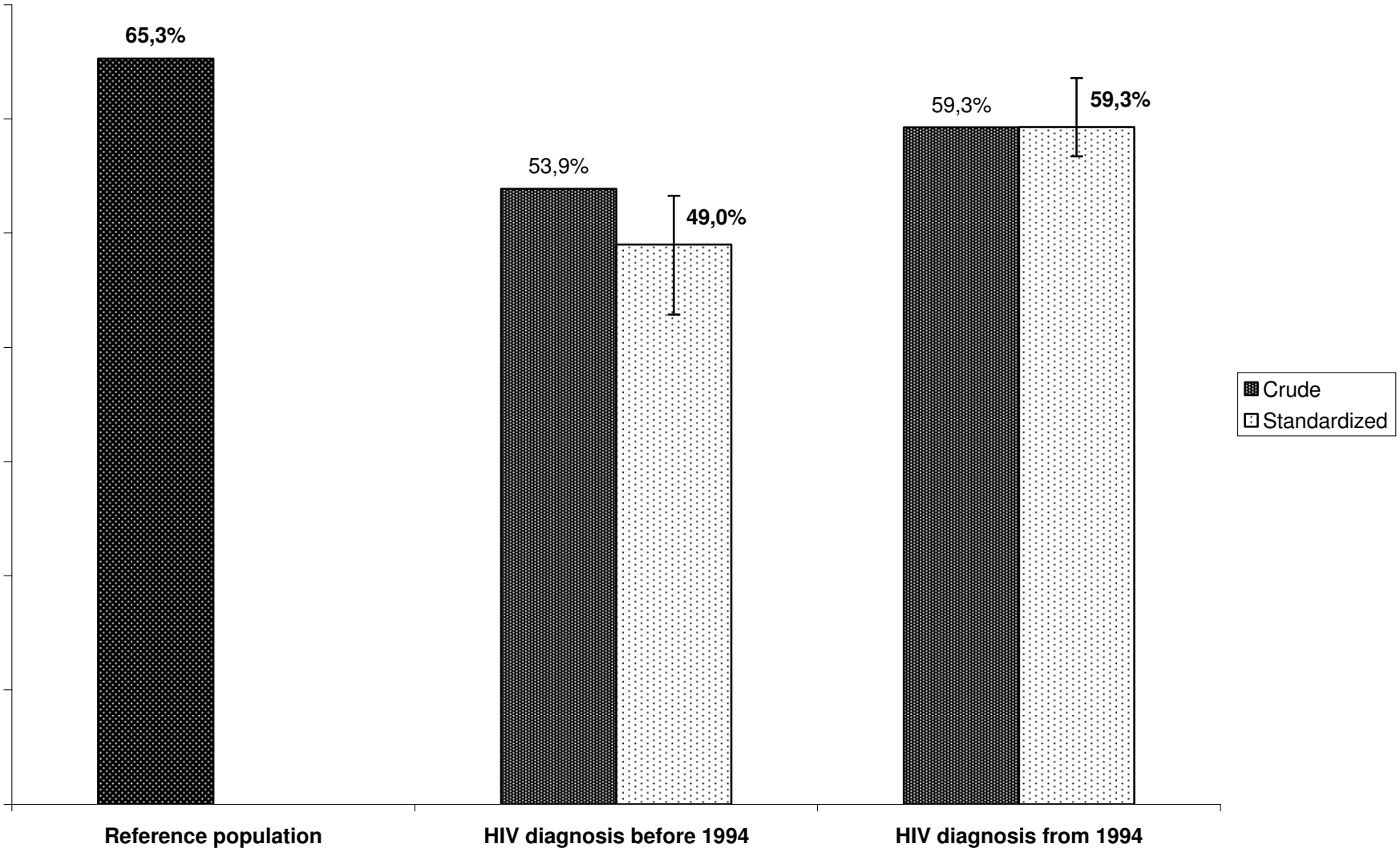
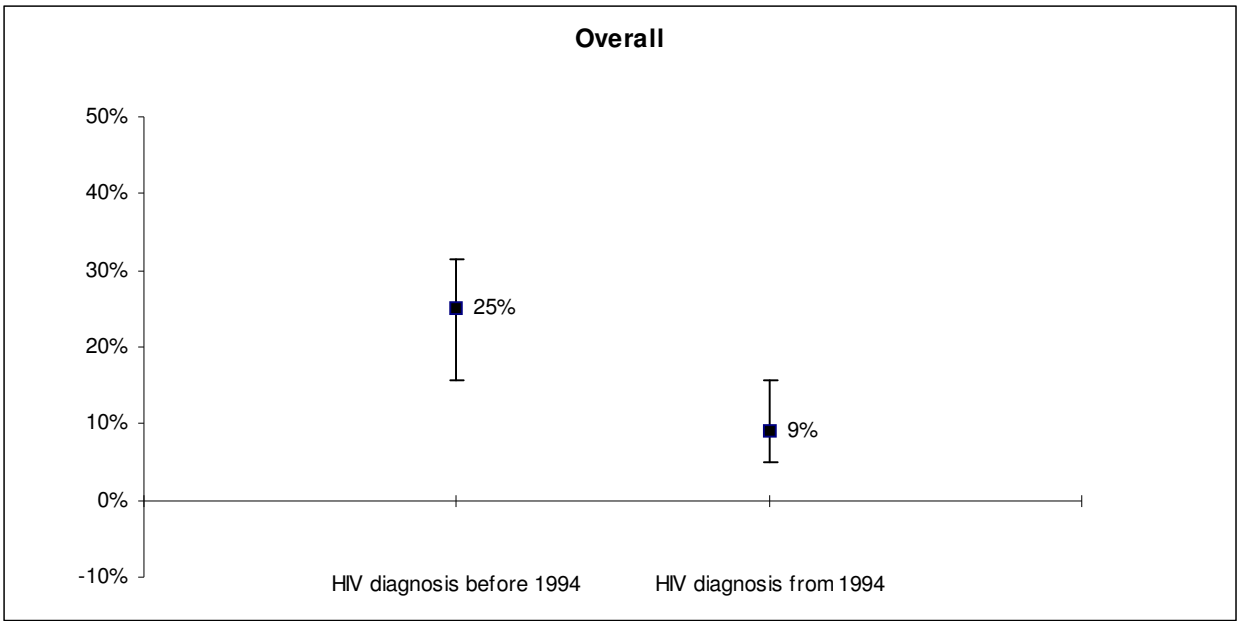
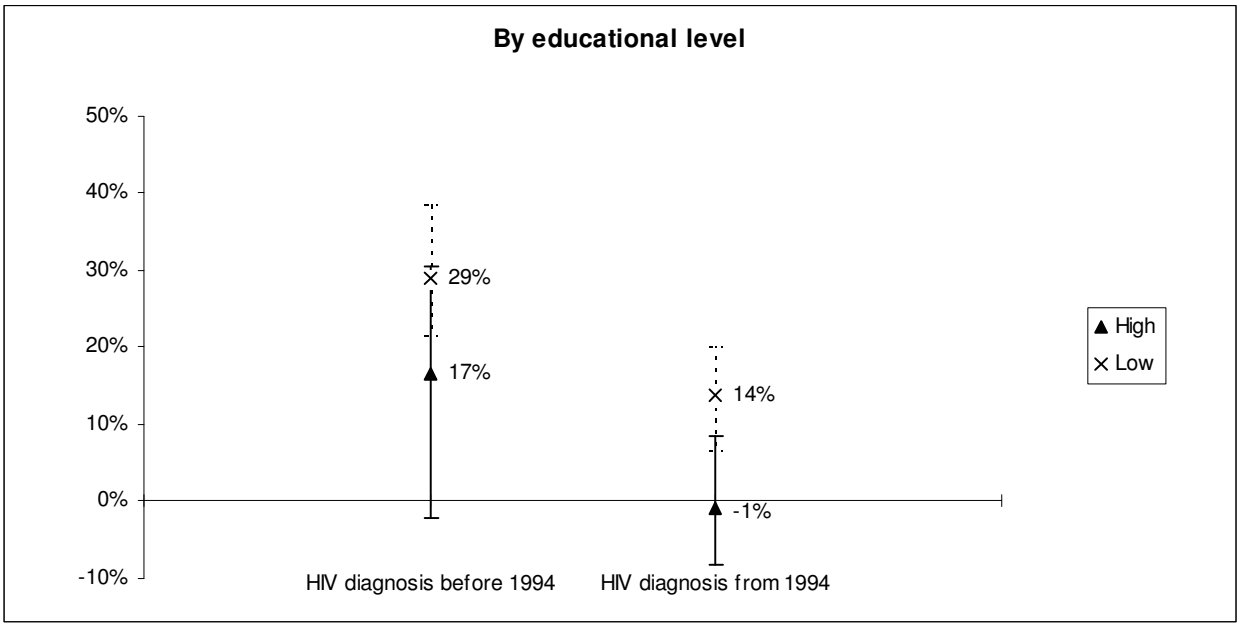

65,3%
53,9%
49,0%
59,3%
59,3%
Crude
Standardized
Reference population
HIV diagnosis before 1994
HIV diagnosis from 1994

Figure 2. Differential in employment rates with the French general population (and 95% confidence interval) among persons HIV-diagnosed before 1994 and from 1994 onwards, overall and according to educational level.





For example, employment rate of individuals diagnosed as being HIV-infected from 1994 onwards and who have a low educational level is 14% lower (95% confidence interval: 7% to 20%) than that of individuals who have a comparable educational level in the general population