

Deprivation and AIDS in a southern European city

Different patterns across transmission group

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Objective: To analyse deprivation and AIDS among three AIDS transmission groups (men who have sex with men – MSM, heterosexuals, and intravenous drug users – IDUs) in Barcelona, Spain, during the period 1990–95. **Methods:** This is an ecological study, the unit of analysis being the neighbourhoods. Included were AIDS cases residents in Barcelona. The association among AIDS rate and deprivation was studied using Spearman correlation coefficients and Poisson regression. **Results:** For MSM, inner city neighbourhood residence meant a greater risk of AIDS; but lower educational level was inversely related with AIDS rates. For heterosexuals, variables related with AIDS rates were younger age, inner city areas and social unrest for women, and extreme poverty for men. Among IDUs variables related with AIDS were unemployment and social unrest for both sexes. **Conclusion:** The association between AIDS rates and deprivation differs across transmission groups in a southern European city.

Keywords: deprivation, epidemiological methods, transmission groups

Spain and other southern European countries have the highest AIDS rates in the European Union.¹ In Spain, AIDS and drug use are heavily related because 60% of AIDS cases are drug users at risk of contracting HIV through both needle sharing and sexual contacts.² Most AIDS deaths are among men who use drugs intravenously, mainly heroin.^{3–5}

The influence of social, cultural and economic forces on the transmission of the HIV infection needs analysis. Poverty, residence in inner-city disrupted neighbourhoods, drug use, prostitution and immigration are some of the social forces that shape HIV transmission.^{6–10} The need to include socio-economic data in AIDS surveillance systems has recently been pointed out,¹¹ but social inequalities in AIDS may change across AIDS transmission groups.

The objective of this study was to analyse deprivation and AIDS in Barcelona over the period 1990–95, among three groups of AIDS transmission (men who have sex with men, heterosexuals, and intravenous drug users).

METHODS

Barcelona is the second largest city in Spain, with 1,650,000 inhabitants. This is an ecological study, the unit of analysis being the neighbourhoods. The sample included 37 of the 38 neighbourhoods, excluding one as an outlier with small population base (1,524 inhabitants).

The population of the others varied between 2,357 and 109,751. All AIDS cases among residents identified by the AIDS registry of Barcelona during the period 1990–95 were included. The city AIDS registry includes all patients diagnosed with AIDS detected by the Epidemiological Surveillance System. This active system gathers data provided by doctors, hospital discharges, mortality data and linkages with the tuberculosis and drug users registers, thus providing an all-embracing data source.¹² Three transmission groups were studied: men who have sex with men (MSM) and were not intravenous drug users older than 14 years (875 cases), heterosexuals who were not intravenous drug users older than 14 years (342 cases) and intravenous drug users (IDUs) (this includes MSM and heterosexuals who were IDUs) between 15 and 49 years (1,632 cases). Other variables in the AIDS registry were sex and age-group categorized by the median age in each transmission group; less than 35 years and more than 34 years in MSM and heterosexuals and less than 25 and more than 25 years in IDUs.

Estimated AIDS incidence rates per 100,000 population in each neighbourhood were age-standardized by the direct method. Indicators of deprivation in the neighbourhood were unemployment (percentage of people unemployed in the census), extreme poverty (proportion of residents with welfare income maintenance payments per 1,000 inhabitants, these are a minimum monthly income for people that do not have any income), low education (percentage of people with less than primary education in the census), overcrowding (percentage of households with more than one person per room) and social unrest (proportion of men over 21 years that had been in jail per 100,000 inhabitants). A

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categorical variable was created for inner city neighbourhoods, including three wards with the poorest social indicators. Other indicators were home ownership (percentage of people that owned their home) and immigration (percentage of people who immigrated from other parts of the country over the period 1950–70).

The association of age-standardized AIDS rates and deprivation in the neighbourhood was studied using Spearman correlation coefficients. Separate analyses were done for each AIDS transmission group and sex. Multivariate analysis was done using Poisson regression.¹³ The dependent variable was AIDS rate in each neighbourhood and the independent variables were age-groups and the neighbourhood social indicators described above, with either conceptual meaning or statistical significance at bivariate analysis.

RESULTS

Most AIDS cases were men: of course, 100% of MSM, but also 78% of IDUs and 50% of heterosexual cases. The mean age was 31 years for IDUs and 40 for the other groups. There were large variations in AIDS rates across neighbourhoods. For MSM, neighbourhoods AIDS rates fluctuated between 4.79 and 97.3 per 100,000 men over 14 years and were higher in the neighbourhoods of the city centre. AIDS rates for heterosexuals varied in men from 0 to 63.5 per 100,000 men older than 14 years and in women from 0 to 35.5 per 100,000 women older than 14 years. AIDS rates in IDUs fluctuated across neighbourhoods: in men from 11.3 to 243.3 per 100,000 men of 15–49 years and in women from 0 to 88.8 per 100,000 women of 15–49 years of age. AIDS rates in heterosexuals and in IDUs were higher in the most deprived neighbourhoods of the city, including the inner city area and some areas with housing projects built for the massive immigration of the 1960s.

Correlation coefficients show that AIDS rates in IDUs are related with unemployment, low education, extreme poverty, social unrest and overcrowding in the area ($r > 0.6$ in men and $r = 0.4$ in women), while AIDS in MSM has a negative association with overcrowding, ownership of household and immigration in the area ($r > -0.5$). AIDS in heterosexuals is related with extreme poverty and social unrest ($r = 0.44$) and has a negative association with home ownership ($r = -0.52$).

Variables related with AIDS rates in the multivariate analysis also changed across transmission groups (table 1). For MSM the risk of AIDS was greater for inner city residence and older age-groups. Lower educational level of the neighbourhood, overcrowding in the neighbourhood and ownership of household had RR lower than 1 and was statistically significant. For heterosexuals, variables related with AIDS rates were less than 35 years of age, inner city neighbourhoods and social unrest for women, and extreme poverty for men. Among IDUs variables related with AIDS rates were more than 24 years of age, unemployment and social unrest for men, and unemployment, inner city neighbourhoods and social unrest (which interacted with age) for women.

DISCUSSION

AIDS rates in MSM were higher in the centre of the city (not only in inner city neighbourhoods) and inversely related with low education, overcrowding and home ownership. Home ownership is not related to socioeconomic level of the neighbourhood in Barcelona. Buildings in the centre of the city are mainly old and a substantial share is in the rental market, while new buildings are sold rather than rented. AIDS for MSM rates are inversely associated with deprivation, although rates are also high in some deprived areas of the inner city area where many gay men linked to show business and the arts live. This AIDS distribution probably reflects the distribution of homosexual's residence.

AIDS in heterosexual and IDUs transmission groups occurs more often in neighbourhoods with higher un-

Table 1 Multivariate association (Poisson regression) among the aids rate and area social variables by sex and aids transmission group. Barcelona 1990–95

	RR	95% CI
Men who have sex with men		
More than 34 years	1.78	1.41–2.25
Low education	0.98	0.96–0.99
Overcrowding ≥ 12.5	0.65	0.52–0.81
Home ownership	0.57	0.48–0.67
Inner city neighbourhoods	3.29	2.54–4.27
		dev=102.781
Heterosexuals		
Men		
Less than 35 years	0.77	0.56–1.06
Extreme poverty (>3)	2.31	1.24–4.33
Inner city neighbourhoods	1.83	0.93–3.60
		dev=71.938
Women		
Less than 35 years	2.52	1.77–3.58
Social unrest (>250)	1.68	1.13–2.50
Inner city neighbourhoods	2.13	1.22–3.71
		dev=92.118
Intravenous drug users		
Men		
More than 24 years	118.4	74.35–188.5
Unemployment	1.23	1.19–1.26
Social unrest (≥ 300)	1.26	1.06–1.49
		dev=141.310
Women		
Unemployment	1.12	1.06–1.18
Inner city neighbourhoods	2.97	2.17–4.08
Less than 25 years and social unrest <300	1	
Less than 25 years and social unrest ≥ 300	0.92	0.45–1.92
More than 24 years and social unrest <300	13.0	5.45–30.96
More than 24 years and social unrest ≥ 300	22.8	10.78–48.38
		dev=128.607

95% CI: 95% Confidence interval
dev: deviation

employment, extreme poverty and social unrest. This distribution has been described by authors showing the association between urban decay and AIDS in the Bronx (New York)¹⁴ and also that AIDS incidence is higher in low income areas than in high income areas^{15,16} and in areas with high socio-economic deprivation and poverty.¹¹ The geographic distribution of IDUs AIDS rates in Barcelona is similar to the distribution of IDUs, which also is related to inner city neighbourhoods, poverty and social unrest.¹⁷

This is an ecological study and the indicators studied are area-based. They have allowed the study of contextual effects influencing AIDS incidence, but not other social effects at an individual level (e.g. social class). More socio-economic information in the AIDS registry would be needed to be able to study individual as well as contextual effects. This information could be used to determine the characteristics of future infected people and therefore to focus the strategies of prevention, treatment and follow-up of AIDS cases.

This study has shown that the association between AIDS rates and deprivation changes across transmission groups. To our knowledge this relationship has not been described before in a southern European country, where the highest AIDS rates among developed countries have been experienced. It is necessary to take into account these facts when the relationship between AIDS and deprivation is analysed and also when prevention strategies are implemented.^{18,19} Currently, we are implementing interventions in the AIDS field designed to assist drug users, both with specific health problems (infectious disease, mental health ...) and with practical needs (housing, food ...). Harm reduction programmes include active search and treatment of organic problems (such as tuberculosis), methadone maintenance programmes, syringe exchange, outreach programmes, legal and occupational support.²⁰

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