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Internalised homonegativity predicts HIV-associated risk behavior in European men who have sex with men in a 38-country cross-sectional study: some public health implications of homophobia

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ABSTRACT

Objectives: Internalised homonegativity (IH) is hypothesised to be associated with HIV risk behaviour and HIV testing in men who have sex with men (MSM). We sought to determine the social and individual variables associated with IH and the associations between IH and HIV-related behaviours.

Design and setting: We examined IH and its predictors as part of a larger Internet-delivered, cross-sectional study on HIV and health in MSM in 38 European countries.

Participants: 181 495 MSM, IH data analysis subsample 144 177. All participants were male, over the age of consent for homosexual activity in their country of domicile, and have had at least one homosexual contact in the past 6 months.

Methodology: An anonymous Internet-based questionnaire was disseminated in 25 languages through MSM social media, websites and organisations and responses saved to a UK-based server. IH was measured using a standardised, cross-culturally appropriate scale.

Results: Three clusters of European countries based on the level of experienced discrimination emerged. IH was predicted by country LGB (lesbian, gay and bisexual) legal climate, Gini coefficient and size of place of settlement. Lower IH was associated with degree the respondent was ‘out’ as gay to others and older age. ‘Outness’ was associated with ever having an HIV test and age, education and number of gay friends, while IH (controlling for the number of non-steady unprotected sex partners and perceived lack of control over safe sex) was associated with condom use for anal intercourse.

Conclusions: IH is associated with LGB legal climate, economic development indices and urbanisation. It is also associated with ‘outness’ and with HIV risk and preventative behaviours including HIV testing, perceived control over sexual risk and condom use.

ARTICLE SUMMARY

Article focus
- Internalised homonegativity (IH) has been implicated as a variable associated with HIV risk behaviours.
- We examined the paths associated with IH in a study of over 140 000 MSM in 38 European countries.
- We established several social structural variables acting through IH to influence HIV testing and condom use.

Key messages
- Gay legal discrimination, size of place of residence and measure of economic inequality were macro-level or country-level variables that influenced IH.
- Low IH, in turn, influenced being ‘out’ and through ‘outness’ HIV testing.
- Perceived control over safe sex and condom use was predicted by IH and the country-level residence, legal and economic variables.

Strengths and limitations of this study
- The study had a large n and with 38 countries, we were able to demonstrate that countries clustered onto a discrimination continuum.
- We demonstrate linkages between macro-level (country), meso-level (community) and micro-level (individual) variables including HIV-associated risk behaviour.
- Effect sizes were sometimes small and of theoretical rather than practical importance.

Homonegative climate is associated with IH and higher levels of HIV-associated risk in MSM. Reducing IH through attention to LGB human rights may be appropriate HIV reduction intervention for MSM.
INTRODUCTION

Disease has classically been associated with disadvantage, with lower socioeconomic and occupational status being associated with chronic disease. Infectious disease has also been disproportionately associated with disadvantage, along with access to health services (expressed by Hart’s inverse care law that those who are most in need of healthcare have the lowest access to it). These patterns of disadvantage extend to targets of discrimination, including women and racial and ethnic minorities. More recently, structural inequalities such as income distribution have been implicated in poor health outcomes and access.

Discrimination is largely based on obvious stigmatising characteristics such as race or appearance, and little attention has been paid to less visible or invisible stigmatising statuses, such as homosexuality and homosexual behaviour. As Ross found, there is no close link between experienced discriminatory acts and expectation of discrimination, because those homosexual men who anticipate the worst outcomes remain the most hidden and are thus less likely to experience discrimination. Poor mental health has been hypothesised to result from internalisation of negative attitudes and assumptions about homosexual people, commonly described as ‘homophobia’. Internalised homonegativity (IH), internalisation of negative attitudes and assumptions about homosexual people by homosexuals themselves lead to feelings of guilt, inferiority and lack of self-worth.

Recent data indicate that IH is directly associated with mental health outcomes, with avoidance of HIV testing and identification as bisexual or straight in men who have sex with men (MSM) (but not HIV-risk behaviours when sexual identification and race/ethnicity were controlled for), and indirectly through the mediators of discomfort with discussing HIV status and condom use. Ryan et al. found that family rejection of gay and lesbian adolescents was associated with an 8.4 times higher likelihood of attempting suicide, 5.9 times higher likelihood of depression, 3.4 times higher levels of using illegal drugs and 3.4 times higher risk of engaging in unprotected intercourse compared with teens who reported no or low levels of family rejection. A recent review of US studies concluded that IH has minimal effect on risk behaviour, although that conclusion has been criticised for being based largely on US data and for assuming a linear relationship between the two variables. However, Ross et al. have demonstrated that IH predicts sexual risk behaviour in gay men in Uganda, where homosexuality is heavily stigmatised. The data suggest that IH may vary significantly from country to country as a function of levels of discrimination at legal and structural levels as well as individual experience: that is, ambient homophobia is a major determinant of IH. European data from over a decade ago indicate that general population homonegativity is negatively associated with religion and immigration, and positively associated with urbanisation and economic development. The European MSM Internet Survey (EMIS) is a European study with a unique opportunity to research IH in a range of political and social settings.

EMIS in 38 European countries is the first pan-European survey of MSM by European researchers. It provides an opportunity to examine IH and both its structural predictors and its associations with HIV risk behaviour in a large and geographically diverse sample, with sufficient countries to enable analysis by country-level (macro) as well as local-level (meso) and individual-level (micro) variables. A short form of Ross and Rosser’s IH scale has recently been developed with culturally stable items to make this possible. We report on an analysis of IH levels by country structural variables including legal discrimination and income inequality, and levels of experienced discrimination and, in turn, its associations with HIV testing and preventive sexual behaviour. We hypothesise that IH will be influenced by legal climate regarding LGB (lesbian, gay and bisexual) variables and possibly other structural issues, and that IH will itself be associated with MSM’s visibility and social context and HIV-related prevention behaviours including HIV testing and condom use.

METHODS

The methods of the EMIS have been described in detail elsewhere. In brief, EMIS is a joint project of academic, governmental and non-governmental partners from 38 countries in Europe (EU and neighbouring countries) to simultaneously run an online survey in 25 different languages during summer 2010. EMIS was designed to inform the planning of prevention interventions for MSM by identifying prevention needs commonly unmet across MSM (priority aims), as well as subgroups of MSM who have many prevention needs poorly met (priority target groups).

Promotion and recruitment

The Internet-based self-completion survey study was promoted online and offline through various media for gay, bisexual and other MSM under the slogan ‘Be part of something huge!’ More than 235 local, national and international lesbian–gay–bisexual transgender websites undertook online recruitment, and many of these organisations also promoted the survey offline via posters, recruitment cards and face-to-face interaction. By visiting a promotion website, men were exposed to banner advertisements inviting them to participate in the study. PlanetRomeo, Manhunt, Qruiser, Qguys and Gaydar sent individual messages to their users inviting them to complete the survey. By clicking on the banner or the study link, potential respondents were directed to a
survey ‘landing page’ and asked to choose 1 of the 25 languages for completion. Once they had chosen a language, the first page described the study, including its purpose, its voluntary and anonymous nature, and gave contact information on how to contact the researchers.

Men were eligible to participate if they were living in Europe, at or over the age of homosexual consent in the country they lived in, sexually attracted to men and/or having sex with men. They also needed to indicate that they understood the nature and purpose of the study and consented to take part.

The survey was physically located on servers owned and administered by the company Demographix.com, whose staff was responsible for testing it across different computer platforms/operating systems and with different web browsers, and managing the technical aspects including back-ups and data delivery to the researchers. The data were protected with a 128-bit SSL encryption server not accessible to the public. We neither collected the IP address of participants’ computer nor installed any cookies on it. The survey was available online between 4 June 2010 and 31 August 2010. EMIS could be completed in any of the 25 languages and the questions were identical in each language version. It took 21 min to complete the survey on average. No study recip- ence was offered. All study procedures were approved by the Research Ethics Committee of the University of Portsmouth, UK (REC 08/09:21).

Data preparation and analysis
At the close of fieldwork, there were 184,469 cases in the consolidated file. Partially completed surveys (moving away from the web page before pressing ‘submit’) were not captured. When downloaded three cases were lost because of data corruption, and 2,427 cases were removed from the dataset because they gave no country of residence or a country of residence outside the study area. A further 544 cases were removed on the basis that they were women, or men with no homosexual desire or experience, gave no age or were under 13 or over 89 years old. This left a total of 181,495 cases meeting the qualifying criteria. Data from 291 cases from European countries and states that did not reach 100 qualifying cases were removed as were 6,995 cases with more than one inconsistency, defined as answers to two questions which could not both be valid. Inconsistent data could be submitted by moving backwards and forwards in the survey and changing previously given answers. It could also be submitted simply by supplying inconsistent answers across one or more questions. Given the length and complexity of the survey, we allowed respondents to have one inconsistency in their given answers; but we excluded all cases with more than one inconsistency, suggestive of random answers being given, which is to be expected in a low-threshold questionnaire like EMIS. This left an analytical sample of 174,209 MSM from 38 European countries.

MEASURES AND ANALYSES
Measures
IH was scored according to the criteria described by Ross et al39 and Smolenski et al39 as an additive scale of 7 items, ranging from 0 to 6 (Cronbach’s α=0.70).

Education was measured using the six levels of the International Standardised Classification of Educational Degrees (ISCED), corresponding to the educational system of each country.

‘Outness’—defined as the proportion of people one is out to as gay or bisexual (family, friends, work or study colleagues)—was measured on a 5-point Likert scale from ‘all or almost all’ to ‘none’.

The proportion of male friends who are also attracted to men was measured on a 6-point Likert scale from ‘almost all of them’ to ‘almost none of them’ and ‘I don’t have any male friends’.

Having ever had an HIV test was a binary (yes/no). We compared this binary variable with the extended variable of how long the respondent had had an HIV test (24 h, 7 days, 1 month, 6 months, 12 months, 5 years, more than 5 years ago) and found that the two measures correlated 0.88. We thus decided to use the binary measure in analyses, particularly given the non-linear nature of the time measure.

Perceived control over sexual risk-taking was measured on a 5-point Likert scale anchored by ‘strongly agree’ and ‘strongly disagree’ with the statement “The sex I have is always as safe as I want it to be.”

The relative frequency of condom use with non-steady partners was measured as “In the last 12 months, how often were condoms used when you had anal intercourse with non-steady male partners?” (6-point Likert scale ‘all or almost all’ to ‘none’).

The number of non-steady anal intercourse partners was asked as ‘How many non-steady partners did you have anal intercourse with in the last 12 months?’ (number).

Sexual diversity of practice: EMIS asked for the recency of a range of sexual practices with non-steady partners. Although this set was originally designed to reflect certain transmission routes for HIV and sexually transmitted infections, it can serve as a proxy for diversity of sexual practices, even if sexual practices with steady partners are not included. Sexual diversity was the sum of the nine different types of sexual behaviours with non-steady partners reported in the past 6 months (mutual masturbation, oral insertive, oral receptive, anal insertive, anal receptive, rimming, being rimmed and insertive and receptive ‘fist-fucking’. These were re-coded as binaries to reflect engaging in them or not in the past 6 months and summed to form a measure of the relative diversity of the respondents’ sexual repertoires (Cronbach’s α=0.77).

Size of settlement was measured on a 5-point scale from a ‘very big city or town (a million or more people)’ to ‘a village/the countryside (less than 10,000 people)’.

Legal climate was measured by scoring the presence of the six legislative measures of LGB status (legal
discrimination) listed by Wikipedia,20 with a high score of six for the presence of all legislative protections (homosexual acts are legal, recognition of same-sex relationships, same-sex marriage, same-sex adoption, gays serve in the military, LGB antidiscrimination laws).

The Gini coefficient of income inequality in a country was extracted from the UN Human Development Report coefficient for all countries (2008) with the exceptions of Cyprus, Malta, Luxembourg and Serbia, which were derived from an identical calculation method using the CIA Gini score (2008). The Gini coefficient ranges from 0 (all people in a country have equal income) to 1.0 (one person has all the income). It serves as a general economic measure of distribution of wealth.

Analyses
Analyses, unless otherwise indicated, were carried out using SPSS V. 19 and V.20 on the 38-country dataset (table 1). Cluster analysis of the 38 countries was carried out using SPSS V.19: a two-step procedure using

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*overall 83.2% have IH scores.
†Combines employed full-time, part-time, self-employed.
‡0–6 scale.
Euclidian distances was employed, entering three variables: country LGB legal discrimination scores, proportion of MSM reporting verbal abuse and proportion of MSM reporting physical violence because someone knew or presumed they were attracted to men. Three country clusters emerged including 9, 17 and 12 countries, respectively, with good fit (Silhouette coefficient of cohesion and separation=0.65; figure 1).

Bivariate analyses were carried out using $\chi^2$ with Cramer’s $\Phi$ as a measure of effect size for ordinal data, and t test (using Cohen’s D as a measure of effect size) (table 2). Effect size statistic for univariable analysis of variance (ANOVA) for interval or ratio level data was $\eta^2$. Because of the large size of the subsample with valid IH scores (N=144 177), almost all analyses were highly statistically significant, so p levels were not reported. Means of IH were graphed against selected structural and behavioural variables in figure 2 to illustrate the relationship between variables. Regression analysis in table 3 was carried out by linear regression for interval-level or ratio-level dependent variables using simultaneous entry in hierarchical blocks of individual demographic variables, individual behavioural variables, plus external source country-level variables. Path coefficient calculations, appearing in table 3 and in figure 3, are reflected by $\beta$ from the linear regressions in table 3, with path arrows indicating the direction of temporal relationship (eg, IH cannot affect age, so the relationship has to be in the opposite direction) or predicted relationship in the model. Stepwise linear regression was carried out for variables predicting perceived control over sexual risk-taking in table 4 to allow variables to be entered in a forward hierarchical model.

RESULTS

Basic demographic data are presented in table 1 from participants with valid IH data. These data from 38 countries illustrate the ns for each country (ranging from 88 in Macedonia to over 45 000 in Germany), median age (ranging from 24 in Moldova to 36 in Switzerland and the UK), per cent reporting living in a city >500 000 population (ranging from 1.1% in Malta to 87.9% in Turkey), per cent with tertiary education (ranging from 31.2% in Austria to 84.6% in Turkey), per cent employed (ranging from 54.8% in Serbia to 85.0% in Malta) and per cent now in a relationship with another man (ranging from 22.0% in Bosnia-Herzegovina to 53.5%). IH scores ranged from 1.22 in the Netherlands and 1.23 in Sweden to 2.58 in Bulgaria and 2.56 in Bosnia-Herzegovina.

Data from the 38 countries clustered into three groups using (1) measures of legal climate supporting LGB rights, (2) proportion experiencing verbal discrimination
Table 2  Univariable analysis: predictors of ever testing for HIV

| Variable                                                                 | Untested (%) | Ever tested for HIV(%) | Statistic*  \
|--------------------------------------------------------------------------|--------------|------------------------|------------  
| Being ‘out’ to family/friends/colleagues (=outness)                      |              |                        |             
| All or almost all                                                        | 16.2         | 83.8                   |            0.28  
| More than half                                                           | 24.1         | 75.9                   |            0.28  
| Less than half                                                           | 29.7         | 70.3                   |            0.28  
| Few                                                                      | 39.4         | 60.6                   |            0.28  
| None                                                                     | 57.3         | 42.7                   |            0.28  
| Proportion of male friends attracted to men                              |              |                        |            0.26  
| Almost all                                                               | 14.8         | 85.2                   |            0.26  
| More than half                                                           | 16.3         | 83.7                   |            0.26  
| Approximately half                                                       | 20.2         | 79.8                   |            0.26  
| Less than half                                                           | 28.5         | 71.5                   |            0.26  
| Almost none of them                                                       | 44.6         | 55.4                   |            0.26  
| Have no male friends                                                     | 45.6         | 54.4                   |            0.26  
| Education (6 levels of ISCED†)                                           |              |                        |            0.13  
| No secondary qualification                                               | 38.5         | 61.5                   |            0.13  
| Some high school/trade qualification                                     | 34.2         | 65.8                   |            0.13  
| Lower secondary education                                                 | 30.1         | 69.9                   |            0.13  
| Upper secondary education                                                 | 33.2         | 66.8                   |            0.13  
| Higher education below degree level                                      | 24.4         | 75.6                   |            0.13  
| University degree completed                                              | 19.1         | 80.9                   |            0.13  
| Size of settlement                                                       |              |                        |            0.15  
| Very big city or town (1 million or more)                                | 19.4         | 80.6                   |            0.15  
| Big city or town (½ to 1 million)                                        | 23.1         | 76.9                   |            0.15  
| Medium city (100000 to ½ million)                                        | 28.5         | 71.5                   |            0.15  
| Small city (100000 to 100000)                                            | 35.0         | 65.0                   |            0.15  
| Village or rural area (<10000)                                           | 36.7         | 63.3                   |            0.15  
| Mean±SD                                                                  | 30.4±1.31    | 35.5±10.60             |            0.47  
| Internalised homonegativity                                              | 1.85±1.31    | 1.37±1.18              |            0.47  
| Age                                                                      | 30.43±1.56   | 35.56±10.60            |            0.47  

*Given a sample size of 144 177, significance is not shown (144 177 cases with an IH score are 82.8% of the eligible cases with consistent data).

†The six levels of the International Standardised Classification of Educational Degrees (ISCED).

Table 3  Path analysis of internalised homonegativity and HIV-related risk behaviours

| Analysis 1                                                                 | β*          | B           | 95% CI of B          |        0.15  
|---------------------------------------------------------------------------|-------------|-------------|----------------------|        0.08  
| Step 1: Structural variables predicting internalised homonegativity        |             |             |                      |        0.13  
| LGB legal climate (country level)                                         | -0.14       | -0.16       | -0.14 to -0.13       |        0.08  
| Gini coefficient (country level)                                         | 0.09        | 2.81        | 2.71 to 3.02         |        0.08  
| Size of settlement (individual level)                                     | 0.08        | 0.07        | 0.06 to 0.07         |        0.08  
| Step 2: Individual demographic and behavioural variables predicting internalised homonegativity (IH) |             |             |                      |        0.15  
| ‘Outness’                                                                | -0.51       | -0.46       | -0.45 to -0.46       |        0.08  
| Age (per year)                                                           | -0.08       | -0.01       | -0.01 to -0.01       |        0.08  
| Step 3: IH, social and demographic variables predicting having an HIV test |             |             |                      |        0.08  
| IH (per 1)                                                                | -0.01       | -0.01       | -0.01 to -0.01       |        0.08  
| ‘Outness’                                                                | -0.21       | -0.07       | -0.07 to -0.06       |        0.08  
| Proportion of gay friends                                                | -0.14       | -0.04       | -0.04 to -0.04       |        0.08  
| Education                                                                | 0.10        | 0.04        | 0.04 to 0.03         |        0.08  
| Age (per year)                                                           | 0.17        | 0.01        | 0.01 to 0.01         |        0.08  
| Analysis 2                                                                |             |             |                      |        0.15  
| IH as a predictor of sexual variables                                     |             |             |                      |        0.15  
| Perceived control over sexual risk-taking (Y/N)                           | -0.15       | -0.18       | -0.17 to -0.19       |        0.15  
| Sexual diversity                                                         | -0.01       | -0.01       | 0.01 to 0.01         |        0.15  
| Ever had an HIV test (Y/N)                                                | -0.13       | -0.40       | -0.38 to -0.42       |        0.15  
| Relative frequency, condom use, non-steady partners in the past year      | 0.03        | 0.03        | 0.03 to 0.03         |        0.15  

LGB, lesbian, gay and bisexual.

*Forms path coefficients in figure 3.

β, standardised regression coefficient; B, unstandardised regression coefficient.
and (3) physical violence because of assumed homose-
A second linear regression limited to the demo-
Table 2 illustrates bivariate associations with strong
effect sizes predicting ever having had an HIV test, spe-
cifically being ‘out’ and the proportion of MSM friends,
followed by education and the size of settlement.
ANOVA of IH score by the relative frequency of
condom use with non-steady partners, with covariates,
the number of non-steady partners that they had unpro-
tected anal intercourse within the past year and per-
cieved control over sexual risk-taking, demonstrated a
small-to-moderate effect size ($\eta^2=0.03$). An accelerat-
ng relationship between IH and the relative frequency of
condom use (covariates’ perceived control over sexual
risk and the number of casual partners in the past year)
with non-steady male partners was apparent (figure 2).
The strong relationship of perceived control over sexual
risk-taking (figure 2) with condom use led to an addi-
tional analysis of the predictors of this perceived control
table 4). The highest stepwise predictors were the
number of non-steady partners one had anal intercourse
within the past 12 months, IH, Gini coefficient and LGB
legal climate.

**DISCUSSION**

While these data represent 144 177 MSM in 38 countries,
their collection via the Internet constitutes a non-random
sample. Previous Swedish and UK data comparing
Internet sexual data collection with questionnaire data
from a large national random sample from a sexuality
study in the same country indicate that general
Internet samples tend to be somewhat younger, more
likely to be single, better educated and urban. Internet
samples of MSM may be more bisexually identified, worse
educated and rural compared with traditional gay venue
questionnaire-based samples in Sweden. The Swedish data
indicate the known biases for Internet samples by com-
pairing them with a national ‘gold standard’ study. The
EMIS data are likely to be biased towards those who are
better educated and Internet-literate and probably more
familiar with the gay subculture. This sampling bias will
be more substantial in Eastern European countries where
household Internet access is less common and a smaller
proportion of the whole MSM population participated in
EMIS. On the other hand, the Law of Large Numbers
would suggest that for the larger country samples, range

**Table 4** Stepwise predictors of perceived control over sexual risk taking

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\beta$</th>
<th>B</th>
<th>95% CI of B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of non-steady partners in the past 12 months</td>
<td>$-0.21$</td>
<td>$-0.07$</td>
<td>$-0.07$ to $-0.06$</td>
</tr>
<tr>
<td>Internalised homonegativity</td>
<td>$-0.12$</td>
<td>$-0.10$</td>
<td>$-0.10$ to $-0.09$</td>
</tr>
<tr>
<td>Gini coefficient</td>
<td>$-0.11$</td>
<td>$-0.03$</td>
<td>$-0.03$ to $-0.03$</td>
</tr>
<tr>
<td>LGB legal climate</td>
<td>$0.03$</td>
<td>$0.02$</td>
<td>$0.01$ to $0.03$</td>
</tr>
<tr>
<td>Age</td>
<td>$0.03$</td>
<td>$0.02$</td>
<td>$0.02$ to $0.03$</td>
</tr>
<tr>
<td>Education</td>
<td>$0.02$</td>
<td>$0.01$</td>
<td>$0.01$ to $0.02$</td>
</tr>
<tr>
<td>Outness</td>
<td>$-0.02$</td>
<td>$-0.02$</td>
<td>$-0.02$ to $-0.01$</td>
</tr>
<tr>
<td>Proportion of gay friends</td>
<td>$0.01$</td>
<td>$0.01$</td>
<td>$0.01$ to $0.02$</td>
</tr>
</tbody>
</table>

LGB, lesbian, gay and bisexual.
is adequately represented. The three clusters which emerged from countries based on antigay discrimination are consistent with clusters of countries reported by Lottes and Akula on self-expressed sexual values, including justification of homosexuality, in a pan-European sample. For groups which are discriminated against and highly stigmatised, there is no good alternative to Internet data collection for a study of this size. However, Internet biases are, from previous studies on sexuality, known and quantifiable.
**Structural variable relationships of IH**

These data demonstrate the possible paths connecting anti-gay discrimination at legal and demographic levels with IH, along with the size of the place of residence. The relationship is clear despite the relatively low variance in the tripartite cluster-based classification of country by legal and experienced discrimination level. Levels of IH are closely and linearly related to the ‘liberal’, ‘moderate’ and ‘conservative’ clusters, providing criterion validity linking levels of discrimination and IH, in turn, is closely associated with younger age, social measures of being ‘out’ and connected with gay peers, which in turn are associated with HIV test-taking (figure 3). While the effect size of a $\beta<0.1$ is minor, generally, the greater the distance of a structural variable from an individual, the more difficult it is to achieve a large effect size. Paths from social climate variables to IH and behaviour are measurable and quantifiable, given that this study has the power to detect theoretically important differences from the ‘background radiation’ of structural and social climate factors at a country level. Although the study appears to be overpowered at the individual data level, at the country variable level, the n is only 38. Figure 2 graphically indicates the relationships between IH and both structural and behavioural variables.

**HIV testing and IH**

Higher IH is also associated with decreased levels of HIV test-taking at any time, as mediated by ‘outness’ (but not directly), and denying that their sexual conduct is always as safe as the respondents want it to be (perceived control over sexual risk-taking). Thus, higher IH appears to both discourage HIV testing (which may be considered a marker of acknowledgement of stigmatised status) and also to reduce the ability to have safe sex despite the intention to do so. Diversity of sexual behaviour (figure 2) also appears to be restricted by IH, with a lower sexual repertoire, possibly because of the interactions limited by time, locale, anonymity or peer modeling.

**Condom use and IH**

Condom use for anal intercourse (controlling for the number of non-steady sexual partners for anal sex, and the perceived control over sexual risk-taking) revealed a relationship of lower IH with increasing condom use (figure 2). This suggests that IH is associated with risky sexual behaviour generally and condom use specifically. This unexpected implication of the degree of control over sexual risk-taking bore further investigation. Table 4 examines the stepwise predictors of perceived control over sexual risk-taking and implicates structural variables (Gini coefficient, LGB legal climate), IH and age, plus the existence of social networks and being ‘out’. How these variables amalgamate into lack of control over safe sex may involve fear, lack of access to condoms, surreptitious or no safety negotiations, lack of good preventive information or the need for rapid or anonymous sex, among other factors. Perceived control over safe sex may have similarities to self-efficacy, and the relationships between condom self-efficacy and structural discrimination and its internalisation warrant further investigation.

**Paths between structural variables, IH and HIV risks**

These data indicate relationships between the levels of legal and experienced discrimination and IH and, in turn, between IH and both outness and gay peer contact and HIV risk behaviours. HIV-risk behaviours associated with high IH include lower levels of HIV testing (not knowing HIV status and/or receiving treatment being a risk), lower levels of perceived control over safe sex and...
lower levels of condom use for anal sex when this safe sex volition and the partner numbers are controlled for. The relationship of the Gini coefficient and IH is interesting, and here, the Gini coefficient probably represents a level of attitude to equality beyond the purely economic (figure 2) and is consistent with the association found between sexuality-related attitudes and human development indices in previous pan-European research.

**Consistency with previous data**

These findings on IH are consistent with the previous data of Shoptaw et al on IH, albeit using a different IH measure, in African-American MSM in Los Angeles, including their finding that IH is associated with lower HIV testing and education levels. It is also consistent with the pathways that Ross et al. described in HIV seropositive US MSM, where IH is associated with risk behaviour through less openness, discomfort with discussion of sexuality, not discussing HIV status and lower condom use. The finding that there is a higher level of risk behaviour (non-use of condoms with casual partners) is also consistent with the data of Ryan in relation to the impact of family homonegativity in adolescents, and that of Sandfort on the impact of school psychological environment on the mental health of Dutch LGB adolescents.

**Impact of homophobic climate and IH and potential intervention levels**

These data suggest, however, that IH may have pervasive effects on sexual behaviour related to HIV prevention through the association of a homonegative legal and social climate with higher levels of risk and lower levels of preventive behaviours, at both the personal and probably policy levels, although more research is required to elucidate these. Hatzenbuehler et al. note that state-level protective policies modify the effect of sexual orientation on mental health disorders, and it is logical that one of the mechanisms for this may be through the reduction of institutional discrimination, hate crimes, homonegativity and by providing interventions to reduce internalised homonegativity.

The public health implications of these data are fourfold. First, it is clear that interventions must incorporate changes in the legal and policy climate (and perhaps religious climate) with regard to MSM. Second, such climate changes need to be communicated to professionals (including healthcare workers) who are at the government or professional interface with MSM clients, possibly with appropriate in-service training. Third, structural interventions should translate into the provision of specific services or outreach to MSM. Fourth, anti-IH measures for MSM might include individual-level opportunities on the Internet anonymously targeting stigmatised sexual minorities. These could be based on short, easily read informational modules, reduction of pathological stereotypes through pride-enhancing modules, role-model stories and approaches to respond to the negative ‘voice within’ or distancing strategies. The success in reaching some 180 000 MSM via the Internet in three months, Europe-wide, in 38 countries and 25 languages, in this study indicates the potential of this medium and for region-wide rather than country-wide approaches. While effect sizes for some structural components are small, Europe has a population of over 802 million and if we assume conservatively that 2% of men aged 15–65 are MSM, the potential public impact on 5.35 million MSM is considerable. Legislative and legal climate changes and human rights protections are not expensive in monetary terms compared with classic medical screening and treatment. Staff and public servant training or re-training costs, however, may be necessary.

As far as we are aware, no study in Europe has previously looked at HIV-preventive behaviour and homonegativity. From these pan-European data, homonegative stigma can be clearly linked through IH to increased HIV risk in MSM at both the population and personal levels. Discrimination is bad law, bad policy, bad psychology and bad medicine: reducing homonegative policy and interactions at the legal and social levels will have a positive impact on the health as well as human rights of MSM populations.

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