

Manuscript: Archives of sexual behavior

Title: Impact of migration and integration on Turkish Men who have Sex with Men in Germany: results from the European MSM Internet Survey.

Authors: Axel J Schmidt^{1*}, Michael Ross², Rigmor C Berg³, Peyman Altan⁴

¹ Sigma Research, Department of Public Health, Environments and Society, London School of Hygiene and Tropical Medicine, London, United Kingdom

² Program in Human Sexuality, Department of Family Medicine, University of Minnesota Medical School, Minneapolis MN 55454, United States of America

³ Norwegian Institute of Public Health, Oslo, Norway, and University of Tromsø, Department of Community Medicine, Tromsø, Norway

⁴ Turkish Public Health Institution

*Corresponding author: LSHTM, 15-17 Tavistock Place, London WC1H 9SH
United Kingdom

Acknowledgements: The authors want to say thank you to the more than 200 websites who placed the EMIS banner, and particularly to those who have sent around individual messages to their users: PlanetRomeo, Manhunt, Qruiser, Qguys, and Gaydar. We also thank all NGOs who promoted our survey. Without this help, EMIS's success would not have been possible.

EMIS-2010 Associated Partners: DE: GIZ, Robert Koch Institute; ES: *Centre de Estudis Epidemiològics sobre les ITS i SIDA de Catalunya* (CEEISCat); IT: Regional Centre for Health Promotion Veneto; NL: University College Maastricht; UK: Sigma Research.

EMIS-2010 Collaborating Partners relevant for this analysis: DE: Berlin Social Science Research Center (WZB), Deutsche AIDS-Hilfe; Federal Centre for Health Education (BZgA); TR: Turkish Public Health Association, KAOS-GL, Istanbul LGBTT, Siyah Pembe Uçgen Izmir; EU: ILGA-Europe, Aids Action Europe, European AIDS Treatment Group, PlanetRomeo, Manhunt & Manhunt Cares

Contributions: AJS coordinated the study and the EMIS-2010 network, performed the statistical analyses, and wrote the manuscript. MR conceptualized the analysis and the Internalized Homonegativity scale and contributed to the manuscript. RCB contributed to the manuscript and supervised the implementation of IH into the EMIS questionnaire.

Sources of funding: EMIS-2010 was funded by a grant of the European Commission under the EU Health Programme 2008-2013. Further funding was received from *CEEISCat* (*Centre d'Estudis Epidemiològics sobre les ITS/HIV/SIDA de Catalunya*), Spain; Department of Health for England; Maastricht University (The Netherlands); Regione del Veneto (Italy); and Robert Koch Institute (Germany). Further funding for the participation of men in Germany was provided by *Bundeszentrale für gesundheitliche Aufklärung* (BZgA), Germany.

Conflict of interest: None.

Article (words) 2,590

Abstract (words: 233/250)

To examine the impact of migration and acculturation of Turkish men who have sex with men (MSM) to Germany, using data from the European MSM Internet Survey (EMIS-2010), on measures of acculturation including circumcision status, internalized homonegativity (IH), HIV/STI knowledge, sexual orientation, outness, HIV-testing, and sexual behaviors. We compared four groups of MSM: MSM born and residing in Germany who had completed the questionnaire in German (n = 38,915), MSM born and residing in Germany, with a father or mother born in Turkey (n = 97), MSM residing in Germany who were born in Turkey or whose parents were born in Turkey (n = 262), and MSM who were born and residing in Turkey and who completed the questionnaire in Turkish (n = 1,717). Data showed that there were significant dose-response curves between level of migration and several outcome variables. As exposure to Germany increased, MSM had lower IH, higher HIV/STI knowledge, increased outness, and were less likely to be circumcised. There were similar significant findings with regard to sexual HIV risk behavior (unprotected anal intercourse with partners of unknown (or sero-discordant) HIV status). Data were consistent with acculturation over generations in immigrant groups in MSM migrating from Turkey to Germany. Integration includes both cultural aspects (circumcision) and integration into a more homopositive gay environment (IH, outness, increased HIV/STI knowledge), and sexual HIV risk behavior. Migration and associated acculturation may constitute a risk change for HIV/STI and mental health issues associated with IH and outness.

Keywords (4-5): Emigrants and Immigrants; Homosexuality, Male; mental health; migration; Internalized Homonegativity; homophobia

Introduction

Changes in the beliefs, behaviors and language of migrants and their families have been extensively documented. Gordon's (1964) book *Assimilation in American Life* noted a pattern of generational change in immigrant groups; first generation (foreign-born) were less acculturated and less exposed to American life than their American-born children (the second generation), and their grandchildren (third-generation) were likewise more similar to the American mainstream than their parents. Waters and Jiménez (2005) have noted that this process comes about through exposure to the new society, improvement in socio-economic status, intermarriage, and education, and that typically, barriers may include racial or ethnic disadvantage, and maintenance of ethnic enclaves. As an illustration, the first generation will speak the native language of the old country, the second generation will be bilingual, and the third generation will be monolingual in the language of the new country. Thus, there will be a progression, based on exposure and acculturation (Berry & Sam, 1997), from the old cultural practices and language to the new. Such acculturation has been shown to include religion, dress, and diet. They also include the epidemiological change in health risks associated with the original population toward the rates of the new population (particularly for those conditions which are not or are minimally genetically based).

One area, which has not yet been subject to assessment of change as a function of migration and acculturation, concerns gay and other men who have sex with men (MSM). Assimilation is typically defined as adopting the ways of a different culture and becoming part of a new society, while integration is defined as incorporating individuals from different groups into

another society as equals (Berry & Sam, 1997). In this paper, we use the broader term “acculturation” as it does not contain the negative implications of assimilation.

There is no reason to expect that Turkish MSM would differ from other ethnic or cultural groups in terms of acculturation patterns upon migration. Pachankis *et al.* (2017) examined the intersections of antigay and anti-immigrant stigma, and how both affects MSM migrating to and within Europe. They found that antigay structural stigma in migrants’ sending countries might continue to impact MSM migrants’ HIV prevention practices after arrival in a new country. Attitudes to sex and homosexuality, and sexual behaviors, are among the variables that might be expected to illustrate the process of acculturation. We examined mixed versus homogenous Turkish parenthood in German residents with Turkish migration background, contrasted with Turkish-born MSM living in Turkey and German MSM without migration background. Specifically, we looked at Internalized Homonegativity (IH), which Ross *et al.* (2013) and Berg *et al.* (2013) have demonstrated in the European MSM Internet Survey (EMIS-2010), has significant structural and legal climate roots.

METHODS

The detailed methods of EMIS-2010 have been reported elsewhere (Weatherburn, et al., 2013) (The EMIS Network, 2013). In brief, EMIS-2010 was an anonymous, self-administered online survey conducted simultaneously in 25 languages across 38 countries. Participants were recruited through more than 230 social media and dating websites for gay, bisexual and other MSM. Typical completion time was 20 minutes. Men residing in Germany, after completing EMIS, were asked to answer a few additional questions, including two on their mother’s and father’s country of birth. No financial incentives were given. No IP addresses were collected. The survey was accessible online from June 6 to August 31, 2010.

Participants

For this analysis, we constructed four sub-groups:

1. Men born and residing in Germany who completed the EMIS-2010 questionnaire in German, answered the additional questions on their mother's and father's country of birth, and whose parents were neither from Turkey nor from another predominantly Muslim country ("Germany, no migration background").

2. Men born and residing in Germany who completed the questionnaire in German, whose father *or* mother were born in Turkey ("Germany, half Turkish migration background").

3. Men residing in Germany who completed the questionnaire in German, born in Germany but with both parents born in Turkey, *or* born in Turkey themselves, *or* completing the EMIS questionnaire in Turkish ("Germany, full Turkish migration background")

4. Men born and residing in Turkey who completed the questionnaire in Turkish ("Turkey").

All other respondents were excluded from this analysis, *i.e.* respondents who did not live in Germany or Turkey, used another language version of the questionnaire than German or Turkish, and did not answer the questions on the country of birth of their parents.

Data in this paper come from 40,993 respondents who were eligible for the four sub-groups as described above. All are: men; above the age of sexual consent in Germany or Turkey; having sex with men and/or sexually attracted to men; and who passed the internal data validity checks. They represent 23.5% of all EMIS-2010 qualifiers (N = 174,209). Excluded were 118,015 (67.7%) MSM who lived in other European countries than Germany or Turkey; 12,869 (7.4%) who lived in Germany but did not complete the German additional questionnaire; 1,991 (1.1%) who lived in Germany but used a another language version of the EMIS questionnaire than German or Turkish; 90 (0.1%) and 251 (0.1%) who lived in Germany but stated that one or

both of their parents were born in the WHO “Eastern Mediterranean region” (mostly Iran, Tunisia, Egypt, Morocco, Palestine).

Measures

Internalized Homonegativity was measured with the Short Internalized Homonegativity Scale (SIHS), a seven items, cross-culturally validated ‘Reactions to Homosexuality’ additive scale, first developed in 1996 and recently revised (Smolenski, Diamond, Ross, & Rosser, 2010). Participants answered each of the statements on a 7-point Likert scale from 'strongly disagree' to 'strongly agree' and the respondents could also check the answer 'does not apply to me'. Respondents answering the latter or skipping any one item were coded as missing cases. The score range was 0 to 6 with a higher score representing greater homonegative internalization. Cronbach’s alpha was $\alpha = 0.76$. A more detailed description of the scale has been published elsewhere (Tran, et al., 2017). Because of the answer option “Does not apply to me” for each of the 7 statements, the number of respondents for the IH score was smaller than for other variables.

HIV/STI knowledge was assessed by constructing a score ranging from 0 to 100, based on 16 statements (Box 1, scale not validated), for which respondents could state whether they knew this already or not, including 5 statements on HIV-testing, 5 on HIV transmission, 3 on transmission of other sexually transmitted infections (STIs), and 3 on post-exposure prophylaxis (PEP).

To assess *sexual orientation*, we used a modified Kinsey scale based on the recency of sexual contacts with men and women.

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”. We report here the proportion of men out to “none” or “only few” (“*closeted*”).

Recent HIV-testing was defined as the proportion of respondents without longstanding HIV-diagnosis who had been tested for HIV in the last 12 months and who knew their test result (Global AIDS Monitoring indicator #3.4B). *HIV prevalence* was defined as the proportion of respondents diagnosed with HIV among those tested (Global AIDS Monitoring indicator #3.3B; (UNAIDS, 2017)). *HIV risk* was defined as the proportion of respondents who reported condomless anal intercourse with partners of unknown or discordant HIV status among those who had sex with men in the last 12 months (Dublin Declaration Monitoring indicator #Q3.27; (ECDC, 2018)). In 2010, HIV pre-exposure prophylaxis was unavailable, and the fact that HIV could not be transmitted when undetectable (Rodger, et al., 2019) was not yet commonly accepted in most countries.

The final three measures in this analysis were *circumcision* status, the proportion of respondents with *more than 10 sexual partners* in the last 12 months, and the proportion of respondents who engaged in *anal intercourse* in the last 12 months.

As possible confounders we conceptualized *recruitment* (dichotomized as the proportion of men recruited through PlanetRomeo vs. all other websites); *education* (dichotomized as level 5 or 6 of the 1997 version of the International Standard Classification of Education (ISCED) vs. levels 1–4); *settlement size* (dichotomized as “large cities” of 500,000 inhabitants or more, vs. smaller settlements), and age.

Procedures

To compare across the four groups the odds for one of the aforementioned binary measures, we applied individual level multivariable logistic regression (SPSS v20, IBM Corporation, New York), controlling for age, education, settlement size and main recruitment website. Results are reported as adjusted odds ratios (AOR), with 95% confidence intervals. For the continuous outcomes (IH and knowledge) we applied individual level multivariable linear regression, reported as β -values, and B with a 95% confidence interval.

Ethical approval

The study was approved by the Research Ethics Committee of the University of Portsmouth, UK (REC application number 08/09:21).

RESULTS

Respondents

Table 1 illustrates the sample demographic data by the four analytic groups, indicating that MSM living in Turkey have lower age and higher educational attainment, and are more likely to live in larger population settlements. Of the 1,717 respondents born and residing in Turkey, 87.3% reported living in settlements larger than 500,000 inhabitants, reflecting a substantial recruitment bias. By taking into account an additional question on Turkish broad sub-regions, it can be assumed that 946 lived in İstanbul (or Bursa), 197 in Ankara (or Kayseri, or Konya), 149 in İzmir, 85 in Adana (or Antalya, or Mersin), and 14 in Diyarbakır. MSM living in Germany with Turkish migration background were still more likely to live in larger settlements than those without, but this difference was less pronounced. Respondents residing in Turkey as well respondents from Germany with Turkish migration background were substantially younger, partly reflecting the large migration waves from Turkey to West Germany in the 1960s. Another indicator of recruitment bias is the much higher proportion of respondents living in Turkey with

tertiary education (84% vs. 31% among German respondents without Turkish migration background).

Endpoints

An obvious indicator of acculturation was circumcision status: while 99% of MSM in Turkey were circumcised, this measure halved for MSM with half Turkish migration background. While outness increased with exposure to Germany, internalized homonegativity and recent sex with women decreased. As for recent HIV testing, MSM living in Germany reported higher levels than MSM living in Turkey, but no differences were found among German MSM across different migration backgrounds. MSM living in Turkey and Turkish-born MSM living in Germany/both parents born in Turkey reported higher numbers of sexual partners. While the proportion engaging in anal sex was similar across the four groups, condom use for anal sex increased with exposure to Germany—but so did the proportion of men diagnosed with HIV.

Table 2 provides adjusted β and AORs indicating that there are significant differences on sexual orientation between Turkey and the German full migration groups and half- and no migration German groups, on “outness” in the same groups, and % of sexual HIV risk behavior; and between Turkey and all the German groups on receiving an HIV test, number of sexual partners (but not % of anal intercourse in the past 12 months). These differences are graphed in Figure 1.

DISCUSSION

Our data show significant dose-response curves between level of migration and circumcision, outness, IH, and HIV/STI knowledge showing the impact of culture change with decreased circumcision, lower IH, more exclusive same-sex sexual activity, massively increased outness, higher HIV/STI knowledge, more condom use, and more HIV-testing in MSM as

exposure to Germany increased. The circumcision process has a religious context which is an obligation mostly occurring before the age of 7 and is carried out by parents. It is largely considered as a medical intervention. Therefore, being circumcised is out of the decision of a child due to parental religious reasons as well as his age. However, it still reflects the process of acculturation. There were similar significant findings with regard to HIV sexual risk behavior (condomless anal intercourse with partners of unknown (or discordant) HIV status).

These data on a large study including Turkish and German MSM are among the first to describe the relationships between MSM and indices of migration, including both physical and psychological self-reported status. The data demonstrate that all of the measures (illustrated in Figure 1) show a significant trend downward toward the host country population for circumcision status, percentage reporting they were closeted, Internalized Homonegativity, and upward for mean HIV/STI knowledge. These data confirm that most of these measures appear to follow the pattern of generational change as MSM migrate from Turkey to Germany, and continuing through men with one Turkish parent, to MSM in the host country (Germany). It is noteworthy that dose-response relationships were demonstrated (where dose is degree of migration background and response is the outcome variables) in all the significant outcomes (Figure 1).

These data confirm that for anatomically-based cultural indices (circumcision) and structurally and interpersonally-based indices (being closeted, IH, HIV/STI knowledge), and sexual behavior (sex with other men in the past year, getting an HIV test result, number of sexual partners, and HIV sexual risk behavior), data suggest a migration effect. Kocken *et al.* (2006) showed that in immigrants from the Dutch Antilles to the Netherlands attitudes towards condom use were far less positive than in people raised and educated in the Netherlands and explained

that with a taboo against discussing sexuality in the Antillean culture. Mole *et al.* (2014) demonstrated for eastern European immigrants to London, that the process of migration influenced sexual behavior— *e.g.* the longer the exposure time to the UK and British social norms, engaging in condomless anal sex decreased.

The sample is limited by relatively small numbers in the half-migration and full-migration backgrounds (n 's = 97 and 262 respectively) but nevertheless, for significant measures, similar dose-response relationships were demonstrated. The parent study was not designed to compare migration backgrounds and so the outcomes were to some extent chosen on the expectation that they might be impacted by homonegative environments. While circumcision status and other variables were based on self-report, it is unlikely that there would be any systematic bias in any inaccuracy of self-report, although in those with a full migration background, there is a 5% difference in reported circumcision rates. The study is cross-sectional and thus causality cannot be alleged. There is also the potential for bias in selection of those who choose to migrate: Turkish migrants were older and less well educated than those who remain in Turkey and came from smaller population centers. However, these biases would tend to bias toward *not* rejecting the null hypotheses.

Taken together, these data suggest that along with previous studies in other migrant groups suggesting that migration is associated with changes in nutrition, diet, language and dress, along with attitudes and beliefs about a number of issues, we can add sexual behavior, circumcision (although this is almost invariably a parental decision rather than the decision of the child), degree of being closeted, and HIV/STI knowledge to migration-associated outcomes in gay and bisexual men. These findings underscore the potential to study changes in behaviors in gay and bisexual men that occur in the process of migration from a less-liberal to a more-liberal

and accepting society (whether that is based on legal climate, dominant religion, or culture, or other factors). We believe that our data support the proposition that studying changes associated with migration offers a valuable opportunity to research the impacts of structurally and interpersonally homonegative environments on the behavior and mental health of gay and bisexual men.

REFERENCES

- Waters, M. C., & Jiménez, T. R. (2005). Assessing Immigrant Assimilation: New Empirical and Theoretical Challenges. *Annual Review of Sociology*, 31, 105-125.
- Gordon, M. M. (1964). *Assimilation in American life: the role of race, religion, and national origins*. New York: Oxford University Press.
- Pachankis, J. E., Hatzenbuehler, M. L., Berg, R. C., Fernández-Dávila, P., Mirandola, M., Marcus, U., . . . Schmidt, A. J. (2017). Anti-LGBT and Anti-immigrant Structural Stigma: An Intersectional Ana. *J Acquir Immune Defic Syndr*, 76(4), 356-366.
- Mole, R. C., Parutis, V., Gerry, C. J., & Burns, F. M. (2014). The impact of migration on the sexual health, behaviours and attitudes of Central and East European gay/bisexual men in London. *Ethnicity & Health*, 19(1), 86-99.
- Kocken, P. L., Van Dorst, A. G., & Schaalma, H. (2006). The Relevance of Cultural Factors in Predicting Condom-Use Intentions among Migrants from The Netherlands Antilles. *Health Education Research*, 21(2), 230-238.
- Ross, M. W., Berg, R. C., Schmidt, A. J., Hospers, H. J., Breveglieri, M., Furegato, M., . . . The EMIS Network. (2013). 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. *BMJ Open*, 3(2), pii: e001928.
- Berg, R. C., Ross, M. W., Weatherburn, P., & Schmidt, A. J. (2013). Structural and environmental factors are associated with internalised homonegativity in men who have sex with men: findings from the European MSM Internet Survey (EMIS) in 38 countries. *Soc Sci Med*, 78, 61-69.
- Weatherburn, P., Schmidt, A. J., Hickson, F., Reid, D., Berg, R. C., Hospers, H. J., . . . The EMIS Network. (2013). The European Men-Who-Have-Sex-With-Men Internet Survey (EMIS): Design and Methods. *Sex Res Social Policy*, 10(4), 243-257.

- The EMIS Network. (2013). *EMIS 2010: The European Men-Who-Have-Sex-With-Men Internet Survey. Findings from 38 countries*. Stockholm: European Centre for Disease Prevention and Control (ECDC).
- Smolenski, D. J., Diamond, P. M., Ross, M. W., & Rosser, S. R. (2010). Revision, criterion validity, and multigroup assessment of the reactions to homosexuality scale. *J Pers Assess*, 92(6), 568-576.
- UNAIDS. (2017). *Global AIDS Monitoring 2018. Indicators for monitoring the 2016 United Nations Political Declaration on Ending AIDS*. Geneva: UNAIDS:
http://www.unaids.org/sites/default/files/media_asset/2017-Global-AIDS-Monitoring_en.pdf. Retrieved from
http://www.unaids.org/sites/default/files/media_asset/2017-Global-AIDS-Monitoring_en.pdf
- ECDC. (2018, 03 19). *2018 progress*. Retrieved from Dublin Declaration monitoring:
https://ecdc.europa.eu/sites/portal/files/documents/FINAL_DD%202018_questionnaire.pdf
- Berry, J., & Sam, D. (1997). Acculturation and Adaptation. In J. Berry, M. Segall, & C. Kagitcibasi, *Handbook of Cross-Cultural Psychology, 2nd edition. 3 - Social Behavior and Applications* (pp. 291-326). Needham Heights: Allyn & Bacon.
- Tran, H., Diamond, P. M., Ross, M. W., Berg, R. C., Weatherburn, P., & Schmidt, A. J. (2017). Validation and multiple group assessment of the Short Internalized Homonegativity Scale in Homosexual and Bisexual Men in 38 European Countries: Results From the European MSM Internet Survey. *J Sex Res*, 55(4-5):617-629
- Rodger, A. J., Cambiano, V., Bruun, T., Vernazza, P., Collins, S., & Lundgren, J. (2019). Risk of HIV transmission through condomless sex in serodifferent gay couples with the HIV-positive partner taking suppressive antiretroviral therapy (PARTNER): final results of a multicentre, prospective, observational study. *The Lancet*, 393(10198), 2428-2438. doi:[https://doi.org/10.1016/S0140-6736\(19\)30418-0](https://doi.org/10.1016/S0140-6736(19)30418-0)

TABLES AND FIGURES

Table 1: Demographics, linear and binary outcomes by national and migration group

		Germany, no migration background	Germany, half migration background	Germany, full migration background	Turkey	Total
N		38,917	97	262	1,717	40,993
<i>Demographics (possible confounders)</i>						
Age	Mean ± SD	35.36 ± 11.44	27.94 ± 7.76	29.37 ± 7.58	28.52 ± 7.85	35.02 ± 11.38
	% < 25	20.6	40.2	31.1	25.0	21.3
	% 40 +	33.4	8.2	7.6	8.6	32.1
Education ¹	% ISCED 5–6	30.7	21.9	33.3	83.5	32.9
Settlement size	% 500,000+	40.7	54.8	54.9	87.3	42.8
Recruitment ²	% PlanetRomeo	82.4	80.4	89.3	73.9	82.1
<i>Continuous outcomes</i>						
Internalized Homonegativity ³	Mean ± SD	1.22 ± 1.13	1.47 ± 1.51	2.13 ± 1.47	2.44 ± 1.33	1.27 ± 1.17
HIV/STI Knowledge Score ⁴	Mean ± SD	75.27 ± 16.97	73.58 ± 20.06	67.70 ± 20.63	61.93 ± 19.91	74.66 ± 17.35
<i>Binary outcomes</i>						
Circumcision	% Circumcised	19.7	51.5	94.3	99.4	23.6
Sexual orientation ⁵	% Sex with men only	87.8	88.0	79.0	77.7	87.3
Outness ⁶	% Closeted	23.7	20.6	52.3	64.6	25.6
Received HIV test result ⁷	% Last 12 months	33.9	33.0	33.3	24.9	33.5
HIV among those tested ⁸	% Diagnosed	11.9	7.0	9.1	2.4	11.6
Number of sexual partners	% >10	23.2	18.8	29.1	34.2	23.7
Anal intercourse	% Last 12 months	82.4	86.0	84.6	86.5	82.6
Sexual HIV risk behaviour ⁹	% Last 12 months	25.4	35.6	32.2	50.1	26.5

SD, standard deviation; (1) ISCED, International Classification of Education (1997); (2) % recruited by the largest recruiter PlanetRomeo as opposed to all others; (3) Short Internalized Homonegativity Scale, range 0–6; (4) EMIS HIV/Knowledge score based on 16 items, range 0–100; (5) Modified Kinsey scale, based on the recency of sexual contacts with men and women in the last 12 month, % who had sex with men only; (6) closeted, out about being gay or bisexual to none or only few persons (family, friends, work or study colleagues); (7) Global AIDS Monitoring indicator #3.4B; (8) Global AIDS Monitoring indicators #3.3B; (9) % reporting condomless anal intercourse with partners of unknown (or discordant) HIV status among those who had sex with men in the last 12 months (Dublin Declaration Monitoring indicator #3.27).

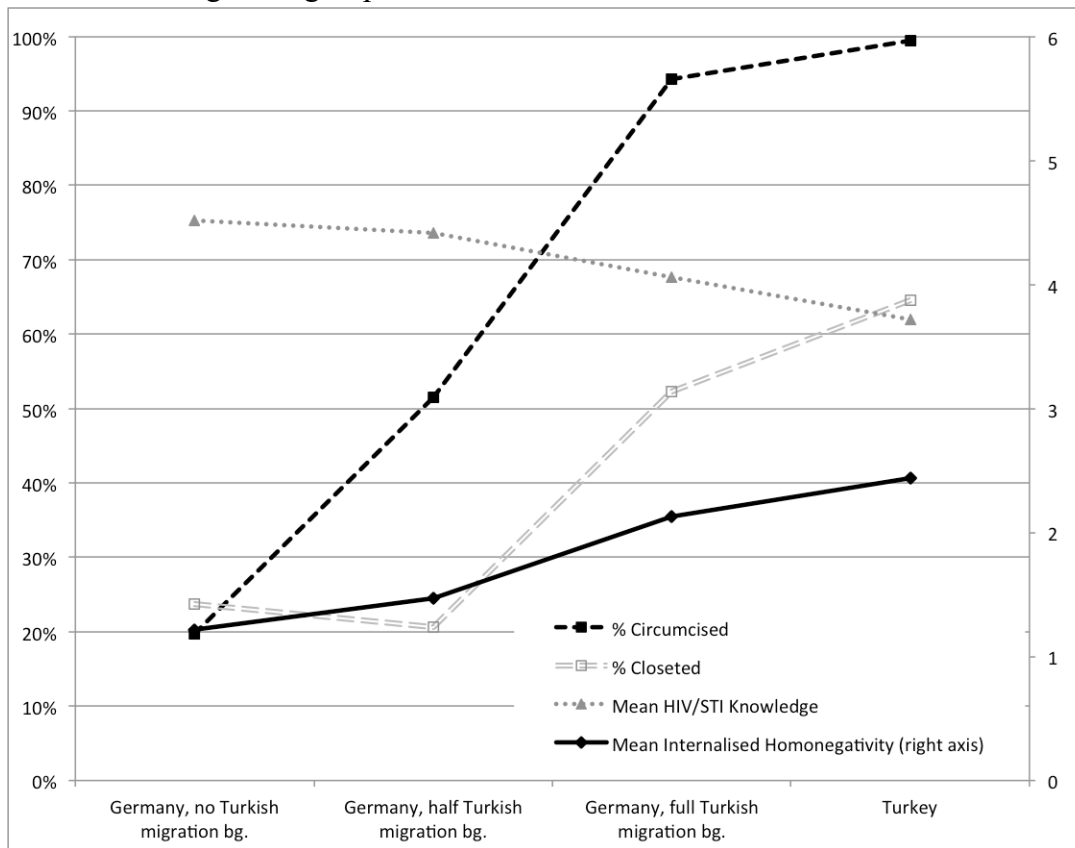
Table 2: Adjusted β values for continuous outcomes (IH, HIV/STI knowledge), adjusted odds ratios for binary outcomes (all other), **bold** if statistically significant, and 95% confidence intervals, by national and migration group

	Internalized Homonegativity ³	HIV/STI Knowledge Score ⁴	Sexual orientation ⁵ (% sex with men only)	Outness ⁶ (% Closeted)	Received HIV test result ⁷ (% last 12 months)	HIV among those tested ⁸ (% Diagnosed)	Number of sexual partners (% > 10)	Anal intercourse (% Last 12 months)	Sexual HIV risk behaviour ⁹ (%)
Effect Measure	β ; B (95% CI of B)	β ; B (95% CI of B)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Germany, no migration bg.			<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>
Germany, half migration bg.	0.21 ; 0.42 (0.40; 0.44)	-0.20 ; -5.55 (-5.83; -5.27)	0.82 (0.43; 1.55)	0.99 (0.59; 1.66)	0.86 (0.55; 1.35)	0.74 (0.52; 1.59)	1.26 (0.73; 2.19)	1.07 (0.59; 1.94)	1.40 (0.90; 2.21)
Germany, full migration bg.			0.44 (0.32; 0.61)	4.57 (3.53; 5.90)	0.87 (0.66; 1.13)	0.90 (0.52; 1.59)	1.01 (0.70; 1.46)	1.01 (0.71; 1.44)	1.35 (1.02; 1.78)
Turkey			0.32 (0.28; 0.37)	10.60 (9.45-11.88)	0.54 (0.48; 0.61)	0.20 (0.12; 0.31)	1.55 (1.34; 1.78)	1.01 (0.86; 1.17)	3.04 (2.71; 3.40)
Age			1.13 (1.03-1.23)	1.21 (1.14-1.29)	0.84 (0.79; 0.89)	0.28 (0.23; 0.34)	0.83 (0.77; 0.89)	1.06 (0.98; 1.14)	1.15 (1.08; 1.22)
<25			<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>	<i>Ref.</i>
25-39	-0.08 ; -0.01 (-0.01; -0.01)	0.07; 0.11 (0.09; 0.12)	0.80 (0.74; 0.85)	1.40 (1.32-1.48)	0.74 (0.70; 0.78)	2.18 (2.01; 2.35)	1.23 (1.15; 1.31)	0.68 (0.64; 0.72)	0.93 (0.88; 0.98)
40+									
Education ¹			1.11 (1.04; 1.19)	0.96 (0.91; 1.02)	1.02 (0.97; 1.07)	0.63 (0.58; 0.68)	1.19 (1.12; 1.27)	1.17 (1.11; 1.25)	0.83 (0.78; 0.87)
ISCED 5–6	0.03 ; 0.07 (0.05; 0.10)	0.12 ; 4.36 (3.99; 4.72)	1.74 (1.62; 1.86)	0.40 (0.38; 0.42)	1.33 (1.27; 1.39)	2.53 (2.34; 2.74)	1.23 (1.16; 1.31)	1.32 (1.25; 1.40)	1.08 (1.03; 1.14)
Settlement size									
500,000+	-0.10 ; -0.24 (-0.27; -0.22)	0.14 ; 5.01 (4.67; 5.35)	1.01 (1.00; 1.03)	1.00 (0.99; 1.01)	0.96 (0.95; 0.97)	1.04 (1.02; 1.06)	0.95 (0.94; 0.96)	0.98 (0.97; 0.99)	1.02 (1.01; 1.03)
Recruitment ²									
PlanetRomeo	-0.03 ; -0.01 (-0.02; -0.01)	0.01; 0.06 (-0.01; 0.14)							

Ref., Reference group; (1) ISCED, International Classification of Education; (2) % recruited by the largest recruiter PlanetRomeo as opposed to all others; (3) Short Internalized Homonegativity Scale, range 0–6; (4) EMIS HIV/Knowledge score based on 16 items, range 0–100; (5) Modified Kinsey scale, based on the recency of sexual contacts with men and women in the last 12 month, % who had sex with men only; (6) closeted, out about being gay or bisexual to none or only few persons (family, friends, work or study colleagues); (7) Global AIDS Monitoring indicator #3.4B; (8) Global AIDS Monitoring indicators #3.3B; (9) % reporting condomless anal intercourse with partners of unknown (or discordant) HIV status among those who had sex with men in the last 12 months (Dublin Declaration Monitoring indicator #3.27)

ACCEPTED

Figure 1: Circumcision, outness, Internalized Homonegativity, and HIV/STI knowledge by national and migration group



Box 1: 16 Statements to assess HIV/STI knowledge

Area 1: General knowledge on HIV and HIV-testing

- AIDS is caused by a virus called HIV.
- There is a medical test that can show whether or not you have HIV.
- If someone becomes infected with HIV it may take several weeks before it can be detected in a test.
- There is currently no cure for HIV infection.
- HIV infection can be controlled with medicines so that its impact on health is much less.

Area 2: Knowledge on HIV transmission

- You cannot be confident about whether someone has HIV or not from their appearance.
- Effective treatment of HIV infection reduces the risk of HIV being transmitted.
- HIV cannot be passed during kissing, including deep kissing, because saliva does not transmit HIV.
- You can pick up HIV through your penis while being 'active' in unprotected anal or vaginal sex (fucking) with an infected partner, even if you don't ejaculate.
- You can pick up HIV through your rectum while being 'passive' in unprotected anal sex (being fucked) with an infected partner.

Area 3: Knowledge on transmission of STIs

- Even without ejaculation, oral sex (sucking and being sucked) carries a risk of infection with syphilis or gonorrhoea.
- When HIV infected and uninfected men have sex together, the chances of HIV being passed on are greater if either partner has another sexually transmitted infection.
- Most sexually transmitted infections can be passed on more easily than HIV.

Area 4: Knowledge on PEP

- Post-exposure prophylaxis (PEP) attempts to stop HIV infection from taking place after a person is exposed to the virus.