



HIV, stigma and mental health: the current state of affairs in the Netherlands

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Abstract

This study aimed to investigate the difference in anxiety and depression scores between HIV-positive and HIV-negative men who have sex with men (MSM). Furthermore, it was examined whether HIV-related stigma was associated with higher depression scores, and if this association was moderated by the time since HIV diagnosis. To inspect this, a dataset from the research report “Mannen & Seksualiteit” by Soa Aids Nederland (2018) was used. Analyses of variance (ANOVAs) found no difference between HIV-positive and HIV-negative MSM on the anxiety and total (anxiety plus depression) scales. Initially, no difference was identified on the depression scale either. However, when adding the covariates age, education level and country of birth, the analysis showed a significant association between HIV-status and depression scores. Further analysis revealed that HIV-positive MSM had higher depression scores than HIV-negative MSM. Additionally, a moderation analysis demonstrated that experienced HIV-stigma was significantly associated with higher depression scores. A significant difference in depression scores according to time since diagnosis was also observed; MSM who were diagnosed earlier (1982-2009) had higher depression scores than MSM who were diagnosed later (2010-2018). The interaction (stigma \times time since diagnosis) on depression scores was not significant, suggesting that the association between HIV-stigma and depression scores was not moderated by time since diagnosis. The results were in line with existing literature, with the exception of time since diagnosis. It was expected on the basis of previous literature that the earlier diagnosed group would have lower depression scores, while the present study came to an opposite conclusion. Future research should take into account that a mixed-method approach could provide more in-depth information than solely quantitative data. Furthermore, policymakers are advised to construct interventions that lower the amount of HIV-stigma and consequently reduce the prevalence of depression in HIV-positive MSM.

Keywords: HIV, stigma, MSM, anxiety, depression, mental health

Introduction

Human immunodeficiency virus (HIV) is a worldwide epidemic that affects the health of many individuals; around 37.9 million people are living with HIV globally (UNAIDS, 2019). While the total incidence of HIV is somewhat declining, particularly men who have sex with men (MSM) in Western, urbanized and relatively wealthy countries are at high risk of contracting HIV (Van Griensven, Van Wijngaarden, Baral, & Grulich, 2009; Pachankis, Eldahan, & Golub, 2016). Specifically, the risk to acquire HIV is 22 times higher for MSM than for heterosexuals (UNAIDS, 2019). In the Netherlands, a total of 30.124 HIV-positive individuals were registered as of May 2019. Approximately 664 new HIV diagnoses were reported in 2018, with the majority (66%) of these diagnoses being MSM (Van Sighem et al., 2019). A North American study as part of the National HIV Behavioral Surveillance System (NHBS) showed that 44% of the HIV-positive tested MSM were unaware that they were infected (CDC, 2011). This indicates that the problem of MSM being HIV-positive might be bigger than the data suggests. However, on a positive note, the proportion of undiagnosed HIV-positive MSM seems to be slowly decreasing in the Netherlands, from 34% in 2007 to 31% in 2012 (De Coul et al., 2015).

Besides the physical manifestation, HIV influences mental health as well. Extensive research has been conducted over the past decade(s) concerning HIV-positive MSM and their mental health. Clear evidence has been obtained stating that HIV-positive MSM have a higher prevalence of depression, anxiety, stress and other adverse mental health problems than HIV-negative MSM (Chan & Mak 2019; Lyons, Pitts, & Grierson, 2012; Hays, Turner, & Coates, 1992; Heywood & Lyons, 2016). However, there is a lack of consensus regarding whether mental health problems precede an HIV infection, or if they are a consequence of the infection (Koblin et al., 2006; Safren, Reisner, Herrick, Mimiaga, & Stall, 2010; Stall et al., 2003). Sherr, Clucas, Harding, Sibley and Catalan (2011) suggest the possibility of these two perspectives co-existing. In either case, it is clear that HIV-positive MSM report difficulties with their mental health.

The high prevalence of depression experienced by HIV-positive MSM can possibly be explained by the stigma existing on their sexual orientation as well as their HIV-status (Chan & Mak, 2019; Ciesla & Roberts, 2001; Lowther, Selman, Harding, & Higginson, 2014). Although some evidence indicates that the public opinion in the Netherlands of HIV-positive individuals seems to be moderately positive (Bos, Kok, & Dijker, 2001), other evidence suggests that HIV-positive MSM still feel stigmatized and discriminated against in the Netherlands (Stutterheim, Bos, & Schaalma, 2008). It is for these aforementioned reasons of great importance to investigate whether HIV-positive MSM indeed still struggle with their mental health in the seemingly tolerant Netherlands, to examine the difference with HIV-negative MSM, and to look into the role of stigma.

Existing research

HIV and mental health

Research has shown that living with HIV not only affects the physical health of infected individuals, but also their mental health. For instance, a North American study by Bing et al. (2001) with a nationally representative sample ($N = 2864$) shows that HIV-positive individuals are significantly more likely to experience depression (36.0%) than individuals from a general population sample (7.6%), which also holds true for generalized anxiety disorder (15.8% vs. 2.1%). An Australian study by Lyons et al. (2012) specifically compared HIV-positive MSM to HIV-negative MSM and concluded that HIV-positive MSM had received treatment for mental health problems more frequently than HIV-negative MSM at some point in their lives (64% vs. 53%, $p = 0.004$), and for current mental health problems (37% vs. 25%, $p = 0.001$) (Lyons et al., 2012). Furthermore, it is shown that there is a positive correlation between the number of HIV symptoms and depression cross-sectionally, as well as one year later (Hays et al., 1992), and that depression and anxiety in HIV-positive MSM leads to poorer disease progression and more physical health problems (Heywood & Lyons, 2016).

In contrast, several other studies have proposed the notion that HIV-positive and HIV-negative individuals do not differ in their mental health. For instance, Williams, Rabkin, Remien, Gorman and Ehrhardt (1991) observed low rates of depression and anxiety in MSM, and found no difference between the HIV-positive and HIV-negative MSM in their sample. Similarly, Lyketsos et al. (1996) demonstrated only small and non-significant differences in depression between HIV-positive and HIV-negative MSM, and these small non-significant differences stayed relatively stable over time (Lyketsos et al., 1996, p. 217). Hence, these studies are questioning the belief that HIV-positive MSM have more mental health problems than HIV-negative MSM.

However, a meta-analysis by Ciesla and Roberts (2001) reanalyzed the data of aforementioned and other studies that did not find a correlation between HIV and depression. They proposed that these studies “had low statistical power, failing to include enough participants to detect anything but a very large effect of HIV-status” (Ciesla & Roberts, 2001, p. 725). From their meta-analysis, an unequivocal conclusion emerged, which aligns with the reasoning of Heywood and Lyons (2016): the probability of having a major depression is two times greater for HIV-positive individuals compared to HIV-negative individuals. In addition, Ciesla and Roberts (2001) controlled for sexual orientation and found no differences. Thus, they have shown that the prevalence of depression is indeed higher in HIV-positive MSM than HIV-negative MSM. Fortunately, Rabkin (2008) notes that major depression is able to be treated as effectively in HIV-positive individuals as in physically healthy persons.

While the meta-analysis of Ciesla and Roberts (2001) is relatively old, it is quite valuable because of its in-depth analysis and criticism of studies with lacking methodological precision. A more recent systematic review by Sherr et al. (2011) investigated the prevalence of depression in HIV-positive

individuals and what kind of interventions could aid in mitigating this. They conclude, despite the different measurements used, that the prevalence rates of depression in HIV-positive individuals are high. The most recent systematic review of HIV and mental health that was found, is by Niu, Luo, Liu, Silenzio and Xiao (2016). They systematically reviewed 94 studies between 1998 and 2014. They too concluded that depression was the most prevalent symptom in HIV-positive individuals, followed by anxiety. This systematic review only reviewed Chinese studies and also included subgroups other than MSM, which makes the results less generalizable. Nevertheless, it still is relevant information that needs to be considered.

Stigma and time since diagnosis

Apart from the physical and mental consequences of an HIV infection, HIV-positive MSM also face stigmatization. While the public opinion of HIV-positive individuals in the Netherlands seems to be moderately positive (Bos et al., 2001), the extent to which HIV-positive individuals perceive stigmatization suggests something else. Stutterheim et al. (2008) analyzed whether HIV-positive individuals in the Netherlands perceived stigmatization, and what effect this had on their mental health. The results showed that stigmatization is a significant problem in the lives of HIV-positive individuals; many perceive stigma from media outlets (79.1%), the gay community (66.7%), and while going out or partying (65.4%). Perceived stigmatization manifested itself in different ways, such as: advice to conceal their HIV-status (54.1%), blaming (38.2%), and increased physical distance (34.4%) (Stutterheim et al., 2008). As a consequence, individuals that perceived stigma had lower self-esteem, lower psychological well-being, and faced more depressive symptoms and anxiety (Stutterheim et al., 2008).

Meta-analyses by Logie and Gadalla (2009), and Rueda et al. (2016) were conducted to assess the role of stigma in the health and well-being of HIV-positive individuals. The two meta-analyses essentially came to the same conclusion. Logie and Gadalla (2009) showed that stigmatization was associated with poor physical health ($r = -0.324$, $p < 0.0005$), and poor mental health ($r = -0.402$, $p < 0.0005$). Rueda et al. (2016) explicitly mention that “HIV-related stigma has a detrimental impact on a variety of health-related outcomes in people living with HIV” (Rueda et al., 2016, p. 1). These results indicate that stigma indeed plays a big role in the high rates of mental health problems in HIV-positive MSM.

Besides stigma, Catalan et al. (1992) and Kelly et al. (1998) suggest that the mental health of HIV-positive individuals is influenced by the time since their HIV diagnosis or disease progression. They demonstrate that the more HIV progresses, the more depressive symptoms one will get. However, these studies are quite dated and the same notion may not hold true anymore. Nowadays, many more HIV prevention and treatment options exist (Vella, Schwartländer, Sow, Eholie, & Murphy, 2012). Thus, one might suspect that the longer an individual is infected with HIV, the more he or she gets used

to it, and depressive symptoms will decrease. More recent studies by Fekete, Williams, and Skinta (2018) and Rueda et al. (2011) indeed show that – in contrast to stigma – time since diagnosis is negatively correlated with depression. Hence, these studies show that the longer one is living with HIV, the less influence it presumably has on their mental health.

Theoretical framework

An abundance of theories has been used in HIV research to explain mental health problems. Three theories are briefly discussed below: Syndemic theory (Singer, 1994), Fundamental causes theory (Link & Phelan, 1995) and Minority stress theory (Meyer, 2003).

Syndemic theory. ‘Syndemic’ is a contraction of the words ‘epidemic’ and ‘synergistic’. It entails that multiple health problems can reinforce each other and synergistically produce more negative outcomes than a single health problem (Singer, 1994). Singer suggests that psychosocial epidemics such as violence, drug (ab)use, and mental health problems are all intertwined and predominantly distributed over socio-economically deprived groups. These factors reinforce each other and can lead to an increased risk for diseases like HIV/AIDS, and hence deteriorate the health and well-being of individuals (Singer, 2009). Stall et al. (2003) were the first to test whether multiple psychosocial problems were associated with an increased risk for HIV. They showed that psychosocial problems (substance (ab)use, depression, childhood sex abuse and partner violence) were more common among MSM, that these psychosocial problems had an additive effect on sexual risk-taking behavior, and that this increased the risk to become infected with HIV. Similarly, O’Cleirigh, Mimiaga, Safren, Stall and Mayer (2010) argue that there is a *positive dose-response* for psychosocial factors: the more problems one experiences, the greater the risk for sexual risk-taking behavior and HIV. Thus, HIV prevention should not focus solely on sexual risk-taking behavior, but take a broader perspective and a holistic approach (Stall et al., 2003).

However, most of the studies on syndemics are cross-sectional and rely on self-reported behavioral outcomes, which cannot confirm the theory (Stall, Coulter, Friedman, & Plankey, 2015). Recently, a longitudinal study was conducted and demonstrated the association between psychosocial factors and sexual risk-taking behavior. It was found that MSM with 4-5 psychosocial problems had the biggest risk to partake in sexual risk-taking behavior, and contract HIV (Mimiaga et al., 2015).

Fundamental causes theory. Fundamental causes theory (Link & Phelan, 1995) states that adverse social circumstances – Link and Phelan focused on socioeconomic status (SES) – can be the root of and amplify several risk factors, such as psychosocial problems, consequently leading to health inequalities. Contrary to low SES, individuals with a higher SES have access to more resources such as money, knowledge, and power, which generally protects them against an array of health problems (Link & Phelan, 1995).

Aside from low SES, Hatzenbuehler, Phelan and Link (2013) imply that stigma can also be a fundamental cause of health inequalities. They describe stigma as “the co-occurrence of labeling, stereotyping, separation, status loss, and discrimination in a context in which power is exercised” (Hatzenbuehler et al., 2013, p. 813). They assert that stigmatization can occur in multiple separate domains (e.g., HIV-stigma and sexual stigma). The health of stigmatized groups like HIV-positive MSM is poorer due to four factors (Turan et al., 2017). Firstly, HIV-positive MSM have less access to several resources. Secondly, they often do not have much social support and can feel socially isolated. Thirdly, they utilize dysfunctional psychological and behavioral coping responses. Lastly, their health is affected by the physiological stress responses that they have. Hatzenbuehler et al. (2013) conclude that more awareness needs to be raised about stigma as a social determinant and fundamental cause of minority health inequalities.

Minority stress theory. Minority stress theory, which originates from Meyer (2003), is a more micro-level theory about the psychological processes underlying stress. It proposes that being part of a minority group – Meyer primarily focused on lesbians, gay men and bisexuals – causes psychological stress due to stigma, prejudice and discrimination by the majority group. Minority stress is unique in the way that these specific stressors are not experienced by the majority group, are chronic, and are socially based. This additional stress might lead to more physical and mental health problems among minorities (Meyer, 2003).

Hatzenbuehler, Nolen-Hoeksema and Erickson (2008) observed a significant association between minority stress and mental health problems; minority stress may cause psychological distress which can be the basis for depression (Hatzenbuehler et al., 2008). Accordingly, this leads to an increased risk of sexual risk-taking behavior and contracting HIV (e.g., Safren, Blashill, & O’Cleirigh, 2011). A longitudinal study by Hatzenbuehler et al. (2008) hypothesizes that this heightened risk for contracting HIV might be due to escape-avoidance behavior as a coping mechanism for the experienced minority stress. Logie, Newman, Chakrapani and Shunmugam (2012) introduced an adjusted minority stress model in which they argue that there might be multilevel stigma. Not only do HIV-positive MSM have to deal with sexual stigma, they also cope with HIV-related stigma, which can exacerbate the risk for depression (see also Chan & Mak, 2019).

This idea is affirmed by studies that demonstrate that MSM – and specifically bisexual or gay individuals – experience more psychological distress, are more likely to suffer from depression, and report a higher level of suicidal ideation. Consequently, this leads to a lower subjective well-being and life satisfaction (Almeida, Johnson, Corliss, Molnar, & Azrael, 2009; Huebner, Rebchook, & Kegeles, 2004; Mays & Cochran, 2001; Sandfort, De Graaf, Bijl, & Schnabel, 2001).

Research questions and hypotheses

Multiple studies have demonstrated an association between HIV-status and mental health; it has been found that HIV-positive MSM have a relatively high number of mental health problems, and more so than HIV-negative MSM (Chan & Mak 2019; Ciesla & Roberts, 2001; Hays et al., 1992; Heywood & Lyons, 2016; Lyons et al., 2012). However, there is some contradictory evidence as some older studies did not find a relation between HIV and mental health issues (Lyketsos et al., 1996; Williams et al., 1991). Thus, the main research question in this study is: “To what extent do HIV-positive MSM experience more anxiety and depression than HIV-negative MSM in the Netherlands?” Furthermore, research has shown that HIV stigmatization is a significant problem in the lives of HIV-positive MSM, which can lead to poorer physical and mental health (Chan & Mak, 2019; Logie & Gadalla, 2009; Rueda et al., 2016; Stutterheim et al., 2008). Contrary to stigma, a longer time since diagnosis seems to mitigate this and protects HIV-positive individuals from deteriorating mental health. This leads to the second question: “To what extent does HIV-stigma influence the mental health of HIV-positive MSM, and is this association moderated by the time since diagnosis?” A conceptual model displays these associations in Figure 1 (see page 20-24 for Tables and Figures).

The hypothesis regarding the main research question is that it is expected that, despite the contradictory evidence, HIV-positive MSM suffer more from anxiety and depression than HIV-negative MSM in the Netherlands. Also, it is assumed that while attitudes regarding HIV-positive MSM have become less negative, HIV-stigma will still (partly) explain the poorer mental health of HIV-positive MSM, which will presumably be mitigated by the time since diagnosis.

Methods

Design and procedures

To measure these research questions, a dataset from the study “Mannen & Seksualiteit” by Soa Aids Nederland (2018) was used. This was a cross-sectional study that has been conducted in 2018. The researchers used a quantitative online questionnaire to acquire data for the study. Multiple themes were discussed in this questionnaire, such as: demographics, sexual behavior, psychosocial characteristics and HIV-testing behavior among other things. To ensure that individuals with migration backgrounds could participate, the questionnaire was translated into English, French, Farsi, Arabic and Turkish.

Participants and sampling

The recruitment of the participants was done via convenience sampling on social media in March and April 2018. Ads to attract participants were displayed on social media apps like Facebook and Instagram,

and on gay (social) media like Attitude, Winq.nl, GayNews and Grindr. Besides, professionals of the Dutch Health Authority (GGD) and HIV health care providers gave MSM a leaflet in which a link to the questionnaire was provided and some information about the study was given.

A total of 8101 people accessed the website of the survey. 7986 participants continued to the survey and 6205 participants met the inclusion criteria. Of these, 3935 participants (63% of the total) completely filled in the survey; 1781 participants were excluded due to missing age (23%), age younger than the inclusion criterion of 16 years (3%), female gender (1%), not being sexually active (46%), only having had sex with women (25%), and never had sex or only attracted to women (2%). Most participants were cisgender men (99%), highly educated (56%), lived in highly urbanized areas (45%) and were between 20 and 24 years old (23%). A small percentage of the participants was HIV-positive (10%), while most were HIV-negative (89%).

Data collection instruments

The questionnaire was designed with several existing questionnaires as a basis. The questionnaire was made with the program Qualtrics, and was hosted on a server of Utrecht University. HIV-status was assessed by asking participants the outcome of their most recent HIV test, with response options including HIV-positive, HIV-negative, waiting for the results, and do not know.

Mental health was measured with the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983). This is a 14-item instrument, consisting of 7 items to assess anxiety (e.g., “I get sudden feelings of panic”; $\alpha = .87$), and 7 items to assess depression (e.g., “I feel cheerful”; $\alpha = .82$). The questions were based on a 4-point Likert scale; the individual items were combined into the HADS subscales which show the sum score of the mean of all items. The questions had different answer choices, but for both the anxiety and depression subscale, a higher score indicated more anxiety or depression.

Experienced HIV-stigma was assessed only among participants who indicated to be HIV-positive, using an adapted version of a measure developed by De Wit, Murphy, Adam and Donohoe (2013). The HIV-stigma measure assesses negative cognitive responses (4 items, e.g., “They should be ashamed”; $\alpha = .88$), negative affective responses (4 items, e.g., “People experience disgust”; $\alpha = .69$), adverse social behaviors (4 items, e.g., “People are keeping distance”; $\alpha = .82$) and sexual rejection (4 items, e.g., “People are interested in having sex”; $\alpha = .89$). The internal consistency of the overall scale was acceptable ($\alpha = .78$).

Data analyses

Data analyses were undertaken with IBM SPSS Statistics (version 25). Data analyses could be performed only on participants with known HIV-status; men who reported that they were waiting for their results or did not know their HIV-status were hence excluded from the analyses. Descriptive analyses were done to characterize the sample and responses on main study variables. Hereafter, a correlation matrix was computed with Spearman's correlation coefficient. To assess if HIV-positive MSM experience more anxiety and depression than HIV-negative MSM, separate analyses of variance (ANOVAs) were undertaken for each of the dependent variables, HADS anxiety, depression and total (anxiety plus depression) scores, with HIV-status (positive or negative) as the independent variable. An additional linear regression analysis was conducted to control for possible confounders (i.e., age, education level and whether one is Dutch-born). To assess the association between HIV-stigma and mental health, and the possible moderating role of time since diagnosis, the SPSS PROCESS macro was used (model 1, Preacher & Hayes, 2004).

Results

Descriptive analyses

A sample of 3721 participants was used, as the analyses required a sample that consisted solely out of participants who were either HIV-positive or HIV-negative; participants who were still waiting for their results or did not know their status had to be excluded from the analyses. The descriptive characteristics of the sample are shown in Table 1. It can be seen that almost all participants were male (99.1%) identified as gay (88.9%), and were highly educated (68.7%). About 10% of the participants were HIV-positive, while most were HIV-negative (90.3%). Participants reported on average a level of $M = 5.78$ on anxiety, while levels of depression on average were somewhat lower ($M = 3.62$). HIV-positive participants on average experienced a limited extent of stigmatization because of their HIV-status ($M = 2.30$).

Table 2 shows zero-order correlations between study variables. The correlations between stigma and the HADS scores (anxiety, depression and total) are positive and significant, and thus reflect that participants who experience more stigma also report higher HADS scores. Furthermore, there are significant negative correlations between age and the HADS scores, indicating that younger participants have higher HADS scores than their older counterparts.

Regression analyses

The ANOVAs found no significant difference according to HIV-status for the HADS anxiety scores, ($F(1, 3151) = 2.09, p = 0.148$) and total scores, ($F(1, 3151) = 0.06, p = 0.805$). While a significant effect of HIV-status was found on HADS depression scores ($F(1, 3151) = 4.33, p = 0.038$), Levene's test showed that the variances of the depression scale scores were not equal across HIV-status groups ($F(1, 4151) = 31.11, p = 0.000$). To resolve the problem of unequal variances, additional analyses using Welch and Brown-Forsythe statistics were conducted. These analyses both showed that the association between HIV-status and depression was no longer statistically significant when unequal variances were taken into account ($F(1, 352.41) = 3.05, p = .082$).

An additional linear regression analysis was conducted to assess if potential confounders could account for the non-significant effect of HIV-status on HADS depression scores when correcting for unequal group variances. More specifically, HADS depression scores were regressed on HIV-status, with age, education level, and country of birth (the Netherlands or elsewhere) as control variables. This analysis showed significant associations between HADS depression scores and the covariates age, education level and country of birth. Importantly, this analysis also showed a significant association between HADS depression scores and HIV-status ($F(1, 3145) = 9.94, p = .002$). Profile plots showed the direction of this association: HIV-positive MSM had higher depression scores than HIV-negative MSM.

Moderation analysis

To investigate whether stigma experienced by HIV-positive MSM is correlated with a higher HADS depression score, and if this association is moderated by time since diagnosis, a moderation analysis was performed using the SPSS macro PROCESS, model 1 (Preacher & Hayes, 2004); see Table 3. The independent variable (experienced HIV-stigma) was centered, for ease of interpretation. Assumptions were checked beforehand. Firstly, multicollinearity was checked by looking at the *Variance Inflation Factor* (VIF). The VIF is < 5 , suggesting there is no problem with multicollinearity. Secondly, there appears to be a linear relationship between the dependent and independent variable, as the *Deviation from Linearity* is $> .05$. Further, a *Kolmogorov-Smirnov* (K-S) test was done to check for normality. While the K-S test was significant ($p < .05$), the relatively large sample ensures the robustness of the analysis. Lastly, homoscedasticity was assured as reflected by using robust standard errors; in PROCESS, the HC4 (Cribari-Neto) option was used to warrant this. The control variables age, education level and country of birth were added as well.

The overall model was significant, ($F(6, 294) = 3.4, p = .0031, R^2 = .068$). Experienced HIV-stigma was significantly associated with higher HADS depression scores ($b = 1.59, t(294) = 2.44, p =$

.015). There also was a significant difference in HADS depression scores according to time since diagnosis ($b = -1.38$, $t(294) = -2.53$, $p = .012$). As shown in Figure 2, MSM who were diagnosed earlier (1982-2009) – and thus had been living longer with HIV – had higher depression scores ($M = 4.56$) than MSM who were diagnosed later (2010-2018; $M = 3.62$). The interaction between stigma and time since diagnosis on depression scores was not significant, suggesting that the association between HIV-stigma and depression scores was not moderated by time since diagnosis. All control variables (age, education level and country of birth) were not significant.

Discussion

This study looked at two separate interrelations: the association between HIV-status and anxiety and depression, and the influence of HIV-stigma on the mental health of HIV-positive MSM, with time since diagnosis as moderating variable. In line with the hypothesis, this study found a significant correlation between HIV-status and depression scores. Namely, HIV-positive MSM in this study had higher depression scores than HIV-negative MSM. Furthermore, stigma experienced by HIV-positive MSM was associated with higher depression scores, but time since diagnosis did not mitigate this.

The findings of this study are in line with the results of comparable studies, although with an exception concerning the time since diagnosis. Previous research indicated that HIV-positive individuals were more likely to experience depression (Bing et al., 2001; Lyons et al., 2012), while other studies did not find a difference between HIV-positive and HIV-negative individuals in their mental health (Lyketsos et al., 1996; Williams et al., 1991). The current study is consistent with the first mentioned notion, as it did find a difference in depression scores between HIV-positive and HIV-negative MSM.

Regarding stigma, existing literature suggested that HIV-positive individuals do indeed experience stigma, and that this consequently may lead to poorer mental health (Logie & Gadalla, 2009; Rueda et al., 2016; Stutterheim et al., 2008). The present study found a similar trend; more experienced HIV-stigma was associated with higher depression scores. This study is one of the few recent studies on this subject, and thus quite valuable. While a significant correlation between experienced stigma and depression scores was demonstrated, it is important to note that the average level of experienced stigma by HIV-positive MSM in this study was not particularly high. Moreover, R^2 – the proportion of variance for the dependent variable that is explained by the independent variable – is only .068, which is not considered strong. This means that only 6.8% of the variance in depression scores is explained by experienced stigma by HIV-positive MSM.

Contrastingly, existing literature suggested that time since diagnosis would be negatively correlated to depression. Thus, the longer one is living with HIV, the less influence it presumably would have on their mental health (Fekete et al., 2018; Rueda et al., 2011). However, the current study came

to a different conclusion; the group that was diagnosed with HIV earlier (1982-2009) had higher depression scores than the later diagnosed group (2010-2018). The cause of this is debatable; for example, it could be that the earlier diagnosed group experienced more stigma – and consequently depression – when they were diagnosed than the later diagnosed group, as the level of HIV-stigma was higher in former times. As a result, they might still experience depression today, more so than the later diagnosed group. Hence, more research is warranted to reach consensus about the relationship between time since diagnosis and depression.

The findings of the present study are also in line with theoretical perspectives in relation to HIV and mental health problems. The aforementioned *fundamental causes theory* and *minority stress theory* are best suited to explain the findings of this study. Fundamental causes theory stated that adverse social circumstances can be the root of risk factors that can lead to health inequalities (Link & Phelan, 1995). Hatzenbuehler et al. (2013) suggested that stigma could also be a fundamental cause of health inequalities. The findings of this study can be seen as support for this theory, as stigma did increase the depression level, and thereby health inequalities.

Further, the minority stress theory (Meyer, 2003) suggested that being part of a minority group causes psychological stress, which can form the basis of depression (Hatzenbuehler et al., 2008). HIV-positive MSM belong to two distinct minority groups, namely the minority group of men who have sex with men (mostly gay men), and the group of HIV-positive individuals. According to the minority stress theory, HIV-positive MSM should therefore experience more stress – and consequently depression – than their straight and HIV-negative counterparts. The present study only looked at the difference between HIV-positive and HIV-negative MSM; the difference in mental health between MSM and non-MSM was not examined. However, the findings do support the minority stress theory, as HIV-positive MSM in this study have higher depression scores than HIV-negative MSM.

The current study presented itself with several limitations. Firstly, the used data sample is a convenience sample. Consequently, the external validity may be not as high as desired, causing the results to be nongeneralizable. The convenience sample may also contribute to a selection bias in gathering the participants; when a potential participant is depressed, he or she probably does not participate in a study. Thus, this study might have relatively few participants with depression in comparison to reality, which also effects the internal as well as the external validity. Besides, not everyone is willing to discuss their sexuality and sexual behavior; those individuals will also not likely participate. Secondly, the used data was generated with an online survey; this limits the extent to which in-depth knowledge can be obtained. Lastly, self-reports were used. Self-report studies have the disadvantage that participants may overemphasize their answers or withhold certain information on purpose. The general level of stigma found in the present study was relatively low; this could be due to a social desirability bias. If participants (sub)consciously answered the stigma related questions more

positively than their opinion in reality is, the results are affected and the internal validity could be compromised.

This study has uncovered several implications for future research and practice. Firstly, future studies should take into consideration that a mixed-method approach (e.g., a survey and additional face-to-face interviews) could provide more in-depth knowledge as well as some form of generalizability, which is desirable. Moreover, to combat the possible social desirability bias, self-reports could be replaced with an Implicit Association Test (IAT) to assess the level of stigma and improve the internal validity. Lastly, this study has shown that HIV-positive MSM have higher depression scores than HIV-negative MSM, and that HIV-stigma was associated with higher depression scores. Hence, it is advised that HIV-positive MSM should be aided with their problems and receive guidance to lower the prevalence of depression. It is recommended for policymakers to create interventions to lower the amount of HIV-stigma and consequently reduce depression in HIV-positive MSM.

The aim of this study was to investigate the difference in anxiety and depression between HIV-positive and HIV-negative MSM. Further, the association between HIV-stigma and mental health with time since diagnosis as a moderating variable was examined. To conclude, this study showed that HIV-positive MSM suffer more from depression than HIV-negative MSM. In addition, HIV-stigma is positively associated with depression, and earlier diagnosed individuals seem to have higher depression scores than later diagnosed individuals. While the level of experienced HIV-stigma seems to be relatively low in this study, it is not only a problem when it is very high, as stigma can still pose problems while being at a moderate level. After all, it stays pivotal to combat stigma.

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Tables and Figures

Table 1. *Characteristics of the sample (N = 3721)*

	Min.	Max.	Mean (SD) or %
Age	16	79	38.07 (14.43)
Sex			
Male			99.1%
Trans male			0.5%
Education level			
Higher			68.7%
Lower			31.3%
Dutch-born			89.3%
Sexual orientation			
Gay			88.9%
Bisexual			9.5%
HIV-status			
Positive			9.7%
Negative			90.3%
HADS (Anxiety)	0	21	5.78 (3.90)
HADS (Depression)	0	20	3.62 (3.53)
HADS (Total)	0	40	9.40 (6.88)
Stigma	1	5	2.30 (.41)

Table 2. *Correlation matrix*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Age										
2. Sex	-.05**									
3. Education level	-.02	-.01								
4. Dutch-born	-.04**	-.04*	.08**							
5. Sexual orientation	-.04**	.10**	.01	.05**						
6. Time since diagnosis	-.39**	-.06	-.07	.04	.07					
7. HADS (Anxiety)	-.23**	.02	-.01	.09**	.02	-.08				
8. HADS (Depression)	-.18**	.02	-.08**	.12**	.06**	-.08	.69**			
9. HADS Total	-.23**	.02	-.04*	.11**	.04*	-.09	.94**	.89**		
10. Stigma	-.14**	-.01	-.04*	.05**	.04*	.17**	.14**	.14**	.15**	

Note. The displayed correlations are Spearman's correlations. $p < .05^*$, $p < .01^{**}$.

Table 3. *PROCESS model summary (N = 301)*

Depression score				
	B	SE	T	P
Constant	5.62***	1.50	3.76	.000
Stigma	1.59*	.65	2.44	.015
Time since diagnosis	-1.38*	.55	-2.53	.012
Interaction	-.84	.86	-.98	.327
Age	-.02	.02	-.98	.329
Education level	-.75	.49	-1.51	.131
Dutch-born	1.15	.63	1.81	.071

Note. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$, $R^2 = .068$.

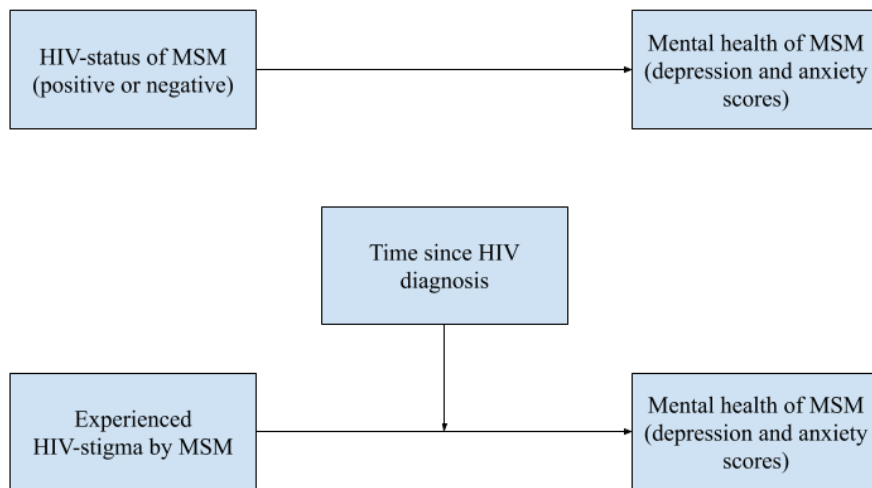


Figure 1. *Conceptual model*

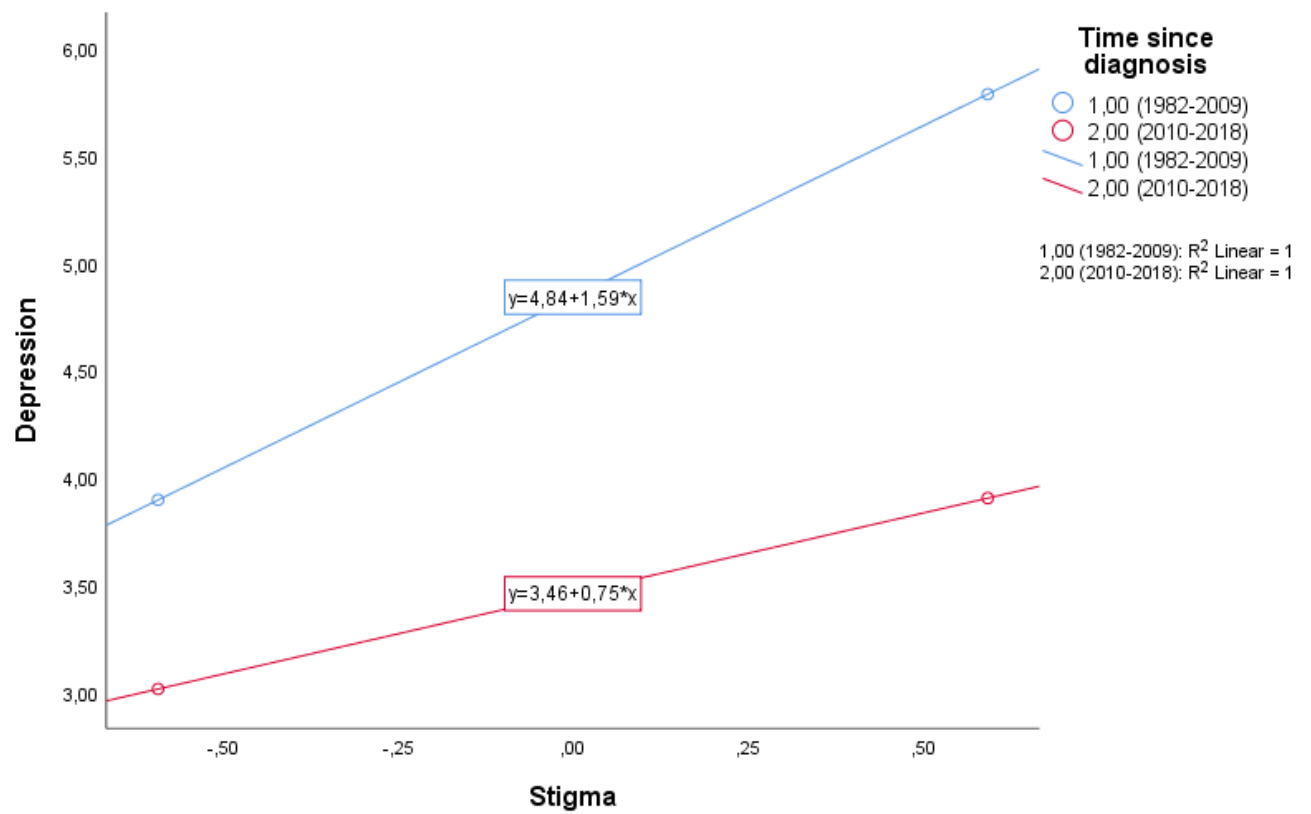


Figure 2. Graph of the relationship between stigma, depression and time since diagnosis