

‘What Comes After Transmission?’

Genital Herpes Knowledge, Psychological Adjustment and Sex-Negativity

by

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Abstract

The present study sought to evaluate the role of knowledge in psychological adjustment to genital herpes. Sex-negativity- positivity (erotophobia-erotophilia) was also considered for its potential moderating effects on knowledge and psychological adjustment. To assess genital herpes knowledge the Herpes Knowledge Scale (HKS; Bruce & Mclaughlin, 1986) was updated for use within the current research. Participants ($N= 401$) diagnosed with genital herpes were recruited online using social media. Knowledge of genital herpes was not associated with psychological adjustment. Erotophobia-erotophilia was significantly associated with psychological adjustment, such that individuals high in erotophobia (sex-negativity) reported poorer adjustment to a diagnosis of genital herpes. Finally, erotophobia-erotophilia did not moderate the relation between knowledge and adjustment. Given the high incidence rate of herpes and the significant psychosocial effects upon acquisition, these findings are important to understand the role of knowledge in psychological adjustment and understand factors that may impede adjustment to genital herpes.

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Table of Contents

Abstract	ii
Acknowledgements	iii
List of Tables	vi
List of Figures	vii
List of Appendices	viii
Introduction.....	1
What is Herpes? A Brief Overview	4
Psychological, Social and Sexual Effects of Herpes	6
Psychological Adjustment to Herpes: Finding an Equilibrium	8
Genital Herpes Knowledge	10
Assessing Genital Herpes Knowledge	13
Sex-Negativity: A Possible Moderator of the Knowledge-Adjustment Relation	14
Current Research.....	18
Preliminary Study - Updating the Herpes Knowledge Scale	19
Method for Scale Revision.....	21
Procedure	21
Scale Analyses	22
Results of Scale Revision.....	23
Discussion of Scale Revision.....	24
Main Study.....	26
Method.....	27
Procedure	27

Measures	27
Statistical Analyses	30
Results.....	31
Participants.....	31
Demographic Differences	33
Preliminary Analyses	35
Genital Herpes Knowledge.....	36
Self-Rated Knowledge	39
Time Since Diagnosis	40
Main Analyses	41
Moderating Influence of Erotophobia-Erotophilia	41
Discussion.....	44
Implications.....	47
Limitations	50
Recommendations.....	51
Conclusion	52
References.....	54

List of Tables

<i>Table 1.</i> Participant Demographics	32
<i>Table 2.</i> Summary of Intercorrelations, Means, Internal Consistency and Standard Deviations for Adjustment, Knowledge and Erotophobia-Erotophilia scores	35
<i>Table 3.</i> Herpes Knowledge Scale (HKS), Percentage of Participants Scoring Correctly per Item, and Item-Total Correlations	36

List of Figures

<i>Figure 1.</i> Hypothesized Moderation Model	42
<i>Figure 2.</i> Moderating effect of Erotophobia-Erotophilia on Self-Rated Knowledge and Adjustment	43

List of Appendices

Appendix A: Preliminary Items	66
Appendix B: Psychological Adjustment	68
Appendix C: Knowledge Questionnaire	69
Appendix D: Sexual Opinion Survey	74
Appendix E: Herpes Knowledge Scale (1986)	75
Appendix F: Factor Loadings for the HKS	78
Appendix G: Proposed Sub-Scales for the HKS.....	82

‘What Comes After Transmission?’ Genital Herpes Knowledge, Psychological Adjustment and Sex-Negativity

What are the psychological consequences of sex-negativity and ignorance surrounding genital herpes for adjustment to the condition? The World Health Organization (2016) estimates that roughly 557 million people between the ages of 15–49 are infected with genital herpes. Despite its high prevalence, knowledge about genital herpes is lacking in the general public (Bruce & Bullins, 1989; Edmiston, O'Sullivan, Charters, Chuah, & Pallis, 2003; Hirschler et al., 2015; LeJeune et al., 2004; Narouz et al., 2003; Ray & McMillan, 2008) and many individuals suffer significant psychological distress including, depression, anxiety and diminished quality of life upon diagnosis (Barnack-Tavlaris et al., 2011; Melville et al., 2003; Mindel & Marks, 2005). Following a diagnosis of genital herpes, many individuals struggle to cope and adapt to their condition (Barnack-Tavlaris et al., 2011). As such, knowledge of genital herpes has been stressed as an import factor for managing the psychological consequences and increasing adjustment to the condition (Centre for Disease Control and Prevention [CDC], 2015; Melville et al., 2003; Vezina & Steben, 2001).

Upon diagnosis, individuals with genital herpes are rarely provided with or directed to psychological support (Alexander & Naisbett, 2002). However, health care professionals do provide basic information about managing the condition and the risk of transmission (Alexander & Naisbett, 2002; CDC, 2015). Information about the prevalence and manageability of genital herpes may support adjustment to the condition and encourage positive health behaviours (Catalozzi et al., 2013; Green et al., 2003; Melville et al., 2003). Prior research into sexually transmitted infections (STIs) has put

forth models of sexual health that emphasized the importance of information and knowledge to enact positive health behaviours and avoid negative health outcomes (e.g., psychological distress). The information-motivation-behavioural skills (IMB) model suggests that when individuals are well informed, motivated to act and possess the behaviour skills necessary to take action, they will experience more positive health outcomes (e.g., psychological adjustment). However, when individuals lack information or are misinformed, they lack the motivation and behavioural skills necessary to enact health promoting behaviours and will therefore experience negative outcomes (Fisher, Fisher, & Harman, 2003).

What is needed is the evaluation of genital herpes knowledge amongst individuals who have been diagnosed with genital herpes to assess how well informed they are about their condition and to evaluate the relation between knowledge and psychological adjustment. Previous research has focused primarily on assessing the general population using basic measures of genital herpes knowledge (Edmiston et al., 2003; Hirschler et al., 2015; Hover & Bertke, 2017; LeJeune et al., 2004; Narouz et al., 2003; Ray & McMillan, 2008). These measures fail to address the specifics of transmission and the ongoing features of the condition that may be particularly relevant to individuals already diagnosed with herpes.

Given genital herpes is transmitted via sexual contact, negative attitudes about sex and sexuality may also play a significant role in the psychological adjustment to genital herpes. Researchers have argued that high rates of adverse sexual health outcomes, such as the high rates of STIs, within our society are the result of a generally negative disposition toward sex and sexuality (i.e., sex-negativity; Lottes, 2000; Reiss, 1990,

2001, 2006; Reiss & Reiss, 1997; Weinberg, Lottes, & Shaver, 2000). On a societal level, sex-negativity promotes repressive attitudes that frame sex as being inherently dirty or dangerous, and stigmatizes having an STI as evidence of the negative consequences of sex (Reiss, 1990, 2001, 2006; Williams, Prior, & Wegner, 2013). Previous research has suggested that sex-negativity may act as a barrier to enacting positive health behaviours and may be associated with significant psychological distress in response to an STI diagnosis (Foster & Byers, 2008). Within the current study, sex-negativity was assessed using the personality dimension of erotophobia-erotophilia, characterized by an avoidance or approach response to sexuality (Fisher, Byrne, White, & Kelley, 1988b).

Upon acquiring genital herpes, a lack of knowledge may impede psychological adjustment given that individuals are unprepared for the management of genital herpes. In addition, previous research has shown that sex-negativity can hinder the ability to retain and apply sex information (Fisher et al., 1988b; Macapagal & Janssen, 2011). However, a gap currently exists in the literature in terms of the interrelationships among genital herpes knowledge, sex-negativity and psychological adjustment to the condition for those diagnosed.

The current research addressed the aforementioned gap by examining the relation between genital herpes knowledge, erotophobia-erotophilia (as a measure of sex-negativity-positivity) and psychological adjustment amongst individuals diagnosed with genital herpes. It was expected that individuals with greater genital herpes knowledge would have greater psychological adjustment. By way of this assessment, gaps in knowledge were identified. The relation between erotophobia-erotophilia and psychological adjustment was also examined to test whether the sex-negative attitude of

individuals scoring higher in erotophobia impedes adjustment. Finally, the present study examined whether the relationship between genital herpes knowledge and psychological adjustment is moderated by erotophobia-erotophilia, such that the positive relation between knowledge and psychological adjustment should be stronger for individuals who are more erotophilic (i.e., sex-positive).

What is Herpes? A Brief Overview

Herpes simplex virus (HSV) is one of the most common sexually transmitted infections (World Health Organization [WHO], 2016). The World Health Organization (2016) estimates that over 4 billion people between the ages of 15–49 are infected with HSV-1 or HSV-2 globally. Although herpes is most commonly an oral HSV-1 infection, both strains of herpes can also be found genitally. Genital herpes can be caused by herpes simplex virus Type 1 (HSV-1), the usual cause of cold sores, or herpes simplex virus Type 2 (HSV-2), which is more commonly associated with genital herpes (Gupta, Warren, & Wald, 2007; Mindel & Marks, 2005). Oral HSV-1 is rarely considered an STI because most people contract it as children through non-sexual skin-to-skin contact (Belshe et al., 2012). However, recent studies have suggested that up to 60% of newly diagnosed cases of genital herpes are due to oral-to-genital HSV-1 transmission (Belshe et al., 2012; Hirschler, Hope, & Myers, 2015).

Diagnosing genital herpes can be uniquely challenging because presentation can vary greatly among individuals and regular screening is not recommended. Most cases of genital herpes, between 70-80%, are asymptomatic or mild enough to avoid detection (Mindel & Marks, 2005; Raphaelidis, 2014). Globally, only 10-20% of people who test positive report a prior diagnosis of genital herpes (WHO, 2016). This presents a problem

because most new cases of genital herpes –up to 70%– are likely acquired through transmission from an asymptomatic partner (Corey, 2002; Munday et al., 1998; Raphaelidis, 2014). Because it is a virus that can ‘hide’ in the body indefinitely, there is currently no cure for genital herpes (Hirschler et al., 2015).

Condoms are often recommended to reduce the risk of genital herpes transmission, however, external condoms only cover a limited surface area and transmission can still occur (Hirschler et al., 2015). A meta-analysis of HSV-2 acquisition and external condom use found that people who always use condoms only had a 30% lower risk of acquiring HSV-2 when compared to people who never use them (Martin et al., 2009; Hirschler et al., 2015).

Although ‘safer sex’ practices such as regular screening and consistent condom use are encouraged to prevent STIs, genital herpes is not part of regular STI screening and condoms have limited efficacy in preventing the transmission of genital herpes (Martin et al., 2009; Hirschler et al., 2015; Wald et al., 2006). Despite efforts to reduce herpes transmission, the majority of the population will be exposed to HSV-1 or HSV-2 at some point in their lives and one in six people will contract genital herpes (CDC, 2015).

The management of genital herpes is a lifelong concern that includes a reaction to the severity of the initial outbreak, concern over severity and frequency of recurrent episodes, the risk of transmission to sexual partners and the potential threat of herpes to neonates (CDC, 2015; Fatahzadeh & Schwartz, 2007). Therefore, it is necessary to ensure that individuals receive education and support following their diagnosis to prevent transmission to future partners and manage the ongoing physical, psychosocial and

psychosexual effects of the condition (Hirschler et al., 2015; Melville et al., 2003; Mindel & Marks, 2005).

Psychological, Social and Sexual Effects of Herpes

Despite genital herpes being a very common and typically mild infection, research has shown that individuals experience significant negative psychosocial and psychosexual effects upon diagnosis (Hirschler et al., 2015; Melville et al., 2003; Merin & Pachankis, 2011; Mindel & Marks, 2005; Nack, 2008; Oster & Cheek, 2008). High levels of clinical depression and anxiety have consistently been found in patients after initial diagnosis (Carney, Ross, Bunker, Ikkos, & Mindel, 1994; Shepherd, 2010; Swanson, Dibble, & Chapman, 1999). Other potential effects include lower quality of life (Barnack-Tavlaris et al., 2011; Doward et al., 1998), diminished self-esteem (Mindel & Marks, 2005) and reduced relational and sexual functioning (Barnack-Tavlaris et al., 2011).

A primary concern for those newly diagnosed is the threat that genital herpes poses to future partners. Many people who have herpes feel that the stress of disclosing their diagnosis to future sexual partners significantly contributes to feelings of depression and anxiety (Newton & McCabe, 2008; Swanson et al., 1999). Several studies exploring psychological distress in individuals with genital herpes have found that fear of transmitting to a current or future partner remained a persistent concern and was accompanied by the reluctance to engage in future sexual relationships (Hirschler et al., 2015; Melville et al., 2003; Newton & McCabe, 2008; Swanson et al., 1999). Individuals often exhibit anxiety regarding their sexual desirability and can develop a negative body image as the result of genital herpes which affects how attractive they feel to current or

future partners (Vezina & Steben, 2001). In addition, the fear of transmission places an undue burden on those who are HSV-positive to police their own sexuality. In doing so, sexual relationships become associated with the potential to cause harm, leading to a fixation on the individual's infectious status (Dunphy, 2014; Hirschler et al., 2015).

Research on the psychological effects of STIs has emphasized that the stigma of having an STI was what individuals primarily considered damaging, not the physical symptoms (Newton & McCabe, 2008). The stigma associated with having genital herpes has often been implicated in contributing to psychological distress and significantly impeding adjustment (Bickford, Barton, & Mandalia, 2007; Breitkopf, 2004; Mindel & Marks, 2005; Shepherd, 2010). Previous research into herpes stigma has utilized Goffman's (1963) theory of social stigma to explain the process whereby genital herpes serves as a 'discrediting attribute'. The notion that having genital herpes is inherently discrediting to one's social identity explains how narratives depicting people with genital herpes as immoral or promiscuous continue to prevail despite the high incidence of the disease (Breitkopf, 2004; Dunphy, 2014). In labelling those with genital herpes as categorically different, people are able to distance themselves from the very real possibility of transmission (Breitkopf, 2004; Hirschler et al., 2015).

If individuals who have internalized negative messages about genital herpes are then diagnosed with the disease, they are forced to confront that they are now part of a group they had previously ostracized (Lee & Craft, 2002). When individuals have internalized herpes stigma, they are likely to experience negative psychological reactions upon diagnosis (Lee & Craft, 2002). Feelings of shame may also increase feelings of personal responsibility for contracting the disease (Barnack-Tavlaris et al., 2011; Bickford

et al., 2007; Breilkopf, 2004). The fact that genital herpes is contagious, incurable, and sexually transmitted make it a natural subject for potential psychological distress.

Particularly if individuals believe that acquisition represents a personal fault or lapse in responsible behaviour (Barnack-Tavlaris et al., 2011; Fortenberry, 2004; Breilkopf, 2004).

Psychological Adjustment to Herpes: Finding an Equilibrium

Given the long-term concerns and potential for distress, it is important to understand mechanisms whereby individuals are able to adjust to having genital herpes. Adjustment to genital herpes has been conceptualized using various constructs, including self-esteem, depression levels, sexual or relational problems and physical functioning (Barnack-Tavlaris et al., 2011; Newton & McCabe, 2008) Psychological adjustment is characterized by a return to equilibrium marked by a decrease in psychological distress, reduced impact of the illness on relationships, and generally positive affect (Moss-Morris, 2013). Moss-Morris' (2013) model of adjustment to chronic illness emphasizes the importance of personal background factors in predicting how individuals may respond and adapt to illness stressors. In particular, individual factors such as personality or attitude may play a significant role in adjusting to genital herpes. Research has shown that individuals who are more sexually conservative or sex-negative may experience greater psychological distress as the result of an STI diagnosis (Foster & Byers, 2008).

Several psychological interventions to improve psychological adjustment to genital herpes, including effective coping strategies, psycho-education and cognitive behavioural therapy, have been evaluated in the literature (Mindel & Marks, 2005). Cognitive coping strategies, such as acceptance coping, were associated with greater

psychological adjustment (Aral, Vanderplate, & Magder, 1988; Barnack-Tavlaris et al., 2011; Mindel & Marks, 2005). Whereas, avoidant coping strategies, such as denial, predicted greater psychological distress and poorer quality of life (Barnack-Tavlaris et al., 2011; Mindel & Marks, 2005). Cognitive biases such as catastrophizing and all-or-nothing thinking were commonly identified (Shepherd, 2010). These biases were seen in the negative perceptions individuals held about themselves (i.e., that genital herpes had 'tainted' them or made them 'dirty'). These beliefs also resulted in negative perceptions about sex and their sexuality, with a focus on sex as a negative experience (Shepherd, 2010).

Only one study has examined the effects of a psycho-educational intervention to improve adjustment to genital herpes (Swanson et al., 1999). Unexpectedly, there were no significant differences in psychological distress between the intervention and control group. Despite these findings, research has suggested that education and knowledge of genital herpes are key to the psychological management of the condition (Alexander & Naisbett, 2002; Mindel & Marks, 2005; Melville et al, 2003). Education following a diagnosis has been shown to be a significant factor for psychological adjustment (Melville et al, 2003). Knowledge about genital herpes helps normalise it as a common infection and may help to reduce feelings of guilt or shame. In addition, research has shown that prior knowledge about genital herpes and the way in which individuals are informed of their diagnoses are associated with psychosocial adjustment following diagnosis (Melville et al., 2003).

Genital Herpes Knowledge

Prior to diagnosis, knowledge about genital herpes is likely to be lacking and individuals may be misinformed about the severity and prevalence of the condition (Hirschler et al., 2015). Upon diagnosis, basic genital herpes knowledge may inform how individuals evaluate the threat of herpes and its possible consequences (Melville et al., 2003; Sharpe & Curran, 2006). Previous research has found that having an accurate evaluation of illness threat and potential consequences is necessary to facilitate adjustment (Brownlee, Leventhal, & Leventhal, 2000; Sharpe & Curran, 2006). As such, the importance of genital herpes knowledge and continued education has been stressed by the CDC to improve coping and increase adjustment (CDC, 2015).

Given the unique factors in genital herpes transmission and management, knowledge about genital herpes can also aid in enacting health promoting behaviours and result in more positive health outcomes after diagnosis (e.g., psychological adjustment; Malta et al., 2007). The information-motivation-behavioural skills (IMB) model posits that to enact health promoting behaviours individuals need to be well informed, motivated to act, and have the skills necessary to execute the relevant behaviours (Fisher et al., 2003). However, when individuals are poorly informed, they lack the required knowledge to motivate the performance of the requisite health behaviours and will therefore experience negative health outcomes such as psychological distress. The IMB model suggests that if HSV-positive individuals lack information or are misinformed about genital herpes they will be unable to perform behaviours which would reduce the potential for transmission to future partners or neonates, as well as behaviours to manage the ongoing features of the condition. Being able to perform these behaviours can

increase perceived control over their condition which can aid in psychological adjustment (Alexander & Naisbett, 2002).

In general, knowledge about genital herpes appears to be limited in the general population (Hirschler et al., 2015). Previous research has found significant gaps in knowledge regarding general features of the virus and transmission (Edmiston et al., 2003; Hirschler et al., 2015; Narouz et al., 2003). One study found that only 55% of participants were aware that the virus that causes cold sores (HSV-1) can occur genitally (Narouz et al., 2003). Another study from the same year found that 40% of participants thought that herpes had a cure (Edmiston et al., 2003). Knowledge of the more complex aspects of transmission, such as asymptomatic shedding and the efficacy of condoms in preventing infection was also lacking (Moore & Smith, 2012; Narouz et al., 2003).

Although genital herpes knowledge may improve after diagnosis as individuals begin to familiarize themselves with their condition, several studies have found evidence to suggest that health care providers sometimes failed to give patients accurate herpes education or treatment information following diagnosis (Catotti, Clarke, & Catoe, 1993; Hirschler et al., 2015; Narouz et al., 2002). Specifically, health care providers were found to have major gaps in knowledge regarding general clinical features, transmission, and recent advancements in serological testing (Catotti et al., 1993; Narouz et al., 2002). With specific regard to transmission, one study found that 43% of general practitioners were unaware that most individuals do not know they are HSV-positive and 53% did not know that the majority of transmissions are due to asymptomatic viral shedding (Narouz et al., 2002).

The variability in clinical presentation can make education challenging as images of genital herpes are often only representative of the 20% of cases that are highly symptomatic (Mindel & Marks, 2005). This could lead individuals to dismiss their symptoms and neglect positive health behaviours such as the use of anti-viral medication for outbreaks (Hirschler et al., 2015). In addition, the prevailing narratives that suggest that genital herpes is the result of reckless or ‘promiscuous’ behaviour, often leads individuals to have an inflated sense of safety prior to diagnosis (Bensen et al., 1999; Royer, Falk, & Heidrich, 2013).

Though there is no screening process for genital herpes as part of routine STI testing, research has shown that as many as 92% of people expect to be tested for herpes as a part of routine testing (Edmiston et al., 2003). Generally, research has shown that individuals are often unaware of what they are being tested for during routine STI testing and may mistakenly assume that they have been tested for ‘everything’, including genital herpes (Head, Crosby, Shrier, & Moore, 2007; Hirschler et al., 2015; Royer et al., 2013). Similarly, individuals often believe they have had a blood test for herpes and had tested negative even though routine serologic tests are not recommended (Hirschler et al., 2015). These misconceptions about testing and the risk of acquiring herpes only serve to make a diagnosis of genital herpes all the more confusing and unexpected (Barnack-Tavlaris et al., 2011; Hirschler et al., 2015).

Upon diagnosis, prior knowledge about genital herpes along with any information offered by health care providers serve to inform how individuals react to and evaluate their condition (Melville et al., 2003; Sharpe & Curran, 2006). However, most individuals are likely to be misinformed about herpes prior to their diagnosis. Acquiring

accurate knowledge about herpes may help overcome negative perceptions of the condition and encourage adjustment (Huntingdon, Sharpe, de Wit, Duracinsky & Juraskova, 2020; Melville et al., 2003).

Given evidence to suggest that genital herpes knowledge is lacking in the general population and that health care providers may not offer adequate information upon diagnosis, it is vital to assess genital herpes knowledge in an HSV-positive population.

Assessing Genital Herpes Knowledge

Several previous efforts to evaluate genital herpes knowledge have been conducted over the past fifty years (Bruce & Bullins, 1989; Edmiston et al., 2003; Hillard, Kitchell, Turner III, Keeling, & Shank, 1984; Hirschler et al., 2015; Hover & Bertke, 2017; Kumar et al., 2013; LeJeune et al., 2004; Lewis, Rosenthal, Succop, Stanberry, & Bernstein, 1999; Mirotznik, 1991; Narouz et al., 2003; Ray & McMillan, 2008; Swanson et al., 1999). Although some studies have found satisfactory knowledge (>70% correct responses) of genital herpes in the general population (Hillard et al., 1984; Hover & Bertke, 2017; LeJeune et al., 2004; Lewis et al., 1999) no recent studies have assessed herpes knowledge using a detailed measure with a focus beyond transmission that has been evaluated for internal consistency and content validity.

Of additional concern was the variability between studies. For example, while several studies have found that the majority of individuals are aware that herpes has no cure, others have found that this knowledge is less common at 58% (Edmiston et al., 2003) and as low as 8% (Lewis et al., 1999). In addition, one of the major challenges in assessing herpes knowledge is that there is little consensus on what constitutes a high

degree of herpes knowledge or the degree of knowledge necessary to help prevent transmission or increase adjustment for individuals with genital herpes.

Genital herpes knowledge in HSV-positive populations tends to be higher than the general population when not assessed at initial diagnosis (Swanson et al., 1999). The assessment of genital herpes knowledge within an HSV-positive population, although typically part of an educational intervention, highlights a potential limitation of current measures. Given that individuals with genital herpes have an inherent familiarity with the basic features of the condition, brief measures which cover only rudimentary information may not be detailed enough for effective use in an HSV-positive population (Foster & Byers, 2008). As such, genital herpes knowledge was measured in the current study using a revised 53-item Herpes Knowledge Scale (Bruce & McLaughlin, 1986). The Herpes Knowledge Scale is the only measure of genital herpes knowledge that has been evaluated for its reliability and validity. In addition, it is the only measure of genital herpes knowledge to have consulted individuals diagnosed with genital herpes to determine scale items.

Sex-Negativity: A Possible Moderator of the Knowledge-Adjustment Relation

Despite the prevalence of genital herpes, knowledge about the condition is limited. Upon diagnosis, individuals can experience significant psychological, social and sexual effects that impede adjustment. Negative attitudes towards sexuality, which suggest that sex is inherently dirty or dangerous, have been shown to affect knowledge of STIs and may be associated with greater psychological distress in response to an STI diagnosis (Foster & Byers, 2008; Smith & Nave, 2007). These negative attitudes are more broadly termed sex-negativity and can be measured using the personality dimension

erotophobia (sex-negativity) -erotophilia (sex-positivity) (Fisher et al., 1988b; Rye, Meaney, & Fisher, 2011).

How is it possible that the same virus (HSV) that causes cold sores, when acquired as a genital infection can result in such negative consequences for the individual? Reiss (1990, 2006) and other researchers have suggested that the high prevalence of sexual problems, such as STIs, are the result of prevailing negative and repressive attitudes towards sex within our society. The paradox that sexual problems are socially condemned yet are incredibly common suggests that our approach to these problems and sexuality more broadly may in fact be the issue (Lottes, 2000; Reiss, 1990, 2001, 2006; Reiss & Reiss, 1997). Empirical evidence in support of this argument has established that differences in sexual health outcomes between cultures can be explained by factors such as sexual ideology and access to sexual health information (Dodge, Sandfort, Yarber, & De Wit, 2005; Harkabus, Harman, & Punttenney, 2013; Lottes, 2000).

Within a sex-negative society the primary focus of sex education is on the avoidance of adverse sexual outcomes, such as STIs or unplanned pregnancy (Reiss & Reiss, 1997; Williams, Prior, & Wegner, 2013). However, the transmission of genital herpes is complex and despite efforts to prevent transmission, prevalence rates remain high. This creates an environment where the avoidance of STIs is prioritized at the expense of any information on what comes after diagnosis. That is, individuals may fail to receive the comprehensive sex education needed to cope with acquiring an STI or support adjustment following diagnosis. Furthermore sex-negativity may affect the way

individuals respond to and grasp sexual health information (Fisher et al., 1988a; Macapagal & Janssen, 2011).

The degree of sex-negativity can also be conceptualized along the dimension of erotophobia-erotophilia. Erotophobia-erotophilia describes the attitudinal response to sexual cues along a negative-positive spectrum (Fisher et al., 1988b). Erotophobia-erotophilia is most often measured using the Sexual Opinion Survey (SOS; Fisher et al., 1988b) which has been found to have strong convergent validity with other measures of sexual attitudes and responses (Rye & Fisher, 2019). The SOS assesses the affective and evaluative response to sex and sexuality with minimal focus on partnered sexuality or current sexual relationships. Therefore, responses to the SOS may be less affected by the reluctance to engage in sexual relationships that often accompanies a herpes diagnosis (Melville et al., 2003; Newton & McCabe, 2008). Other measures that have been used to assess sex-negativity often include attitudes that may vary by culture (e.g. attitudes about abortion) or levels of sexual permissiveness (Fisher, Davis, & Yarber, 2013). As a result, the SOS was used in the current study given its unique evaluation of an approach or avoidant response to sexuality that may be particularly relevant in the response to genital herpes as an STI.

Within the individual, levels of erotophobia-erotophilia are often the result of societal attitudes towards sexuality which dictate childhood and adolescent sexual socialization (Dodge et al., 2005; Fisher et al., 1988b). As a dimension of personality, erotophobia-erotophilia has been studied extensively in relation to other personality and attitudinal measures. Generally, erotophobia tends to be related to fairly rigid value sets, including authoritarianism (Bogaert, 2001; Hogben, Byrne, Hamburger, & Osland, 2001;

Rye, Merritt, & Straatsma, 2019), religious fundamentalism and negative attitudes towards women (Rye, Merritt, & Straatsma, 2019).

Cross-sectional research studying erotophobia-erotophilia has found that individuals high in erotophobia are less likely to retain or apply sex-related information (Fisher et al., 1988b; Macapagal & Janssen, 2011). Even amongst medical students where sexual knowledge levels were fairly high, individuals high in erotophobia were less knowledgeable and had less interest in elective courses to improve their sexual health knowledge than those high in erotophilia (Fisher et al., 1988a). Individuals high in erotophilia discuss sexual health matters more openly and are more comfortable discussing sexual content (Herbenick, Reece, & Hollub, 2009). Women high in erotophilia were also found to have a more positive body image and be more knowledgeable about genital anatomy, appearance and function (Fudge & Byers, 2019). As applied to the study of STIs, individuals high in erotophobia are more likely to stigmatize individuals for an illness with a sexual transmission compared to a nonsexual transmission (Smith & Nave, 2007) and more likely to believe STIs were the result of sexual promiscuity (Foster & Byers, 2008).

Generally, the sex-negative attitude of individuals high in erotophobia may affect psychological adjustment to genital herpes given the condition's sexual transmission. A diagnosis of genital herpes may serve to reinforce erotophobia in that genital herpes may be framed as an example of the negative consequences of sexual behaviour. Although increased knowledge and education may aid in psychological adjustment, levels of erotophobia-erotophilia may affect the emotional response to such knowledge. Not only

could erotophobia-erotophilia be a factor in psychological adjustment but may also have an impact on efforts to increase psychological adjustment through education.

Given that individuals high in erotophobia are less likely to retain and apply sexual health information, individuals who have genital herpes and who are high in erotophobia may have an avoidant response to information about genital herpes prior to or following diagnosis. Although knowledge about genital herpes may help normalize the condition, individuals high in erotophobia may not apply their knowledge in ways that are meaningful for adjustment. For example, understanding the risks of transmission may help individuals plan for future sexual encounters. However, for individuals high in erotophobia, the same information may cause a continued avoidance of sex due to the fear of transmission (Bruce & McLaughlin, 1986; Reiss, 1990, 2001). It stands to reason that for people with genital herpes who are high in erotophobia, being knowledgeable about genital herpes may not facilitate psychological adjustment to the condition.

Current Research

An initial diagnosis of genital herpes can cause serious psychological distress. This distress is worsened by the fact that most people are misinformed about herpes. As such, education following a diagnosis is imperative to psychological adjustment. Unfortunately, health care professionals do not always provide this education to their patients following a diagnosis. Therefore, is it essential to evaluate the degree of genital herpes knowledge in an HSV-positive population. Previous measures used to assess genital herpes knowledge have typically examined only broad information and may be unsuitable for use with individuals already diagnosed. As such, the initial phase of the current study sought to update the Herpes Knowledge Scale (Bruce & McLaughlin, 1986)

to ensure that the assessment of genital herpes knowledge within the current study was conducted using a detailed, up-to-date measure. Following this, the current research evaluated the role of knowledge in psychological adjustment to genital herpes. In addition, the impact of being sex-negative or sex-positive (erotophobia-erotophilia) was considered for its potential to moderate the relation between knowledge and psychological adjustment.

It was expected within the current research that individuals with greater genital herpes knowledge would have greater psychological adjustment. In addition, it was hypothesized that individuals who scored higher on erotophilia would have greater psychological adjustment than individuals who are more erotophobic. Finally, the current research sought to examine whether levels of erotophobia-erotophilia may moderate the relationship between genital herpes knowledge and psychological adjustment, such that the relation would be stronger for individuals higher in erotophilia.

Preliminary Study - Updating the Herpes Knowledge Scale

In the initial stage of the research, I sought to update the Herpes Knowledge Scale (Bruce & McLaughlin, 1986) (Appendix E). Given the age of scale, several items were medically inaccurate and in need of revision. The Herpes Knowledge Scale (HKS) is a 54-item true-false scale used to discern the level of knowledge regarding herpes. Areas of interest include transmission, symptoms, treatment, recurrences, myths and the relationship between oral and genital herpes. The original scale had a high degree of reliability, (Cronbach's alpha = .88; Bruce & McLaughlin, 1986; Bruce & Bullins, 1989).

The scale was initially developed from a pool of 64 items derived from interviewing members of herpes support groups, professionals who counsel people with

herpes and undergraduate students in psychology courses, as well as consulting books and journal articles related to herpes. Readability was judged by five undergraduate students and relevance was assessed by a panel of five experts. Experts agreed on 57 of the original items, however after being administered to 150 undergraduate students only the 54 questions which significantly discriminated between low and high knowledge were included in the final scale. Given the age of the scale it was necessary to update and add several items to reflect current medical information.

A previous effort to update the scale was conducted by Swanson, Dibble and Chapman (1999) which shortened the HKS to a 25-item measure. However, this resulted in a low internal consistency (Standardized alpha= .69). Other attempts to assess herpes knowledge have primarily used short questionnaires of between 8-14 items, often resulting in a reliability coefficient of < .70 (Hover & Bertke, 2017; LeJeune et al., 2004; Lewis et al., 1999; Mirotznic, 1991). In addition, the variability in testing instruments may contribute to the discrepancies in genital herpes knowledge and the lack of normative data. Given that measures to assess herpes knowledge are typically short and only cover broad information, they may not be suitable in a population where a basic understanding of genital herpes would be expected (e.g. HSV-positive populations, health care professionals or medical students) nor would the results be comparable to the level of knowledge assessed by a more detailed instrument.

The goal of updating the HKS was to have a measure of herpes knowledge which not only reflects the medical advancements of the last two decades, but that is a detailed, reliable and validated measure of genital herpes knowledge for use in varying populations.

Method for Scale Revision

Procedure

For the current study, a preliminary review was conducted by sex educators and graduate students of the Optimal Sexual Experiences Research Team of the University of Ottawa. They assessed readability, identified items which would require further review from experts and suggested additional items to reflect recent herpes knowledge.

Additional review was done by several clinicians and sex educators to assess content validity, verify medical information and accuracy, as well as to finalize new items that were not part of the original scale. Four items from the original scale were removed due to concerns regarding their medical accuracy or relevance (see items 3, 7, 19, and 47 in Appendix E). In addition, one item was removed due to concern regarding regional differences in healthcare guidelines (see item 27 in Appendix E). Based on a review of the literature, four new items were developed to address asymptomatic genital herpes, asymptomatic viral shedding and genital herpes testing. These include ‘genital herpes can only be transmitted during an outbreak’, ‘genital herpes testing is usually included in routine STI tests’, ‘People are usually aware if they’ve been infected with genital herpes’ and ‘genital herpes can be transmitted when no visible symptoms are present’ (see items 22, 26, 31, and 45 in Appendix C). Definitions were also added to the scale to clarify terms such as ‘outbreak’ and ‘recurrence’. The revised Herpes Knowledge Scale (HKS) includes 53 items with response options labeled *True*, *False* or *Don’t Know*.

The revised scale was presented to the 401 participants diagnosed with genital herpes who took part in the current study. Participants were recruited online using social media (see pg. 25 and 29 for further details).

Scale Analyses

Reliability of the updated HKS was evaluated using the Kuder-Richardson Formula 20 for dichotomous items. Corrected item-total correlations were conducted to assess inter-item reliability and to ensure that the new items correlated well with the rest of the scale.

To investigate the utility of scale items in an HSV-positive population, statistical tests were run to assess whether the removal of items should be considered. Based on several criteria, items were removed on a trial basis. First, items with low variability (i.e. almost all participants answered correctly) were removed and the remaining items were scored. Similarly, items with low item-total correlations ($< .2$) were removed. In addition, items were removed where scale analysis suggested that item deletion would increase the scale's internal consistency. Each of these iterations of the HKS were then assessed using the regression and moderation procedure from the main analyses. These tests did not yield significantly different results from the full HKS. Therefore, the scale has been included in the analyses with all 53 items approved in the preliminary stage of the research.

Factor Analysis. Although an exploratory principal components factor analysis was conducted during the development of the original scale, the eight factors which accounted for 42.5% of the variance did not correspond to any identifiable knowledge dimensions (Bruce & Mclaughlin, 1986). However, conducting a factor analysis with dichotomous variables can sometimes lead to artificial factors when Pearson correlations are used for the correlation matrix (Kubinger, 2003; Woods, 2002). Due to this, factors may reflect varying item difficulty rather than latent constructs. As a result, using a

tetrachoric correlation matrix has been suggested for factor analysis with dichotomous variables (Kubinger, 2003). Given these methodological concerns, along with statistical advancements since the scale's development, this attempt to identify factors within the HKS was repeated in the current research. Using STATA statistical software to provide a tetrachoric correlation matrix, an exploratory factor analysis was then conducted.

Although an orthogonal Varimax rotation was used during the scale's initial development (Bruce & Mclaughlin, 1986), an oblique Oblimin rotation was used in the current study. Oblique rotation methods assume factors are correlated, whereas orthogonal methods do not (Osborne, 2015) Given that psychological or educational factors are often correlated, the use of an orthogonal rotation in the original scale's development may have produced an unrealistic factor structure (Schmitt, 2011). Potential sub-categories for the scale were identified statistically, using factor analysis, and by grouping items which seem to reflect a similar concept (e.g., 'prevention of genital herpes').

Results of Scale Revision

Internal consistency for the HKS was high, $KR_{20} = .83$. Corrected item-total correlations ranged from .01 to .55, which suggests that certain items had poor inter-item reliability (see Table 3). All four new items added to the scale had significant ($p < .001$) item total correlations. Prior to running the factor analysis, a Bartlett's test of sphericity was conducted and indicated sufficient intercorrelations $\chi^2 (1378) = 4612.94, p < .001$. In addition, the Kaiser-Meyer-Olkin measure of sampling adequacy was $KMO = 0.73$, which was suitable to proceed.

Factor Analysis of the HKS

Using STATA statistical software, an exploratory factor analysis, using a tetrachoric correlation matrix, was conducted with an Oblimin rotation on the revised HKS scale. Using 1 as a minimum eigenvalue and .4 as a minimum factor loading (Pituch & Stevens, 2015), the initial factor analysis of the knowledge scale resulted in 17 factors, accounting for 67.62% of the variance. A scree plot of the eigenvalues indicated that the minimum eigenvalue should be raised to 1.8. Using this criterion, the factor analysis resulted in 10 factors, accounting for 44.70% of the variance. Upon inspecting the factors no clear knowledge dimensions were evident, however several items regarding fertility and childbirth clustered together on the first factor (see Appendix F). As a result, items were grouped conceptually into four categories (see Appendix G); Basic Information and Transmission ($KR_{20} = .51$), Outbreaks and Ongoing Management ($KR_{20} = .42$), Neonatal Herpes and Fertility ($KR_{20} = .52$), and Myths and Misconceptions ($KR_{20} = .61$). Given that these sub-scales are conceptually based, further scale analysis on their utility should be conducted as part of future research.

Discussion of Scale Revision

The updated Herpes Knowledge Scale was found to have good internal consistency within an HSV-positive sample. Content validity for the scale was reviewed by a panel of experts knowledgeable about herpes and sex education. Several items had small item-total correlations and were considered for removal, though they were ultimately retained for use in the main study. These did not reflect the items which were found to have low item-total correlations during the scale's development (Bruce & McLaughlin, 1986). This discrepancy may reflect the use of the scale in HSV-positive

versus HSV-negative populations. Although the results statistically support the validity of the HKS in an HSV-positive population, it was originally designed for use in a general/HSV-negative population. As such, the purpose of evaluating genital herpes knowledge within a given study should determine if the HKS is an appropriate measure and whether all items should be retained. Though it may be sufficient for assessing initial knowledge upon diagnosis, the HKS may not be discriminating enough for populations where high levels of knowledge would be expected.

The current study suggests that knowledge items do not cluster meaningfully using factor analysis, which is consistent with the previous attempt to identify factors (Bruce & McLaughlin, 1986). As a result, items were grouped conceptually into four subscales. Of the four subscales, 'Basic Information and Transmission' and 'Outbreaks and Ongoing Management' may be useful in assessments where brief measures of herpes transmission or management are desired or where the full HKS is not suitable. However, all four subscales suffered from low internal consistency and did not reflect items that clustered together statistically. As such, the proposed subscales should be read as exploratory until further research can evaluate their utility and validity. Despite the potential limitations of the proposed subscales, they are comparable in quality to other brief measures of herpes knowledge that have been used in previous research (Hover & Bertke, 2017; LeJeune et al., 2004; Lewis et al., 1999; Mirotznik, 1991).

Although previous research on the HKS did not include the factor structure for comparison, further research should establish whether similar factor structure patterns are found in multiple samples. Further scale analyses accounting for dichotomous variables, should be conducted on the HKS using various independent samples to determine

meaningful factors. Additional research should explore other methods or scales to evaluate genital herpes knowledge for those already diagnosed.

Main Study

Using the revised HKS, current herpes knowledge amongst individuals who identify as having genital herpes was evaluated to assess the relation between genital herpes knowledge and psychological adjustment. The personality measure of erotophobia-erotophilia was also assessed for its influence on psychological adjustment and its relation to genital herpes knowledge. The current research sought to address three key research questions.

1. What is the role of herpes knowledge on psychological adjustment to genital herpes? It was expected within the current research that genital herpes knowledge would significantly predict psychological adjustment.

2. What is the impact of being erotophobic (sex-negative) or erotophilic (sex-positive) on psychological adjustment to genital herpes? It was hypothesized that erotophobia-erotophilia would significantly predict psychological adjustment. In addition, individuals who were more sex-negative, who scored higher in erotophobia, would have lower psychological adjustment scores.

3. How does erotophobia-erotophilia influence the relation between herpes knowledge and psychological adjustment? It was expected that erotophobia-erotophilia would moderate the relationship between genital herpes knowledge and psychological adjustment, such that the positive relation between these two variables should be stronger for individuals who are more erotophilic (i.e., sex-positive).

Method

Procedure

Potential participants were invited to complete an online survey examining sexual health and attitudes. Before consenting, potential participants were given a more detailed description of the study and were informed of their right to withdraw from the study at any time without consequences. Withdrawal procedures were discussed in detail within the consent and debrief forms and the option to withdraw was provided on every page of the questionnaire. Potential participants were informed that the survey was anonymous and would take from 20 to 25 minutes to complete. Given that the survey was hosted through Qualtrics on US servers, participants were informed that their data would be subject to US laws regarding data security, such as The Patriot Act. Qualtrics was set to prevent Ballot Box Stuffing but did not record IP addresses. In addition, items on the HKS were set so that the sequence of items was random. As part of the debrief, participants were provided with the correct responses to the HKS as well as resources to learn more about genital herpes and where to find STI clinic locations. Participants were not compensated for their participation in this study.

Measures

Participants first completed a preliminary questionnaire that consisted of age, sex/gender, sexual orientation, ethnicity, HSV status and how long ago they had been diagnosed. In addition, participants were asked to self-report their current herpes knowledge as well as rate their knowledge prior to diagnosis (Appendix A). Participants then completed a measure of psychological adjustment designed for use in this study (Appendix B) followed by the revised Herpes Knowledge Scale (Appendix C). Finally, participants completed the short-form Sexual Opinion Survey (Appendix D; Fisher et al.,

1988b; Rye, Meaney, & Fisher, 2011). All measures were used with the permission of their original authors.

Herpes Knowledge. Participants completed the revised Herpes Knowledge Scale (HKS) which includes 53 items with response options labeled *True*, *False* or *Don't Know*. Each item is scored as knowledgeable or not knowledgeable. The total score is obtained by tallying the number of correct (knowledgeable) responses and expressing the sum as a percentage of correct responses ranging from 0–100%. Reliability for the scale was calculated using the Kuder-Richardson Formula 20 for dichotomous items. Results indicated the scale had good internal consistency ($KR_{20} = .83$). As part of the scale analyses conducted in the current study, four conceptual sub-scales were suggested; Basic information and Transmission ($KR_{20} = .51$), Outbreaks and Ongoing Management ($KR_{20} = .42$), Neonatal Herpes and Fertility ($KR_{20} = .52$), and Myths and Misconceptions ($KR_{20} = .61$).

Self-Rated Herpes Knowledge. Using single item measures, participants were asked to rate their current herpes knowledge, as well as retrospectively rate their knowledge prior to diagnosis. Responses are scored on a Likert-type scale ranging from 1 (*poor*) to 5 (*excellent*). Higher scores indicate greater subjective herpes knowledge.

Erotophobia–Erotophilia. To assess the degree to which participants were more sex-negative or sex-positive, levels of erotophobia-erotophilia were measured using the short-form Sexual Opinion Survey (SOS; Fisher et al., 1988b; Rye, Meaney, & Fisher, 2011). The short-form SOS consists of 5 items from the original Sexual Opinion Survey found to be good predictors of erotophobia-erotophilia. The 5 item short-form version of the scale is highly correlated with the original scale ($r = .84$; Rye et al., 2011)

and was found to have adequate internal consistency ($\alpha = .67$) given the number of items (Beatson & Halloran, 2007; Rye et al., 2011). The short-form SOS takes approximately 5 minutes to complete. Responses are scored on a Likert-type scale ranging from 1 (*strongly agree*) to 7 (*strongly disagree*) where lower scores indicate more sex-positive attitudes (erotophilia) and higher scores indicate more sex-negative attitudes (erotophobia). Scores are calculated by reverse coding items 1 and 3 then adding all items; total scores can range from 5 (most erotophilic) to 35 (most erotophobic).

Psychological Adjustment to Genital Herpes. For the purpose of the research, a 5-item measure of psychological adjustment to genital herpes was developed in consultation with the Optimal Sexual Experiences Research Team of the University of Ottawa. Items were developed based on previous research examining the psychological consequences of genital herpes including; psychological distress, fear of social or sexual rejection and negative self-concept (Barnack-Tavlaris et al., 2011; Carney et al., 1994; Melville et al., 2003; Mindel & Marks, 2005). Psychological adjustment was operationalized using Moss-Morris' (2013) adjustment model. Within this model the following are markers of positive adjustment; low psychological distress, positive affect, proper illness management and attempts to minimize illness impact on relationships. Responses are scored on a Likert-type scale ranging from 1(*strongly agree*) to 7(*strongly disagree*) with lower scores indicating lower psychological adjustment and higher scores indicating greater psychological adjustment. Total scores are calculated by reverse coding items 1 and then adding all items, scores can range from 5 to 35. The scale was found to have high internal consistency ($\alpha = .86$).

Statistical Analyses

Data analyses were conducted using SPSS statistical software. Prior to analysis, participants who failed to complete the study were removed. The data was then screened for any significant outliers and normality was assessed. Sensitivity tests were conducted to determine if variables should be transformed. Reliability of the updated HKS was evaluated using the Kuder-Richardson Formula 20 for dichotomous items. Descriptive statistics were used to provide information on the percentage of participants that answered each question correctly on the HKS in keeping with the method used by Bruce and Bullins (1989). Using the sub-categories identified in the preliminary scale analyses, Person's correlations were used to determine knowledge factors which were significantly correlated to psychological adjustment.

One-way analyses of variance (ANOVAs) were conducted to assess any demographic differences on genital herpes knowledge, psychological adjustment and erotophobia-erotophilia. ANOVAs were also used to evaluate differences based on self-rated knowledge and time since diagnosis on the variables of interest. This was followed by post-hoc analyses where appropriate. Two linear regressions were performed with psychological adjustment as the dependent variable, and genital herpes knowledge and erotophobia-erotophilia as predictor variables to assess the variance in psychological adjustment explained by these factors. A third linear regression was conducted to evaluate the degree that erotophobia-erotophilia may explain the variance in genital herpes knowledge.

To evaluate whether erotophobia-erotophilia moderated the relationship between genital herpes knowledge and psychological adjustment, a moderation analysis was

conducted using Model 1 in PROCESS version 3.5 (Hayes, 2012) with 5000 bootstrap samples. Given that erotophobia-erotophilia as measured by the SOS is a continuous variable, the Johnson-Neyman procedure was used. This was to determine where along the continuous variable of erotophobia-erotophilia the relationship between genital herpes knowledge and psychological adjustment transitions from being significant to non-significant. It was hypothesized that individuals who were more knowledgeable about genital herpes would have greater psychological adjustment, specifically, that this relation would be stronger in individuals high in erotophilia.

Results

Participants

Following approval by the Ethics Committee at Carleton University, 432 participants were recruited through social media sites (i.e., Facebook, Reddit and Tumblr). Participants were adults over the age of 18 who are proficient in English and identified as having genital herpes. Informed consent was obtained before beginning the survey and participants were asked to reaffirm their desire to participate upon reading the debrief. The study included 401 participants (see Table 1) who completed the survey. Participants were, on average, female (74.1%) between the ages of 18-25 (37.7%) and 26-35 (41.1%). Participants were predominantly heterosexual (76.1%). The majority of the participants identified as being Caucasian (71.6%); the remainder identified as Black/African American (10.5%), Hispanic/Latino (10.7%), Pacific Islander (0.2%), or other (2.7%). On average, participants had been diagnosed with genital herpes within the last year (46.9%) or in the last five years (33.7%). Further demographic information can be found in Table 1.

Table 1*Participant Demographics*

	<i>n</i>	(%)
Sex/ Gender		
Female	297	(74.1%)
Male	96	(23.9%)
Other (Please Specify)	8	(2.0%)
Age		
18-25	151	(37.7%)
26-35	165	(41.1%)
36-50	71	(17.7%)
51-64	14	(3.5%)
Ethnicity		
White (non-Hispanic) Caucasian	287	(71.6%)
Black/African American	42	(10.5%)
Asian	17	(4.2%)
Hispanic/Latino	43	(10.7%)
Pacific Islander	1	(0.2%)
Other (Please Specify)	11	(2.7%)
Sexual Orientation		
Heterosexual	305	(76.1%)
Gay/Lesbian	19	(4.7%)
Bisexual	56	(14.0%)
Queer	12	(3.0%)
Questioning	4	(1.0%)
Prefer not to say	1	(0.2%)
Other (Please Specify)	4	(1.0%)
Time Since Diagnosis		
Less than 1 year	188	(46.5%)
More than 1 year	135	(33.7%)
More than 5 years	46	(11.5%)
More than 10 years	32	(8.0%)

Note. *N* = 401

The presence of univariate outliers was assessed using box plots. Box plots indicated that there were several potential extreme values. Z scores were also calculated to assess the presence of univariate outliers. Four cases exceeded $z = 3.29$ (Field, 2013) and it was concluded that these extreme outliers should be removed. The presence of multivariate outliers between variables was assessed using Malahanobis distance. Based on a chi-square distribution, three cases had significant $p < .001$ Malahanobis distance statistics and were removed. To test for normality, histograms and boxplots were analysed. A visual inspection indicated that although erotophobia-erotophilia was normally distributed, knowledge was negatively skewed and psychological adjustment was positively skewed. A Shapiro-Wilk's test for normality further indicated that knowledge ($W = .90, p < .001$) and psychological adjustment ($W = .91, p < .001$) were not normally distributed in the population. Sensitivity tests were conducted for each analysis to evaluate whether the variables should be transformed. Transformations did not significantly affect the results. Therefore, to increase interpretability, transformations were not applied.

Demographic Differences

To assess demographic differences within the variables of interest a series of ANOVAs were conducted with Bonferroni post-hoc tests. For certain comparisons the assumption of homogeneity of variance was violated, therefore Welch's ANOVAs and Games-Howell post hoc tests were used to explore significant differences between groups where appropriate.

Age. No significant differences were found between age groups on any of the variables (SOS; $p = .48$, AGH; $p = .60$; HKS; $p = .77$).

Sex/ Gender. Given that only eight participants did not identify as male or female, these participants were not included in the analyses of sex/ gender differences. However, they did exhibit greater adjustment ($M=15.75$, $SD=5.12$) as compared to the rest of the sample. There were no significant differences between men and women in their adjustment to genital herpes $t(391) = -.39$, $p = .69$. Women ($M = 15.54$, $SD = 5.03$) were significantly more erotophobic than men ($M=12.83$, $SD = 4.76$), $t(391) = 4.65$, $p < .001$, $d = .47$, a difference of 2.71, 95% CI, [1.56 to 3.84]. Genital herpes knowledge was also significantly different between men and women, equal variances not assumed, $t(131.52) = 5.01$, $p < .001$, $d = .87$. Women ($M = 92.61$, $SD = 6.27$) were significantly more knowledgeable than men ($M = 87.97$, $SD = 8.34$), a difference of 4.63, 95% CI [2.80 to 6.46].

Sexual Orientation. There were no significant differences in adjustment to genital herpes based on sexual orientation ($p = .40$, $\eta^2 = .007$). However, genital herpes knowledge was significantly different depending on sexual orientation $F(3, 396) = 4.08$, $p = .007$, $\eta^2 = .03$. Participants who identified as gay or lesbian ($M = 86.10$, $SD = 8.44$) were significantly less knowledgeable ($p = .004$) than heterosexual participants ($M = 91.81$, $SD = 7.00$) a difference of 5.71, 95% CI [1.31 to 10.12]. Bisexual participants ($M = 91.81$, $SD = 6.28$) were also significantly more knowledgeable ($p = .01$) than gay and lesbian participants, a difference of 5.72, 95% CI [.77 to 10.66]. Erotophobia-Erotophilia was significantly different depending on sexual orientation $F(3, 397) = 3.576$, $p = .01$, $\eta^2 = .03$. Despite this, post hoc analyses revealed no significant differences between groups. An independent samples t-test was conducted to compare heterosexual and non-heterosexual participants. Heterosexual participants ($M = 15.29$, $SD = 5.05$) were

significantly more erotophobic $t(398) = 3.40, p = .001, d = .34$, than non-heterosexual participants ($M = 13.28, SD = 4.92$), a difference of 2.01, 95% CI [.85 to 3.17].

Ethnicity. There were no significant differences in adjustment to genital herpes based on ethnicity ($p = .33, \eta^2 = .01$). Genital herpes knowledge was statistically significantly different depending on ethnicity $F(4, 396) = 2.80, p = .03, \eta^2 = .03$. Despite this, post hoc analyses revealed no significant differences in knowledge between groups. Erotophobia-Erotophilia was statistically significantly different depending on ethnicity $F(4, 396) = 3.33, p = .01, \eta^2 = .03$. Caucasian participants ($M = 15.29, SD = 5.05$) were significantly more erotophilic ($p = .004$) than African American participants ($M = 13.28, SD = 4.92$), a difference of 3.00, 95% CI [.65 to 5.34].

Preliminary Analyses

See Table 2 for preliminary analyses including, Pearson correlations, means, standard deviations and internal consistency for all measures in the study.

Table 2

Summary of Intercorrelations, Means, Internal Consistency and Standard Deviations for Adjustment, Knowledge and Erotophobia-Erotophilia scores

Measure	1	2	3	α	M	SD
1.AGH	-			.86	12.16	6.31
2.HKS	.08	-		.83*	91.41	7.34
3.SOS	-.25**	.08	-	.67	14.83	5.09

Note. ($n = 401$) AGH = Psychological Adjustment to Genital Herpes, HKS = Genital

Herpes Knowledge (Herpes Knowledge Scale), SOS = Erotophobia-Erotophilia (Sexual Opinion Survey).

* Internal consistency for the HKS was calculated using the Kuder-Richardson Formula 20.

** $p < .01$

Genital Herpes Knowledge

Herpes knowledge was high within the population ($M=91.41$, $SD=7.34$). Despite high average scores, individual scores ranged from 52.83 to 100% correct. Mean correct responses for each item are presented in Table 3. In general, participants were well informed with the exception of several items related to genital herpes and cervical cell changes (see items 33 and 46 in Table 3).

Of the four conceptual sub-scales suggested as part of the current study, only Myths and Misconceptions about genital herpes was found to have a significant association with psychological adjustment $r(399) = .10$, $p = .03$.

Table 3

Herpes Knowledge Scale (HKS), Percentage of Participants Scoring Correctly per Item, and Item-Total Correlations

HKS Items	Percentage Scoring Correctly ^a	
	Correctly ^a	Corr. ^b
1. The length and severity of genital herpes outbreaks vary from person to person.	99.5	.24
2. Genital herpes is caused by a virus.	98.3	.22
3. Genital herpes recurrences can be triggered by menstruation (in females) or sexual intercourse.	84.5	.35
4. Every person who has a primary (first) outbreak of genital herpes will have recurrence within the next year.	79.3	.47
5. Genital herpes makes males infertile.	98.3	.34
6. Herpes Type 1 can occur on the genitals.	94.0	.35
7. A person having recurrences of genital herpes often experiences prodromal (early warning) sensations.	88.5	.16
8. Years may pass between genital herpes recurrences.	96.8	.31
9. Every sore on the genitals is herpes.	95.0	.14

Continued on next page

HKS Items	Percentage Scoring Correctly ^a	Corr. ^b
10. Once a genital herpes sore has healed, the person will never develop another herpes sore.	99.0	.26
11. A person who gets cold sores on the mouth is immune to genital herpes.	94.3	.22
12. Genital herpes outbreaks usually look like a group of blisters on the genitals.	88.5	.06
13. Prodromal (early warning) sensations of potential genital herpes outbreaks include tingling, burning, itching or vague discomfort in the area where the genital herpes sores usually appear.	98.3	.12
14. If a person has sexual intercourse with someone who has genital herpes, they will definitely get genital herpes too.	95.5	.34
15. Several hundred people are expected to catch genital herpes from toilet seats this year.	93.3	.25
16. A woman who has genital herpes will become infertile because of the herpes infection.	96.8	.38
17. A person with an active outbreak of genital herpes is instructed to keep the sore area clean and dry.	92.5	.16
18. Genital herpes leads to death in adults.	96.3	.18
19. There is a cure for genital herpes at present.	94.8	.05
20. Genital herpes recurrences typically become less frequent over time.	94.3	.25
21. A person who has genital herpes often has more psychological distress than physical complications.	86.0	.36
22. Genital herpes can only be transmitted during an outbreak.	93.3	.33
23. When a person has an active outbreak of genital herpes, it is advisable not to have sexual intercourse.	99.0	.01
24. People who have genital herpes can sometimes predict when they will have an outbreak.	81.3	.17
25. Genital herpes can be transmitted even if the herpes sore has a scab on it.	95.8	.44
26. Genital herpes testing is usually included in routine STI tests.	93.0	.32
27. First episodes of genital herpes infection are usually more severe than the recurrences.	98.0	.25
28. A person who has genital herpes is immune to oral (mouth) herpes.	88.3	.09
29. The genital herpes virus lies in the nerve cells near the spinal cord.	84.3	.38
30. Stress can often trigger a genital herpes recurrence.	99.0	.20
31. People are usually aware if they've been infected with genital herpes.	87.8	.28

Continued on next page

HKS Items	Percentage Scoring Correctly ^a	Corr. ^b
32. Herpes can be fatal to a newborn if they contract the infection.	73.1	.20
33. Genital herpes can often be detected by the use of a Pap test.	65.6	.37
34. After a person is exposed to genital herpes, symptoms can often be seen in 2–12 days.	86.8	.10
35. Anxiety can trigger a genital herpes recurrence.	94.8	.21
36. Condoms offer 100% protection from contracting genital herpes.	97.8	.40
37. A genital herpes infection usually leads to syphilis.	93.5	.43
38. A woman who has genital herpes must have a Caesarean section if she has a baby.	83.8	.55
39. Most children have been exposed to oral (mouth) herpes at one time or another.	77.8	.34
40. A woman with genital herpes can deliver a baby through her vagina if she does not have a herpes outbreak at the time of delivery.	86.8	.50
41. If both parents have genital herpes, their children will be born with herpes.	92.8	.48
42. A woman who has genital herpes can never have a baby.	99.5	.34
43. Genital herpes is not transmittable.	99.0	.22
44. L-lysine is a cure for genital herpes.	94.8	.35
45. Genital herpes can be transmitted when no visible symptoms are present.	97.8	.40
46. Genital herpes may cause cervical cancer.	66.1	.35
47. In a primary (first) case of genital herpes, the person may feel like they have the flu	95.5	.35
48. Oral (mouth) herpes is transmissible.	98.5	.13
49. The best way to treat genital herpes sores is to keep them moist.	88.3	.20
50. Genital herpes cannot be transmitted during the prodromal (early warning) stage.	86.8	.29
51. Genital herpes is not prevalent (common) on college campuses.	88.3	.32
52. Oral herpes cannot be transmitted to the genitals during oral-genital sex.	89.8	.22
53. Acyclovir (Zovirax) and valacyclovir (Valtrex), are anti-viral drugs which can help manage genital herpes symptoms.	99.5	.12

Note. Items 1, 2, 3, 6, 7, 8, 12, 13, 17, 20, 21, 23, 24, 25, 27, 29, 30, 32, 34, 35, 39, 40, 45, 47, 48, 53 are true. Items 4, 5, 9, 10, 11, 14, 15, 16, 18, 19, 22, 26, 28, 31, 33, 36, 37, 38, 41, 42, 43, 44, 46, 49, 50, 51, 52 are false.

^a Scores range from 0-100%

^b Corrected item-total correlations.

Self-Rated Knowledge

Current knowledge. Adjustment was significantly different dependent on how participants rated their current knowledge of herpes Welch's $F(4, 32.465) = 6.311, p = .001, \eta^2 = .03$. Participants who rated their current knowledge as 'poor' ($M = 7.17, SD = 2.99$) were significantly less adjusted to genital herpes ($p = .02$) than those who rated their knowledge as 'good' ($M = 12.85, SD = 6.40$) or 'excellent' ($M = 12.33, SD = 6.86$), a difference of 5.68, 95% CI [.90 to 10.46] and 5.16, 95% CI [.41 to 9.92] respectively. As expected, genital herpes knowledge was significantly different dependent on how participants rated their current knowledge of herpes, Welch's $F(4, 29.70) = 17.69, p < .001, \eta^2 = .18$. across all rating levels. There were no significant differences in erotophobia-erotophilia based on current knowledge ratings, $F(4, 396) = .88, p = .47, \eta^2 = .009$.

Prior knowledge. Adjustment was statistically significantly different depending on how participants rated their prior knowledge of herpes $F(4, 396) = 3.48, p = .008, \eta^2 = .03$. Participants who rated their prior knowledge as 'poor' ($M = 11.78, SD = 6.25$) were significantly less adjusted to genital herpes ($p = .03$) than those who rated their prior knowledge as 'average' ($M = 15.52, SD = 7.27$), a difference of 3.73, 95% CI [.30 to 7.17].

Erotophobia-Erotophilia was also significantly different depending on how participants rated their prior knowledge of herpes $F(4, 396) = 4.33$, $p = .002$, $\eta^2 = .04$. Participants who rated their prior knowledge as 'poor' ($M = 15.41$, $SD = 5.14$) were significantly more erotophobic ($p = .006$) than those who rated their prior knowledge as 'fair' ($M = 13.07$, $SD = 4.18$), a difference of 2.34, 95% CI [.48 to 4.12]. There were no significant differences in genital herpes knowledge based on prior knowledge ratings $F(4, 396) = .78$, $p = .54$, $\eta^2 = .008$.

Time Since Diagnosis.

Adjustment was significantly different depending on how long it had been since participants were diagnosed, Welch's $F(3, 97.582) = 3.78$, $p = .01$, $\eta^2 = .04$. Participants who had been diagnosed within the last year ($M = 11.31$, $SD = 5.80$) were significantly less adjusted ($p = .03$) than those who had been diagnosed more than five years ago ($M = 14.96$, $SD = 8.24$), a difference of 3.65, 95% CI [.24 to 7.05]. Erotophobia-Erotophilia was significantly different depending on the time since diagnosis $F(4, 397) = 3.88$, $p = .009$, $\eta^2 = .03$. Participants who had been diagnosed more than five years ago ($M = 12.52$, $SD = 4.33$) were significantly more erotophilic than those who had been diagnosed less than a year ago ($M = 15.25$, $SD = 4.91$, $p = .007$) or more than a year ago ($M = 14.87$, $SD = 5.27$, $p = .04$), a difference of 2.73, 95% CI [.53 to 4.93] and 2.34, 95% CI [.06 to 4.63] respectively. In addition, genital herpes knowledge was significantly different depending on the time since diagnosis $F(3, 397) = 4.84$, $p = .003$, $\eta^2 = .035$. Participants who had been diagnosed more than a year ago ($M = 92.86$, $SD = 6.45$) were significantly more knowledgeable ($p = .002$) than those who had been diagnosed more than five years ago ($M = 88.56$, $SD = 8.48$), a difference of 4.30, 95% CI [1.14 to 7.47].

Main Analyses

A regression analysis found that genital herpes knowledge did not significantly predict the variance in psychological adjustment $R^2 = .006$, $F(1,399) = 2.29$, $p = .13$, $\beta = .08$. However, erotophobia-erotophilia did predict psychological adjustment, $F(1, 399) = 25.81$, $p < .001$, $\beta = -.25$, and accounted for 6.1% (adjusted $R^2 = .06$) of the explained variability in adjustment scores. Individuals who were highly erotophilic (scoring between 5-11) were significantly more adjusted than those who were slightly erotophobic (15-18) ($p = .002$) and very erotophobic (19+) ($p < .001$). Erotophobia-erotophilia was not found to significantly predict the variance in genital herpes knowledge ($R^2 = .006$, $F(1,399) = 2.32$, $p = .13$, $\beta = .08$). For exploratory purposes, self-rated herpes knowledge was also evaluated as a continuous, single-item measure of subjective knowledge. Self-rated knowledge was found to significantly predict psychological adjustment $F(1, 399) = 7.02$, $p = .008$, $\beta = .13$, and accounted for 1.7% (adjusted $R^2 = .015$) of the explained variability in adjustment.

Moderating Influence of Erotophobia-Erotophilia

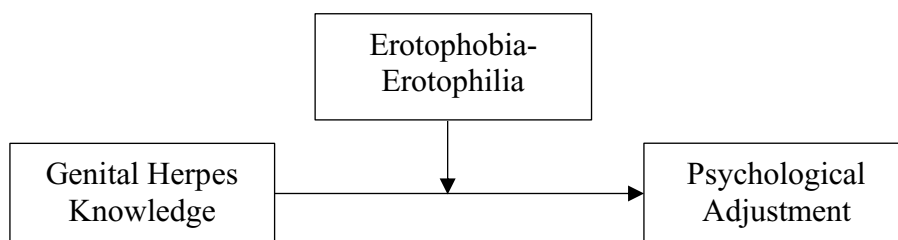
To test the hypothesis that erotophobia-erotophilia may moderate the relation between knowledge and psychological adjustment to genital herpes (see Figure 1), a moderation analysis using Model 1 in the PROCESS macro for SPSS (Hayes, 2012) was conducted. Previous results suggested a lack of main effect between knowledge and adjustment. However, the moderation analysis was conducted despite this, given the potential for a cross-over interaction to produce a significant interaction without significant main effects. The Hubert-White procedure was used to compensate for heteroscedasticity amongst the variables. Although the overall model was significant, R^2

= .07, $F(3, 397) = 11.54, p < .001$, only erotophobia-erotophilia significantly predicted adjustment, $b = -.31, t(397) = -5.63, p < .001$. Genital herpes knowledge, $b = .08, t(397) = 2.10, p = .06$, was not a significant predictor of psychological adjustment, nor was the interaction between knowledge and erotophobia-erotophilia significant, $b = -.003, t(397) = -.43, p = .67$.

Given that previous results suggested that self-reported herpes knowledge did significantly predict adjustment, for exploratory purposes the moderation model was also conducted with self-rated knowledge rather than knowledge assessed using the Herpes Knowledge Scale. This resulted in a better model fit $R^2 = .09, F(3, 397) = 13.24, p < .001$ in which self-rated knowledge, $b = 1.05, t(397) = 3.35, p < .001$, and erotophobia-erotophilia, $b = -.30, t(397) = -5.44, p < .001$, significantly predicted adjustment. In addition, the interaction between self-rated knowledge and erotophobia-erotophilia was significant $b = -.17, t(397) = -2.65, p = .009$ (see Figure 2). Using the Johnson-Neyman technique it was found that when $W \leq 2.59$, self-rated knowledge has a significant effect. This means that individuals scoring ≤ 17.42 on erotophobia-erotophilia reported significantly greater psychological adjustment when self-rated knowledge was high. This relation between knowledge and adjustment was not significant for individuals scoring > 17.42 (See Figure 2).

Figure 1

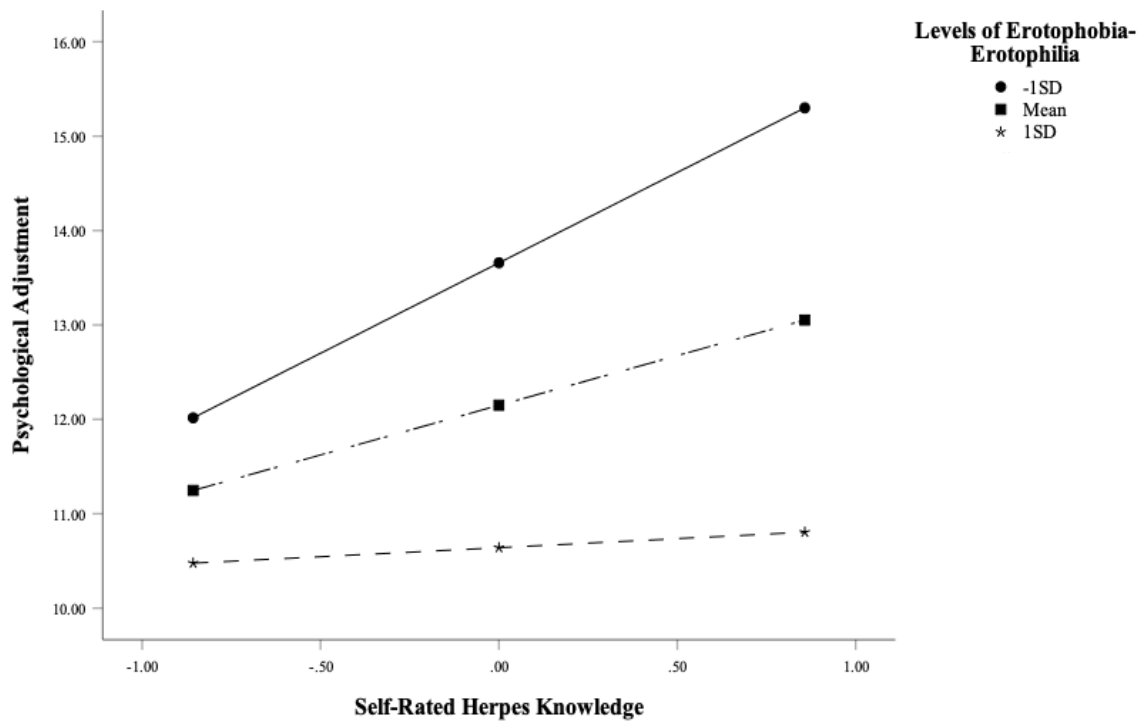
Hypothesized Moderation Model



Note. Levels of erotophobia-erotophilia were expected to moderate the relationship between genital herpes knowledge and psychological adjustment to genital herpes. This model was only significant when using participant’s self-rated genital herpes knowledge rather than knowledge measured using the HKS.

Figure 2

Moderating effect of Erotophobia-Erotophilia on Self-Rated Knowledge and Adjustment



Note. Levels of erotophobia-erotophilia moderated the relationship between self- report genital herpes knowledge and psychological adjustment to genital herpes. Predictor variables have been mean centered. Slopes are provided for mean scores of erotophobia-erotophilia ($M = 14.83$, $SD = 5.09$) as well as one standard deviation above and below the mean. Lower scores indicate erotophilia (sex-positivity) while higher scores indicate erotophobia (sex-negativity).

Discussion

The purpose of the current study was to evaluate factors that affect psychological adjustment to genital herpes. Using an updated measure of genital herpes knowledge and by evaluating the personality trait of erotophobia-erotophilia (sex negativity-positivity) the current research sought to understand how these variables influence psychological adjustment to genital herpes amongst those diagnosed. The results did not support the hypothesis that knowledge as measured by the Herpes Knowledge Scale would predict psychological adjustment to genital herpes. However, as hypothesized, erotophobia-erotophilia significantly predicted adjustment to genital herpes. Levels of erotophobia-erotophilia did not moderate the relation between genital herpes knowledge and psychological adjustment when knowledge was measured using the HKS. That said, exploratory analysis found that participants' subjective self-rated knowledge did significantly predict adjustment. In addition, levels of erotophobia-erotophilia significantly moderated the relation between self-rated herpes knowledge and psychological adjustment, such that the relation was stronger for individuals higher in erotophilia. Given that subjective knowledge had not been identified within the initial hypotheses, the analyses conducted using participant's self-rated knowledge should be read as exploratory and in need of future research.

Within the current research, HSV-positive individuals were found to be very knowledgeable (above 90% correct responses) even amongst those who had been diagnosed within the last year. This was consistent with previous research that assessed herpes knowledge beyond initial diagnosis (Swanson et al., 1999). While the aim of using the HKS was to get a more detailed assessment of knowledge, the current research

suggests that individuals with herpes are well informed on the features of their condition and have a thorough understanding of transmission. Previous research has found that the type of knowledge assessed by the HKS is associated with adjustment to other STIs (Laws, Lee, Rogers, Taubin & Wilson, 2020). Information about the prevalence, transmission and management of herpes helps individuals to evaluate accurately the illness burden and adjust to the condition (Brownlee et al., 2000; Melville et al., 2003; Sharpe & Curran, 2006).

Given that scores on the HKS were high, the lack of main effect in the current research may be a function of the scale itself rather than a truly non-significant relation between knowledge and adjustment. The lack of variance in the HKS suggests its use in an HSV-positive population is seriously limited. Items on the HKS may not be challenging or detailed enough to properly discriminate between high and low knowledge in those already diagnosed with herpes. Although there was enough variance in responses to detect significant between-group differences, the non-significant main effects within the current study should be interpreted with caution.

Though scores on the HKS were significantly associated with participants' self-rated knowledge, there appears to be an important distinction between objective and subjective knowledge within this study. The results suggest that there may be a discrepancy between what experts deemed important information and what people with herpes consider encompasses their knowledge. This discrepancy is particularly important to note as the information deemed significant by experts on the HKS was found to have little relationship to adjustment. This may reflect similar findings which suggest a

discrepancy between the information herpes patients considered pertinent and the extent to which their health care providers covered such topics (Barnack-Tavlaris et al., 2011).

Although the HKS addresses vital topics for people diagnosed with herpes such as basic transmission or disease management, it may not encompass the knowledge required for more actionable behaviour such as preventing transmission or disclosing genital herpes to an uninfected partner. Given the complex nature of genital herpes transmission and antiviral suppression, abstract knowledge alone may not equip individuals to manage genital herpes in their daily lives, which may be more significant for psychological adjustment.

Of the four proposed subscales for the HKS, only 'Myths and Misconceptions' was significantly associated with psychological adjustment. This may reflect the extent to which myths and misconceptions about genital herpes rely on negative depictions or stereotypes to prevail. This type of misinformation about genital herpes may increase perceived stigma and psychological distress. Individuals who are misinformed about herpes may overestimate the burden or potential consequences of genital herpes and have an inaccurate evaluation of the condition. As such, knowledge about genital herpes that serves to dispel misinformation may be more salient for adjustment.

Individuals who scored higher on erotophilia (sex-positive) had greater psychological adjustment than individuals who were more erotophobic (sex-negative). This is in line with previous research which found that individuals who are more sexually conservative experienced greater psychological distress as a result of an STI diagnosis (Foster & Byers, 2008). The positive attitudinal response to sexual cues which characterizes those high in erotophilia may enable individuals with genital herpes to

retain a more positive or optimistic outlook on their sexuality following their diagnosis. In addition, these sex-positive individuals may be less likely to view genital herpes as the negative consequence of sexual behaviour. As such, the positive disposition to sexuality characterized by erotophilia may act as a protective factor against the reluctance to engage in future sexual relationships and negative body image that can result from a herpes diagnosis (Hirschler et al., 2015; Vezina & Steben, 2001). The current findings support the theory that individuals high in erotophobia may internalize stigmatizing beliefs about STIs or believe they are the result of reckless behaviour (Foster & Byers, 2008; Smith & Nave, 2007).

Previous research has noted the role that time may play in psychological adjustment to genital herpes (Green & Kocsis, 1997; Mindel & Marks, 2005). As found within the current study, individuals who had been diagnosed more than five ago were found to have better adjustment and were more erotophilic. This may reflect a decrease in sex-avoidance that comes about as individuals adjust to their condition and become more comfortable disclosing to sexual partners and managing outbreaks.

Implications

Upon diagnosis, individuals with genital herpes are currently provided with some information by their physicians but are rarely provided with or directed to psychological support (Alexander & Naisbett, 2002). The current research suggests that knowledge alone may be insufficient to overcome the psychological distress that is common among HSV-positive individuals. Furthermore, attitudes towards sexuality, measured using erotophobia-erotophilia, were found to significantly affect adjustment to genital herpes. This suggests that an individual's psychological adjustment to genital herpes may rely on

underlying attitudes about sexuality which are not addressed upon diagnosis. Given the stigma that surrounds genital herpes as a sexually transmitted infection, individuals who have underlying negative attitudes about sexuality may require additional support to combat the psychological distress of their diagnosis. In addition, while knowledge can be improved, erotophobia-erotophilia is considered a stable personality trait and may be resistant to change without significant intervention (Wright & Cullen, 2001). Within a sex-negative society where STI avoidance is considered paramount, education alone may not be enough to overcome the stigma and shame attached to a diagnosis of genital herpes. Previous research has stressed the role of perceived stigma to explain differences in psychological adjustment (Barnack-Tavlaris et al., 2011). However, within the individual, erotophobia may reflect how societal stigma and sex-negativity become internalized as shame and discomfort that impedes adjustment. To that end, erotophobia may encourage maladaptive coping such as denial while erotophilia may facilitate positive coping strategies like acceptance (Barnack-Tavlaris et al., 2011; Merin & Pachankis, 2011; Mindel & Marks, 2005).

Although the Herpes Knowledge Scale contains critical knowledge, as assessed by experts, the current research suggests that individuals with herpes may have a different conceptualization of knowledge which is of greater significance to psychological adjustment. While this may be explained by objective differences in what constitutes required knowledge, this discrepancy may also be explained by individuals' perception of their own knowledge as it relates to self-efficacy. Fisher's information-motivation-behavioural skills (IBM) model relies on knowledge providing the motivation and skills needed to enact health behaviours, yet despite high levels of objective knowledge among

participants, only subjective self-rated knowledge influenced adjustment (Fisher et al., 2003). Though low levels of objective knowledge would certainly prevent individuals from enacting effective health behaviours, such as the use of anti-viral medication, subjective knowledge may have greater influence on the motivation stage Fisher posits in the IBM model.

The discrepancy between objective and subjective knowledge within the current research may also reflect the difference between basic and applied knowledge. Knowledge that increases confidence disclosing to sexual partners or managing symptoms may be included within subjective 'genital herpes knowledge'. However, this knowledge may not necessarily be reflected in an objective measure. An objective understanding of genital herpes rates and transmission may not reflect the subjective experience that getting herpes is very common and preventing transmission is challenging. Given the effect of time since diagnosis on psychological adjustment, individuals may gain confidence in their ability to apply their knowledge over time which may contribute to perceived self-efficacy and coping. Beyond ensuring individuals are knowledgeable is the need for individuals to feel confident applying their knowledge in various settings, such as disclosing their status and discussing the risk of transmission with new partners. For psychological adjustment to occur, individuals need to know what comes after transmission and how having genital herpes will affect their lives. The current research suggests that objective knowledge alone does not help answer these questions and that more support and information is needed for those diagnosed.

Limitations

Prior to the current study, the full measure used to evaluate genital herpes knowledge had not been validated for use with an HSV-positive population. As such, it may not have included the level of depth or complexity required to reflect the knowledge desired by this population, as reflected by the lack of variance in responses. The HKS suffered from a large ceiling effect when used with an HSV-positive population which may explain the lack of significant results when compared to self-rated knowledge. Therefore, the results should be interpreted with caution as they relate to the HKS. In addition, the current study suggests that the HKS may not reflect knowledge factors which are relevant for psychological adjustment. Although the HKS may be suitable for use upon initial diagnosis, a more complex knowledge assessment may be required once individuals become familiar with the basic features of the condition. Future measures should be designed to consider the effect that time since diagnosis may have on what type of knowledge is relevant long term. These measures should consider knowledge application as it relates to health behaviours and self-efficacy as this may be a more accurate assessment of knowledge regardless of time since diagnosis. The study of genital herpes knowledge in an HSV-positive population may be best assessed by focusing on individuals' confidence and ability to apply information in a variety of contexts, such as performing health behaviours or disclosing to partners.

Within the current research, erotophobia-erotophilia was assessed with the Short-form Sexual Opinion Survey (SOS). This was chosen due to the full scale's focus on attitudes towards homosexuality which were not considered to be relevant in the present study (Rye et al., 2011). However, the short-form SOS has lower internal consistency

than the full scale and has not been independently validated against other measures (Rye & Fisher, 2019).

Although participants included the length of time since their diagnosis, they were not asked to describe the severity or frequency of their outbreaks which may influence adjustment (Barnack-Tavlaris et al., 2011; Doward et al., 1998; Patel et al., 2001).

However, previous research has found that emotional distress was only weakly related to frequency of occurrences and that perceived severity may be more strongly related to psychological factors than to actual physical symptoms (Green & Kocsis, 1997).

Though the study was promoted on social media through a variety of tags (such as; 'sexual health', 'psychology research', 'sexuality' and 'genital herpes'), during recruitment it became clear that a large percentage of participants were engaged with herpes support groups online through which the study became popular. As a result, the population may not be representative to individuals with genital herpes who do not seek out herpes information or support online.

Recommendations

Future research should explore knowledge factors that may improve psychological adjustment to genital herpes. In particular, research should identify areas where psychoeducation which considers underlying sexual attitudes can be used to improve psychological adjustment. Further research should identify potential discrepancies between information provided by medical professionals and the information desired by patients for the ongoing management of genital herpes to aid in adjustment.

Given the significance of sexual attitudes in the current study, further attitudes and psychological traits should be explored for their influence on psychological adjustment to genital herpes as well as other STIs. Interventions that address these psychological variables, such as increasing sex-positivity, should also be investigated for their potential to mitigate the psychological distress caused by genital herpes.

Further research should continue to examine genital herpes as a chronic condition rather than focusing on the short-term, acute distress that follows an initial diagnosis. Although outbreaks and their severity do decrease overtime, the status of having genital herpes and the potential for asymptomatic transmission are long-term concerns for which there has been limited psychological research.

Conclusion

The current research explored knowledge and sexual attitudes in relation to psychological adjustment to genital herpes. Given the prevalence of genital herpes in the general population and the complex issues surrounding prevention and transmission, it is paramount to understand factors which may improve adjustment to such a common condition that causes such significant distress. The results identified a potential discrepancy between the influence of objective and subjective knowledge in psychological adjustment. This suggests additional clinical support should reflect the relevant information desired by individuals to cope with their diagnoses (Alexander & Naisbett, 2002). Furthermore, the significance of the personality dimension erotophobia-erotophilia highlights the ways in which adjustment to an STI is influenced by sexual attitudes. Health care professionals should be attentive to the impact of negative sexual attitudes on adjustment to genital herpes given its sexual transmission and the stigma

which surrounds a positive diagnosis. These findings expand on previous research that examined adjustment to genital herpes and identified limits to the current education-based approach.

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Appendix A: Preliminary Questionnaire

1. What is your age?

- 18-25
- 26-35
- 36-50
- 50-64
- 65+

2. You identify as?

- Male
- Female
- Other (Please Specify) _____

3. What is your sexual orientation? (Please select all that apply)

- Heterosexual
- Gay/Lesbian
- Bisexual/ Pansexual
- Questioning
- Queer
- Asexual
- Other (Please Specify) _____

4. What is your ethnicity? (Please select all that apply)

- White (non-Hispanic) Caucasian
- Black (African-American)
- Hispanic/Latino
- Asian
- Pacific Islander
- Aboriginal
- Other (Please Specify) _____

5. Rate your current genital herpes knowledge using the following scale:

1	2	3	4	5
Poor	Fair	Average	Good	Excellent

6. Have you ever been diagnosed with genital herpes (HSV-1 or HSV-2)?

Yes

No

7. How long has it been since you were diagnosed with genital herpes?
 - a. Less than 1 year
 - b. More than 1 year
 - c. More than 5 years
 - d. More than 10 years
 - e. N/A (I have never been diagnosed with genital herpes)

8. If 'yes' to question 6, please rate your genital herpes knowledge prior to (before) your diagnosis:

1	2	3	4	5
Poor	Fair	Average	Good	Excellent

N/A (I have never been diagnosed with genital herpes)

Appendix B: Psychological Adjustment Scale

Please indicate the extent to which you agree or disagree with the following statements:

1	2	3	4	5	6	7
Strongly Agree	Agree	Somewhat Agree	Neither Agree or Disagree	Somewhat Disagree	Disagree	Strongly Disagree

1. I do not feel ashamed to have genital herpes
2. I feel insecure about sexual relationships because of genital herpes
3. I get depressed about having genital herpes
4. Genital herpes affects my self-esteem
5. I worry that people will reject me if they know I have genital herpes

Appendix C: Knowledge Questionnaire

Updated Herpes Knowledge Scale

Instructions: For each of the following 53 statements, please select whether you think the statement is true or false.

Key terms:

Outbreak: A period of experiencing symptoms

Recurrence: The reappearance of symptoms after the primary (first) outbreak

1. The length and severity of genital herpes outbreaks vary from person to person. (T)
True
False
2. Genital herpes is caused by a virus. (T)
True
False
3. Genital herpes recurrences can be triggered by menstruation (in females) or sexual intercourse. (T)
True
False
4. Every person who has a primary (first) outbreak of genital herpes will have recurrence within the next year. (F)
True
False
5. Genital herpes makes males infertile. (F)
True
False
6. Herpes Type 1 can occur on the genitals. (T)
True
False
7. A person having recurrences of genital herpes often experiences prodromal (early warning) sensations. (T)
True
False
8. Years may pass between genital herpes recurrences. (T)
True
False
9. Every sore on the genitals is herpes. (F)
True
False
10. Once a genital herpes sore has healed, the person will never develop another herpes sore. (F)
True

- False
11. A person who gets cold sores on the mouth is immune to genital herpes. (F)
True
False
 12. Genital herpes outbreaks usually look like a group of blisters on the genitals. (T)
True
False
 13. Prodromal (early warning) sensations of potential genital herpes outbreaks include tingling, burning, itching or vague discomfort in the area where the genital herpes sores usually appear. (T)
True
False
 14. If a person has sexual intercourse with someone who has genital herpes, they will definitely get genital herpes too. (F)
True
False
 15. Several hundred people are expected to catch genital herpes from toilet seats this year.(F)
True
False
 16. A woman who has genital herpes will become infertile because of the herpes infection.(F)
True
False
 17. A person with an active outbreak of genital herpes is instructed to keep the sore area clean and dry. (T)
True
False
 18. Genital herpes leads to death in adults. (F)
True
False
 19. There is a cure for genital herpes at present. (F)
True
False
 20. Genital herpes recurrences typically become less frequent over time. (T)
True
False
 21. A person who has genital herpes often has more psychological distress than physical complications. (T)
True
False
 22. Genital herpes can only be transmitted during an outbreak (F)
True
False
 23. When a person has an active outbreak of genital herpes, it is advisable not to have sexual intercourse. (T)

- True
False
24. People who have genital herpes can sometimes predict when they will have an outbreak.(T)
True
False
25. Genital herpes can be transmitted even if the herpes sore has a scab on it. (T)
True
False
26. Genital herpes testing is usually included in routine STI tests (F)
True
False
27. First episodes of genital herpes infection are usually more severe than the recurrences.(T)
True
False
28. A person who has genital herpes is immune to oral (mouth) herpes. (F)
True
False
29. The genital herpes virus lies in the nerve cells near the spinal cord. (T)
True
False
30. Stress can often trigger a genital herpes recurrence. (T)
True
False
31. People are usually aware if they've been infected with genital herpes (F)
True
False
32. Herpes can be fatal to a newborn if they contract the infection. (T)
True
False
33. Genital herpes can often be detected by the use of a Pap test. (F)
True
False
34. After a person is exposed to genital herpes, symptoms can often be seen in 2–12 days.(T)
True
False
35. Anxiety can trigger a genital herpes recurrence. (T)
True
False
36. Condoms offer 100% protection from contracting genital herpes. (F)
True
False
37. A genital herpes infection usually leads to syphilis. (F)
True

- False
38. A woman who has genital herpes must have a Caesarean section if she has a baby.
(F)
True
False
39. Most children have been exposed to oral (mouth) herpes at one time or another.
(T)
True
False
40. A woman with genital herpes can deliver a baby through her vagina if she does not have a herpes outbreak at the time of delivery. (T)
True
False
41. If both parents have genital herpes, their children will be born with herpes. (F)
True
False
42. A woman who has genital herpes can never have a baby. (F)
True
False
43. Genital herpes is not transmittable. (F)
True
False
44. L-lysine is a cure for genital herpes. (F)
True
False
45. Genital herpes can be transmitted when no visible symptoms are present (T)
True
False
46. Genital herpes may cause cervical cancer. (F)
True
False
47. In a primary (first) case of genital herpes, the person may feel like they have the flu. (T)
True
False
48. Oral (mouth) herpes is transmissible. (T)
True
False
49. The best way to treat genital herpes sores is to keep them moist. (F)
True
False
50. Acyclovir (Zovirax) and valacyclovir (Valtrex), are anti-viral drugs which can help manage genital herpes symptoms. (T)
True
False
51. Genital herpes cannot be transmitted during the prodromal (early warning) stage.

(F)

True

False

52. Genital herpes is not prevalent (common) on college campuses. (F)

True

False

53. Oral herpes cannot be transmitted to the genitals during oral-genital sex. (F)

True

False

Appendix D: Sexual Opinion Survey—Short Form

Please respond to each item as honestly as you can. There are no right and wrong answers, and your answers will be completely anonymous.

Please indicate the extent to which you agree or disagree with the following statements:

1	2	3	4	5	6	7
Strongly Agree	Agree	Somewhat Agree	Neither Agree or Disagree	Somewhat Disagree	Disagree	Strongly Disagree

1. Almost all sexually explicit material is nauseating.
2. Masturbation can be an exciting experience.
3. It would be emotionally upsetting to me to see someone exposing themselves publicly.
4. The thought of engaging in unusual sex practices is highly arousing.
5. The thought of having long-term sexual relations with more than one sex partner is not disgusting to me.

Appendix E: Herpes Knowledge Scale (1986)**Original Herpes Knowledge Scale (Bruce & McLaughlin, 1986)**

Instructions: For each of the following 54 statements, please note on the answer sheet whether you think the statement is true or false.

If you do not have any idea whether or not the statement is true or false, please note that you don't know.

Use the following code for your responses:

T: The statement is true

F: The statement is false

DK: I don't know whether the statement is true or false

Each statement is numbered. Be sure to match the statement's number with the number on the answer sheet. Please respond to all statements on the questionnaire.

1. The length and severity of genital herpes outbreaks vary from person to person.
2. Genital herpes is caused by a virus.
3. Genital herpes was discovered five years ago.
4. Genital herpes recurrences can be triggered by menstruation (in females) or sexual intercourse.
5. Every person who has a primary (first) outbreak of genital herpes will have recurrence within the next year.
6. Genital herpes makes males infertile (sterile).
7. Between recurrences, the genital herpes virus lies dormant (inactive) in the nerve cells.
8. Herpes Type 1 cannot occur on the genitals.
9. A person having recurrences of genital herpes often experiences prodromal (early warning) sensations.
10. Years may pass between genital herpes recurrences.
11. Every sore on the genitals is herpes.
12. Once a genital herpes sore has healed, the person will never develop another herpes sore.
13. A person who gets cold sores on the mouth is immune to genital herpes.
14. Genital herpes usually looks like blisters on the genitals.

15. Prodromal (early warning) sensations of genital herpes recurrences include tingling or itching in the area where the genital herpes sores usually appear.
16. If a person has sexual intercourse with someone who has genital herpes, s/he will definitely get genital herpes too.
17. Several hundred people are expected to catch genital herpes from toilet seats this year.
18. A woman who has genital herpes will become sterile because of the herpes infection.
19. People who wear contact lenses and have oral (mouth) herpes should avoid putting the lenses in their mouths because the herpes infection could spread to their eyes.
20. A person with genital herpes is instructed to keep the sore area clean and dry.
21. Genital herpes leads to death.
22. There is a cure for genital herpes at present.
23. Genital herpes recurrences do not typically become less frequent over time.
24. A person who has genital herpes often has more psychological complications than physical complications.
25. When a person has an active outbreak of genital herpes, it is advisable not to have sexual intercourse.
26. People who have genital herpes can sometimes predict when they will have a recurrence.
27. A woman who has genital herpes should have a Pap smear at least once a year.
28. Genital herpes can be contagious even if the herpes sore has a scab on it.
29. First episodes of genital herpes infection are usually more severe than the recurrences.
30. A person who has genital herpes is immune to oral (mouth) herpes.
31. Between recurrences, the genital herpes virus lies dormant (inactive) near the spinal cord.
32. Stress can often trigger a genital herpes recurrence.
33. Herpes can be fatal to a newborn if s/he contracts the infection.
34. Genital herpes can often be detected by the use of a Pap smear.

35. After a person is exposed to genital herpes, s/he will often show symptoms in 2–20 days.
36. Anxiety can trigger a genital herpes recurrence.
37. Condoms offer 100% protection from catching genital herpes.
38. A genital herpes infection usually leads to syphilis.
39. A woman who had genital herpes must have a Caesarean section if she has a baby.
40. Most people have been exposed to oral herpes at one time or another.
41. A woman with genital herpes can deliver a baby through her vagina if she doesn't have an active herpes infection at the time of delivery.
42. If both parents have genital herpes, their children will be born with herpes.
43. A woman who has genital herpes can never have a baby.
44. Genital herpes is not contagious.
45. L-lysine is a cure for genital herpes.
46. Genital herpes may be associated with cancer of the cervix.
47. Contraceptive foam has been proven to kill genital herpes in humans.
48. In a primary (first) case of genital herpes, the person may feel like s/he has the flu.
49. Oral herpes is contagious.
50. The best way to treat genital herpes sores is to keep them moist.
51. Acyclovir (also called Zovirax or Valtrex), an anti-viral drug, can cure genital herpes.
52. A person with genital herpes is not contagious during the prodromal (early warning) stage.
53. Genital herpes is not prevalent (common) on college campuses.
54. Oral herpes cannot be transferred to the genitals during oral-genital sex.

Items 1, 2, 4, 7, 9, 10, 14, 15, 19, 20, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 40, 41, 46, 48, and 49 are true. Items 3, 5, 6, 8, 11, 12, 13, 16, 17, 18, 21, 22, 23, 30, 37, 38, 39, 42, 43, 44, 45, 47, 50, 51, 52, 53, and 54 are false.

Appendix F: Factor Loadings for the Herpes Knowledge Scale (HKS)

HKS Item	Factor Loading									
	I	II	III	IV	V	VI	VII	VII	IX	X
1. The length and severity of genital herpes outbreaks vary from person to person.			-.76							
2. Genital herpes is caused by a virus.			.56							.43
3. Genital herpes recurrences can be triggered by menstruation (in females) or sexual intercourse.		.47								
4. Every person who has a primary (first) outbreak of genital herpes will have recurrence within the next year.	.78									
5. Genital herpes makes males infertile.	.71									
6. Herpes Type 1 can occur on the genitals.						.54				
7. A person having recurrences of genital herpes often experiences prodromal (early warning) sensations.						.72				
8. Years may pass between genital herpes recurrences.	.50									
9. Every sore on the genitals is herpes.		-.61								
10. Once a genital herpes sore has healed, the person will never develop another herpes sore.									-.42	.59
11. A person who gets cold sores on the mouth is immune to genital herpes.								.75		
12. Genital herpes outbreaks usually look like a group of blisters on the genitals.										.61

Continued on next page

Factor Loadings for the Herpes Knowledge Scale (HKS)

HKS Item	Factor Loading									
	I	II	III	IV	V	VI	VII	VII	IX	X
13. Prodromal (early warning) sensations of potential genital herpes outbreaks include tingling, burning, itching or vague discomfort in the area where the genital herpes sores usually appear.									-.43	
14. If a person has sexual intercourse with someone who has genital herpes, they will definitely get genital herpes too.								.60		
15. Several hundred people are expected to catch genital herpes from toilet seats this year.			.66							
16. A woman who has genital herpes will become infertile because of the herpes infection.					.59					
17. A person with an active outbreak of genital herpes is instructed to keep the sore area clean and dry.			.68							
18. Genital herpes leads to death in adults.							.46		-.53	
19. There is a cure for genital herpes at present.										-.78
20. Genital herpes recurrences typically become less frequent over time.				.66						
21. A person who has genital herpes often has more psychological distress than physical complications.							.44			
22. Genital herpes can only be transmitted during an outbreak.							.47			
23. When a person has an active outbreak of genital herpes, it is advisable not to have sexual intercourse.	.45	-.48				-.45				
24. People who have genital herpes can sometimes predict when they will have an outbreak.		.40								

Continued on next page

Factor Loadings for the Herpes Knowledge Scale (HKS)

HKS Item	Factor Loading									
	I	II	III	IV	V	VI	VII	VII	IX	X
25. Genital herpes can be transmitted even if the herpes sore has a scab on it.		.42					.48			
26. Genital herpes testing is usually included in routine STI tests.						.41				-.48
27. First episodes of genital herpes infection are usually more severe than the recurrences.				.77						
28. A person who has genital herpes is immune to oral (mouth) herpes.								.45		
29. The genital herpes virus lies in the nerve cells near the spinal cord.		.61								
30. Stress can often trigger a genital herpes recurrence.								-.75		
31. People are usually aware if they've been infected with genital herpes.		.39								
32. Herpes can be fatal to a newborn if they contract the infection.							-.48			
33. Genital herpes can often be detected by the use of a Pap test.					.54					
34. After a person is exposed to genital herpes, symptoms can often be seen in 2–12 days.									.82	
35. Anxiety can trigger a genital herpes recurrence.					.41			-.69		
36. Condoms offer 100% protection from contracting genital herpes.		.70								
37. A genital herpes infection usually leads to syphilis.			.65							
38. A woman who has genital herpes must have a Caesarean section if she has a baby.	.87									

Continued on next page

Factor Loadings for the Herpes Knowledge Scale (HKS)

HKS Item	Factor									
	I	II	III	IV	V	VI	VII	VII	IX	X
39. Most children have been exposed to oral (mouth) herpes at one time or another.	.54						.46			
40. A woman with genital herpes can deliver a baby through her vagina if she does not have a herpes outbreak at the time of delivery.	.87									
41. If both parents have genital herpes, their children will be born with herpes.					.40					
42. A woman who has genital herpes can never have a baby.									-.51	
43. Genital herpes is not transmittable.		.42		-.44						
44. L-lysine is a cure for genital herpes.						.40				
45. Genital herpes can be transmitted when no visible symptoms are present.		.40								
46. Genital herpes may cause cervical cancer.					.53					
47. In a primary (first) case of genital herpes, the person may feel like they have the flu								-.42		
48. Oral (mouth) herpes is transmissible.						-.84				
49. The best way to treat genital herpes sores is to keep them moist.			.74							
50. Genital herpes cannot be transmitted during the prodromal (early warning) stage.		.63								
51. Genital herpes is not prevalent (common) on college campuses.					.69					
52. Oral herpes cannot be transmitted to the genitals during oral-genital sex.				.74						
53. Acyclovir (Zovirax) and valacyclovir (Valtrex), are anti-viral drugs which can help manage genital herpes symptoms.							-.94			

Note N=401, Factor loadings < .4 are suppressed. Oblimin Rotation

**Appendix G:
Proposed Sub-Scales for the HKS**

Basic information and Transmission:

1. Genital herpes is caused by a virus.
2. Herpes Type 1 can occur on the genitals.
3. A person who gets cold sores on the mouth is immune to genital herpes.
4. If a person has sexual intercourse with someone who has genital herpes, they will definitely get genital herpes too
5. There is a cure for genital herpes at present.
6. Genital herpes can only be transmitted during an outbreak
7. Genital herpes can be transmitted even if the herpes sore has a scab on it.
8. A person who has genital herpes is immune to oral (mouth) herpes.
9. The genital herpes virus lies in the nerve cells near the spinal cord.
10. Condoms offer 100% protection from contracting genital herpes.
11. Genital herpes is not transmittable.
12. Genital herpes can be transmitted when no visible symptoms are present
13. Oral (mouth) herpes is transmissible.
14. Genital herpes cannot be transmitted during the prodromal (early warning) stage.
15. Oral herpes cannot be transmitted to the genitals during oral-genital sex

Outbreaks and Ongoing Management:

1. The length and severity of genital herpes outbreaks vary from person to person.
2. Genital herpes recurrences can be triggered by menstruation (in females) or sexual intercourse.
3. Every person who has a primary (first) outbreak of genital herpes will have recurrence within the next year.
4. A person having recurrences of genital herpes often experiences prodromal (early warning) sensations.
5. Years may pass between genital herpes recurrences.
6. Every sore on the genitals is herpes.
7. Once a genital herpes sore has healed, the person will never develop another herpes sore.
8. Genital herpes outbreaks usually look like a group of blisters on the genitals.
9. Prodromal (early warning) sensations of potential genital herpes outbreaks include tingling, burning, itching or vague discomfort in the area where the genital herpes sores usually appear
10. A person with an active outbreak of genital herpes is instructed to keep the sore area clean and dry.
11. Genital herpes recurrences typically become less frequent over time
12. When a person has an active outbreak of genital herpes, it is advisable not to have sexual intercourse.

13. People who have genital herpes can sometimes predict when they will have an outbreak.
14. First episodes of genital herpes infection are usually more severe than the recurrences.
15. Stress can often trigger a genital herpes recurrence.
16. After a person is exposed to genital herpes, symptoms can often be seen in 2–12 days.
17. Anxiety can trigger a genital herpes recurrence.
18. In a primary (first) case of genital herpes, the person may feel like they have the flu.
19. The best way to treat genital herpes sores is to keep them moist.
20. Acyclovir (Zovirax) and valacyclovir (Valtrex), are anti-viral drugs which can help manage genital herpes symptoms.

Neonatal Herpes and Fertility:

1. Genital herpes makes males infertile.
2. A woman who has genital herpes will become infertile because of the herpes infection.
3. Herpes can be fatal to a newborn if they contract the infection
4. A woman who has genital herpes must have a Caesarean section if she has a baby.
5. A woman with genital herpes can deliver a baby through her vagina if she does not have a herpes outbreak at the time of delivery.
6. A woman who has genital herpes can never have a baby.

Myths and Misconceptions:

1. Several hundred people are expected to catch genital herpes from toilet seats this year.
2. Genital herpes leads to death in adults.
3. A person who has genital herpes often has more psychological distress than physical complications.
4. Genital herpes testing is usually included in routine STI tests.
5. People are usually aware if they've been infected with genital herpes.
6. Genital herpes can often be detected by the use of a Pap test.
7. A genital herpes infection usually leads to syphilis.
8. Most children have been exposed to oral (mouth) herpes at one time or another.
9. If both parents have genital herpes, their children will be born with herpes.
10. L-lysine is a cure for genital herpes.
11. Genital herpes may cause cervical cancer.
12. Genital herpes is not prevalent (common) on college campuses.