Original Article

Predictors Affecting the Attitude Towards Homosexuality Among Health Sciences University Students in East Coast Malaysia

Nurul Shahida Che Kamarudin[1], *Raishan Shafini Bakar[2], Ahmad Shahril Ab. Halim[3], Sharifah Zubaidiah Syed Jaapar[4], Najib Majdi Yaacob[5]

ABSTRACT

Introduction
As a minority group homosexuality poses the risk of various mental illnesses and medical comorbidities. In Malaysia, homosexuality is prohibited according to culture, law, and religion. Thus, this group is reluctant to seek help due to the negative attitude of certain healthcare professionals. Healthcare professionals' negative attitudes towards this group may negatively impact patient care quality. This study aimed to identify predictors of health sciences students' attitudes toward homosexuality.

Materials and methods
An online cross-sectional study was conducted among 307 undergraduate clinical students at a university on the east coast of Malaysia from December 2020 to February 2021. The instruments consisted of the Homosexual Attitude Scale Malay Version (HASMV), Self-Reflection and Insight Scale (SRIS), and Duke University Religion Index (DUREL).

Results
The mean (SD) age of participants was 22.91 (0.78) years old. The majority are female, Malay, and Muslim. Mean (SD) scores of attitudes towards homosexuality among health sciences students were 61.53 (17.06). Non-Muslims, final-year students, and those with higher self-reflection scores in central and southern Peninsular Malaysia displayed a more positive attitude towards homosexuality, as did students with a history of contact with homosexuals. Students with higher intrinsic religiosity scores were shown to be more negative towards homosexuality.

Conclusion
The attitude towards homosexuality of Malaysian future health practitioners leaned mostly towards the positive attitude towards homosexuality. These findings shall aid the relevant authorities in revising the curriculum to raise awareness about homosexual health, as well as arranging training programs.

Keywords
Attitude; Health sciences students; Homosexuality; Self-reflection; Malaysia

INTRODUCTION

Homosexuality is an attraction to the same gender, expressed through emotional connections, physical intimacy, and sexual activity. It is a vital aspect of personal identity and should be accepted and valued in society[1]. Those who practice homosexuality identify themselves as lesbian for women and gay for men. Malaysia is one of the countries where homosexuality and homosexual acts are prohibited[2]. Regardless of whether homosexuality is criminalized or legalized in a country, or merely personal opinions of individual health care workers on the subject, Lesbian and/or gay (LG) individuals should be treated with the same level of care as any other individual who comes to seek treatment. Being in a minority group, LG is at risk of having various mental illnesses and medical

1. Nurul Shahida Che Kamarudin, Department of Psychiatry and Mental Health, Hospital Kulim, Kulim, Kedah.
2. Raishan Shafini Bakar, Department of Community Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia.
3. Ahmad Shahril Ab. Halim, Department of Psychiatry, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia & Department of Psychiatry, Hospital Universiti Sains Malaysia, Kelantan, Malaysia.
4. Sharifah Zubaidiah Syed Jaapar, Department of Psychiatry, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia & Department of Psychiatry, Hospital Universiti Sains Malaysia, Kelantan, Malaysia.
5. Najib Majdi Yaacob, Unit of Biostatistics and Research Methodology, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia.

Correspondence
Raishan Shafini Bakar, Department of Community Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia. E-mail: raishanshafini@usm.my

DOI: https://doi.org/10.3329/bjms.v23i4.76526

comorbidities[3-5]. Individuals with LG orientations are at a higher risk of developing sexually transmitted infections due to risky sexual behaviors and substance abuse disorders[6-8]. LG are less likely to seek help for their condition and they are less satisfied with services than the general population[9]. One of the reasons that are suggested as a cause for the increased propensity for mental illness and dissatisfaction with medical services is the perceived stigma. For instance, they assume that doctors and therapists discriminate against them because of their sexual orientation[10,11].

The attitudes of all medical professionals and health sciences students are fundamental due to their capacity to influence the physician-patient relationship, influencing the treatment and its outcome. Healthcare professionals play a vital role in ensuring that health disparities among the LG community are minimized. By providing equal care and support to all patients, regardless of their sexual orientation or gender identity, healthcare professionals can help bridge the gap and create a more inclusive healthcare system It is crucial to comprehend the attitudes of health science students towards homosexuality to enhance healthcare services. Unfortunately, such studies are insufficient, particularly in Asian countries. Previous global studies related to the medical field involved nursing students, medical students, dentistry students, and psychiatrists[12-17]. However, these findings were inconsistent because they were most likely influenced by different geographical, socio-cultural, and assessment tools used in those studies. Most findings in the literature showed that the negative attitude is more common, albeit to a varying degree. Other than nursing students, there are also still scarce studies that were done among allied health students.

Several factors have been identified to influence the level of attitude toward homosexuality among students. Age is one of the factors which play an important role in attitude[14,18-20]. Religious attitudes towards homosexuality vary across and within religions, as well as their level of acceptance. Religious commitment can be divided into two types: extrinsic and intrinsic. Extrinsic religiosity is characterized by self-centeredness. For instance, people go to places of worship to satisfy their desires or to be seen by others, which represents the social norm of society. Thus, religion becomes a means of demonstrating one's belonging and prospering within a group. On the other hand, intrinsic religiosity is marked by a deeper commitment, where religion serves as the guiding principle of one's life. This allows individuals to express their individuality in a more meaningful way[17].

Students who have relationships with LG tend to have more positive attitudes, as they exhibit critical thinking, self-reflection, lower prejudice, and more knowledge about homosexuality[21,22]. Other positive predictors include the female sex[12,14,22], more exposure to different sexual orientations on the internet, higher education level[19,20], people who live in urban areas, individuals with higher household income, and students with higher empathy[17,23].

Studies related to homosexuality in Malaysia have been pioneered by Ng et al. (2015), which found that nursing students showed negative attitudes toward homosexuality. On the other hand, recent studies among medical students and doctors have yielded more positive attitudes[17,24]. It was also found that Malay ethnicity is negatively associated with tolerance towards minority groups[16,17,24]. In terms of religion, students who practice Hinduism had the most positive attitude towards homosexuality. On the other hand, those who practiced Islam had the most negative attitude, followed by Buddhism, Christianity, and other religions[17].

Consequently, healthcare professionals who exhibit a negative attitude would lead to stigma, which makes them discriminated against, belittled, not equally treated, or even dehumanized. This would reduce self-seeking behavior, which would result in later initiation or suboptimal treatment, poor therapeutic alliances, and eventually, poorer health[25]. It is important to investigate attitudes not only from current healthcare professionals but also from health sciences students. Investigating the attitudes of both current healthcare professionals and health sciences students is crucial. Despite the increment of mental health research, the gap in attitude towards homosexuality and factors involved among the health sciences students still exists, especially in Malaysia. The situation causes insufficiency to stimulate and establish a significant impact or changes within the health care services. Indeed, more information is required to plan interventions such as training and education, including the integration of homosexuality as a topic in the curriculum. Our goal was to determine health sciences students' attitudes toward homosexuality and identify predictors for those attitudes.

MATERIALS AND METHODS

Study design, setting, and participants

This was an online cross-sectional study conducted among clinical health sciences students at a university in east coast Malaysia from December 2020 to February 2021. Clinical-year health sciences undergraduate students who were able to read and write in Malay and English were included in the study. Clinical year students here are referring to students in the third, fourth, and fifth years of medicine and dentistry courses, while allied health students started clinical years in their final year (fourth year). The minimum sample size of 300 participants was calculated after considering the dropout rate.

Variables

The socio-demographic profile sheet consists of variables namely: age (in years); sex (male or female), ethnicity (Malay or non-Malay); religion (Muslim or non-Muslim); marital status (single, married or others); course (medicine, dentistry or allied health); final year (yes or no); hometown (in city and state); monthly household income status; and contact with homosexual (yes or no).

Instruments

Homosexual Attitude Scale Malay Version.

This is a self-administered questionnaire that was created to assess preconceptions, misunderstandings, and fears regarding homosexuality[26]. HASMV consists of 21 items which measurement is based on a five-point Likert scale. The response ranged from 1 (very agree) to 5 (very disagree). Items 1, 2, 6, 8, 13, 14, 18, 19, 20, 21 are reversed scored. The scale was calculated based on the mean score. The score ranges from 21-105. Higher mean scores predict better attitudes toward homosexuality. The internal consistency (Cronbach's alpha) of the HASMV was 0.92, and the alpha for each component ranged from 0.63 to 0.87[27].

Self-Reflection and Insight Scale – Self-Reflection Subscale (SRIS-SR)

Self-Reflection and Insight Scale is a scale that uses a Likert scale to evaluate one's thoughts, feelings, behavior, and insight[28]. Response options range from 1 (strongly disagree) to 6 (strongly agree). Higher average scale scores represent higher levels of self-reflection which reflects a positive attitude towards LG. This study used a 12-item self-reflection subscale (SRIS-SR)[21]. Items 1, 2, 5, and 8 are reversed scored. The score ranges from 20-120. The items had strong internal consistency (a=0.91) and test-retest reliability was 0.77[28].

Duke University Religion Index (DUREL)

The DUREL is an instrument for measuring religiosity[29]. This is a five-item scale measuring religious involvement in three dimensions of religiosity. Response options range from 1 (never) to 6 (more than once a day) for religiosity-organizational religious activity (ORA), from 1 (never) to 6 (more than once a week) for non-organizational religious activity (NORA), and from 1 (definitely not true) to 5 (definitely true of me) for intrinsic religiosity (IR) subscales.

Each subscale's higher total scores indicate higher levels of religiosity in that dimension. The original scale demonstrates high reliability in test-retest (intra-class correlation = 0.91), internal consistency (Cronbach's alphas = 0.78–0.91), and convergent validity with other religious measures (r values = 0.71–0.86). DUREL has been translated into Malay and studied among nursing students at a Malaysian university. The Malay version of DUREL showed strong parallel reliability (0.70), good test-retest reliability (Spearman's rho = 0.68, $p < 0.01$), and moderate internal consistency (Cronbach's alpha = 0.45)[30].

Data Collection

The sampling method for this study was convenient sampling. The data-gathering process commenced after obtaining ethical clearance and study permission from the Deans of the School of Medical Science, Dental Science, and Health Science. Google Forms were used to create research questionnaires with study information. Students' representatives for clinical years from the three schools were contacted. The link to the Google form was shared via social media groups (WhatsApp). The virtual form thoroughly explained the purpose and nature of the study, as well as instructions for answering the questions. Participants were assured that their data would remain confidential and used solely for the study. No personally identifiable information, such as email addresses, was collected to maintain anonymity. If they are interested in participating in the study, they have to tick a checkbox indicating that they agreed to participate in the study before proceeding to the questionnaires.

To avoid bias, respondents were asked to complete the set of questionnaires on their own. The researcher was

reachable by phone, WhatsApp, and email if respondents had any inquiries. The questionnaires took about 20-30 minutes to be completed. There was no missing data as the questionnaires were set in a manner that the subjects must answer each question before proceeding to the next. Once the respondent had completed the set of questionnaires, it was submitted to the researcher for further evaluation. Completion and submission of the questionnaires were considered valid consent.

Data Analysis

The IBM Statistical Package for Social Science (SPSS) version 27 was used for data entry and analysis. Descriptive statistics were used to summarize participants' socio-demographic characteristics. All categorical variables were presented as numbers (n) and percentages (%), while continuous variables were described as either mean and standard deviation (SD) for normal distribution or median and interquartile range (IQR) for non-normal distribution.

Simple linear regression (SLR) was used to identify predictors for attitudes towards homosexuality. These included gender, age, ethnicity, religion, final year, course, monthly household income status, hometown, contact with LG, SRIS-SR scores, and DUREL subscale scores (ORA, NORA, IR). SLR results were presented in crude regression (b), 95% confidence interval (CI), t-stat, and p-value.

Variable selection for multiple linear regression (MLR) included all variables with a p-value of less than 0.25, namely: age; sex; ethnicity; religion; final year; contact with LG; SRIS-SR subscale; DUREL's NORA and IR subscales. All Malaysia regions, namely: the southern region; northern region; central region; and east Malaysia were also included since they were the four groups of the state variable. Then, three automated methods, stepwise, backward, and forward were applied.

In addition, the R square at the model summary for all three methods was looked at to check for model fitness. After checking multicollinearity and interaction, assumptions of linearity, normality of response variable, equal variance (homoscedasticity), and independent numerical variable linearity, were assessed. The P-value of less than 0.05 was taken as a statistically significant result. MLR results were presented in adj. b, 95% CI, t-stat, and p-value.

RESULTS

Participants Characteristics

A total of 307 participants, aged 21 to 25 years old with a mean (SD) age of 22.91 (0.78) years, were recruited for this study. The result of the data showed that there were more than 80% were female participants. Out of the total subjects, the majority were Malay and Muslim. Almost all participants were single. More than 70% of them were in their final year. Medical students were the group that mostly responded. More participants studying in the School of Health Sciences compared to the other two schools.

Meanwhile, almost half of them were in the B40 group for monthly household income, and predominantly more than a quarter came from the east coast region. Almost 25% of them contacted with LG. The summarized details of descriptive measures are tabulated in Table 1.

Table 1: Sociodemographic characteristics of participants (n=307)

Variable	n (%)
Age in years	22.91 (0.78)*
Gender	
Female	254 (82.7)
Male	53 (17.3)
Ethnicity	
Malay	224 (73.0)
Chinese	43 (14.0)
Indian	28 (9.1)
Bumiputera	11 (3.6)
Others	1 (0.3)
Religion	
Muslim	231 (75.2)
Buddha	29 (9.4)
Christian	27 (8.8)
Hindu	20 (6.5)
Final year	
Yes	234(76.2)
No	73(23.8)
Monthly household income status	
B40 (<RM4850)	148 (48.2)
M40 (RM4850-10959)	131(42.7)
T20 (>RM10960)	28(9.1)

Variable	n (%)
State	
Northern region	75 (24.4)
East Coast region	93 (30.3)
Central Region	66 (21.5)
Southern region	45 (14.7)
East Malaysia	28(9.1)
Course	
Medicine	114(37.1)
Dentist	77 (25.1)
Allied health (health sciences)	
Nursing	21 (6.8)
Nutrition	19 (6.2)
Environment & occupational health	16 (5.2)
Medical radiation	11 (3.6)
Exercise & sports science	10 (3.3)
Forensic	10 (3.3)
Speech pathology	7 (2.3)
Biomedicine	5 (1.6)
Dietetic	11 (3.6)
Others	6 (2.0)

*Mean (SD)

Attitude towards homosexuality

The HASMV total score ranges from 28 to 101, with an average score of 61.53 (17.06). The SRIS-SR total score ranges from 29 to 72, with an average score of 57.10 (8.08) for self-reflection. The ORA subscale score ranges from 1 to 6, with an average score of 3.71 (±1.06), while the NORA subscale score ranges from 1 to 6, with an average score of 4.68 (±1.58). The IR subscale score ranges from 6 to 15, with an average score of 13.75 (±1.96).

Predictors of attitudes towards homosexuality

Based on multiple linear regression (MLR), six predictors demonstrated significant association with the HAS score ($p < 0.05$), as summarized in Table 2. After adjusting for other variables, there was a significant association between religion and HAS score ($p<0.001$). Compared to Muslim students, non-Muslim students have higher scores in the HAS by 18.85 (b (95% CI) = 18.85 (15.01, 22.68)). Every one-unit increment in SRIS scores leads to an increase in the score in the HAS by 0.20 (b (95% CI) = 0.20 (0.03, 0.37), p=0.022).

Compared to students from the East Coast region, students from the Southern region and the Central region have a more positive attitude towards homosexuality, 5.52 (1.36, 9.68), and 4.73 (1.02, 8.43) respectively. Other significant predictors included contact with LG, intrinsic religiosity, and year of study.

DISCUSSION

Homosexuality is strongly associated with various mental illnesses and medical comorbidities, thus pushing LG away from the medical fraternity will be counter-beneficial to their treatment and future research. To ensure the provision of high-quality health services, future healthcare providers need to resist discriminative behavior and provide nurturing, open communication, and empathic care, in a respectful and non-judgmental manner. Therefore, investigating the attitudes of health sciences students regarding homosexuality and its predictors was a timely need.

Our study showed a highly positive attitude towards homosexuality with a total mean score of 61.35, which was higher compared to the local study by Ng et al. that was conducted in 2015 among nursing students. However, a 2018 study by Francis et al. among medical students showed a higher mean score compared to both Ng et al. (2015) and our study. This might be due to an increase in acceptance of homosexuality, the promotion of same-sex orientation (SSO) activities in social media, and the human rights movement in Malaysia[31-33].

It's essential to note that this study included all health sciences courses, with medical students contributing the most. Based on our research, we have found that medical students exhibit good cognitive abilities. They are skilled in analyzing contradictory beliefs, developing a sense of self, and considering situations from multiple perspectives. Our findings support previous studies in this area[34,35]. These findings can also be partly explained by those who studied medicine and may have adequate knowledge of homosexuality[12]. These higher knowledge levels are most likely reflected in respondents' attitudes. On the other hand, students from other courses such as nursing, displayed inadequate knowledge about homosexuality[13]. Hence, they show a less positive attitude.

Our society has undergone significant social change in recent years. Younger generations are now more informed and educated about current health and sexuality issues[36-38]. Furthermore, due to a variety of modernizing causes, students' lifestyles have advanced as well. A study by Slootmaeckers and Lievens (2014) showed a relationship between lifestyles and attitudes towards homosexuality. Young people today are exposed to more information, including the internet, which reduces their likelihood to strongly disapprove

Table 2: Factors associated with attitude towards homosexuality (n=307)

Variables	Crude b (95% CI)	Adjusted b (95% CI)	t-stat	p-value
Religion				
Muslim	0	0		
Non-Muslim	26.33 (23.02, 29.65)	18.85 (15.01,22.68)	9.67	<0.001
Contact with homosexual				
No	0	0		
Yes	5.15 (3.05,7.25)	8.96 (5.67,12.25)	5.36	<0.001
Intrinsic religiosity	-4.44 (-5.28, -3.59)	-1.73 (-2.52, -0.93)	-4.28	<0.001
Year of Study				
Not final year	0	0		
Final year	6.57 (2.12, 11.02)	4.45 (1.37,7.54)	2.84	0.005
Self-Reflection and Insight Scale	0.32 (0.09,0.56)	0.20 (0.03,0.37)	2.31	0.022
State				
East Coast region	0	0		
Southern region	12.39 (6.62,18.16)	5.52 (1.36,9.68)	2.61	0.009
Central Region	12.11 (6.99,17.23)	4.73 (1.02,8.43)	2.51	0.013
Northern region	10.29 (5.36,15.23)	2.89 (-0.69,6.47)	1.59	0.113
East Malaysia	16.67 (9.82,23.52)	0.049 (-5.23, 5.33)	0.02	0.985

of minority groups[19]. Another study also found that respondents who had more media contact with LG (e.g., watched a YouTube video featuring homosexual artists, or read a book written by a homosexual) were more likely to accept homosexuality[23].

There are a few interesting determinants of attitudes toward homosexuality in the full model. One of the predictors of attitudes toward homosexuality was religion (b=18.85), which would be expected from the findings of previous research on attitudes toward homosexuality[16,17,24]. According to research, there is a strong correlation between being Muslim and having a negative attitude towards homosexuality. This is because homosexuality is considered illegal under Islamic law[39]. The reason for this is that homosexuality goes against the procreative purpose of sexuality[19]. Religion plays an essential role in the lives of Muslims, and the values of the majority of Muslims in Malaysia are shaped by the teachings of the Quran.

Our study highlights the important role of religion, which is not only based on the type of religious practice but also the intrinsic religiosity of individuals. In other words, personal beliefs towards one's own religion's teachings are integrated into the way individuals live their lives[40]. These findings parallel the work of Ng et al. (2015). However, a study conducted by Francis et al.

in 2018 discovered a contrasting result. This might be because the study was based only on medical students in a private college, which may not be a representative sample of the entire health sciences student population in Malaysian society.

Among other factors studied, having contact with this minority group was associated with a better attitude. Our results match those observed in earlier studies[14,19,21]. A possible explanation for this might be that students who have contact with the minority group, felt more connected with them, thus decreasing prejudice[21,41]. The finding is consistent with research showing healthcare providers with no personal connections to a minority group have a more negative attitude[42].

Another important finding was that final-year students' attitude was significantly more positive towards homosexuality. After completing four years of education, students tend to become less prejudiced as compared to their initial years of study[18]. It is also anticipated that final-year students perceive their training as the start of a lifelong career, which may lead them to be more receptive to new ideas and perspectives[35]. It has been discovered that final-year students possess a greater amount of knowledge regarding homosexuality, and therefore, have a lower tendency to stigmatize the LG community[12]. Having a higher level of knowledge aids in the comprehension of the health issues faced by this minority group, making it easier to approach them[18].

Our analysis indicates that students with higher self-reflection scores have a greater probability of having a positive attitude. This is consistent with Poteat's (2015) findings that higher self-reflection is linked to critical thinking and reduced prejudice. It is interesting to note that intergroup contact can be mentally challenging and may be avoided by individuals with lower self-reflection abilities, while those with stronger self-reflection abilities may tend to approach such contact, as supported by another study[41]. Francis et al. (2018) found that self-reflection on biases, assumptions, and behaviors leads to better empathy. Students with higher empathy scores had greater tolerance towards homosexuality.

Equally important, the attitude differences among hometowns were interesting. The results indicated that subjects from central and southern Peninsular Malaysia were less stigmatized towards homosexually oriented individuals. This finding is understandable given that these two regions have higher levels of urbanization and economic development[43], which leads to higher levels of liberalism when compared to other states[24]. During modernization, education can promote "cognitive mobilization" that increases people's propensity to embrace civic liberty and self-expression, as well as accepting new and nonconformist views[19]. It is also worth noting that our reference point is the east coast region, which holds two states, Kelantan and Terengganu, known as "Mecca atrium". This nickname is given due to the strong presence of religion and traditional beliefs. People on the East Coast sometimes seem to live in a different environment compared to other parts of Malaysia. They tend to be very aware of their state of origin and their culture seems to be different from that of the standard culture practiced elsewhere[44].

There were several strengths identified in this study. Our study assessed the prediction of self-reflection in attitudes towards homosexuality, which has not yet been studied locally. Using a web-based survey reduced the likelihood of missing data and obviating the associated data entry error. The chance for social desirability bias was also reduced. The process of asking and answering questions was highly private, allowing respondents to complete the questionnaires at their convenience. This feature was particularly useful for retrieving responses to sensitive questions since respondents tend to be more honest and open when using the internet, as de Leeuw (2012) has pointed out.

In this study, it is important to note that the presented results were interpreted while taking into account certain limitations. One such limitation is that the study employed the convenience sampling method, which means that the findings may not be representative of health science students in the pre-clinical phase or those from other universities. Additionally, having qualitative data to complement the quantitative findings would be beneficial. Future research should also consider including factors that were not studied in this study, such as knowledge about homosexuality and the sexual orientation of the participants.

CONCLUSIONS

Our study revealed that Malaysian future health practitioners mostly hold a positive attitude towards homosexuality. We also found that non-Muslims tend to be more accepting, while intrinsic religiosity has a significant impact on attitudes. Additionally, final-year students and students who interact with minority groups

have more welcoming attitudes. The attitude towards homosexuality is also associated with hometown and self-reflection. Therefore, to reduce stigma and discrimination, practitioners may design interventions that promote self-reflection.

The findings of this study can aid authorities in revising curricula to raise awareness about homosexual health. It can also help in arranging training programs to mentally prepare students and improve their attitudes towards homosexuality before they graduate. By educating or training healthcare providers and society to respect diversity and fight against bias and victimization, we can promote LG rights. However, further research is required for the development of these new strategies.

Author Contributions: N.S.C.K.: investigation, writing—original draft, project administration, formal analysis, writing—review, and editing; R.S.B.: investigation, supervision, writing—review, and editing; A.S.A.H.: conceptualization, writing—review, and editing; S.Z.S.J: investigation, supervision, writing—review, and editing; N.M.Y: software, methodology writing—review, formal analysis, and editing. All authors have read and agreed to the final version of the manuscript.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Human Research Ethics Committee (HREC) Universiti Sains Malaysia (USM) with JEPeM Code: USM/JEPeM/19100704 and date of approval: 8th December 2020.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study, as well as informed consent to publish this paper.

Acknowledgments: We would like to thank the top management of the Health Campus, Universiti Sains Malaysia, for allowing us to conduct the study. We are very grateful to all respondents who were involved in the study.

Conflicts of Interest: The authors have declared that no conflicts of interest exist.

REFERENCES

1 Collinsdictionary.com. https://www.collinsdictionary.com/dictionary/english/homosexuality. Accessed January 21, 2021.

2. Bell J. The global divide on homosexuality. *Pew Res Cent*. Published online 2014:25. https://assets.pewresearch.org/wp-content/uploads/sites/2/2014/05/Pew-Global-Attitudes-Homosexuality-Report-REVISED-MAY-27-2014.pdf

3. Kidd SA, Howison M, Pilling M, Ross LE, McKenzie K. Severe mental illness in LGBT populations: a scoping review. *Psychiatr Serv*. 2016;**67**(7):779-783. doi:10.1176/appi.ps.201500209

4. Russell ST, Fish JN. Mental health in Lesbian, Gay, Bisexual, and Transgender (LGBT) youth. *Annu Rev Clin Psychol*. 2016;**12**(1):465-487. doi:10.1146/annurev-clinpsy-021815-093153

5. Opanasenko A, Lugova H, Mon AA, Ivanko O. (2021). Mental Health Impact of Gender-Based Violence Amid COVID-19 Pandemic: A Review. *Bangladesh J. Med. Sci.*, **20**(5), 17–25. https://doi.org/10.3329/bjms.v20i5.55396

6. Oster AM, Sternberg M, Nebenzahl S, et al. Prevalence of HIV, sexually transmitted infections, and viral hepatitis by urbanicity, among men who have sex with men, injection drug users, and heterosexuals in the United States. *Sex Transm Dis*. 2014;**41**(4):272-279. doi:10.1097/OLQ.0000000000000110

7. Akindipe T, Wilson D, Stein DJ. Psychiatric disorders in individuals with methamphetamine dependence: prevalence and risk factors. *Metab Brain Dis*. 2014;**29**(2):351-357. doi:10.1007/s11011-014-9496-5

8. Gul S, Safeer A, Obaid A. (2022). Metaphors as Tattoos on human body: Passion or Pathosis? *Bangladesh J. Med. Sci*., **21**(3): 730–740. https://doi.org/10.3329/bjms.v21i3.5959

9. Carabez R, Scott M. "Nurses don't deal with these issues": nurses' role in advance care planning for lesbian, gay, bisexual and transgender patients. *J Clin Nurs*. 2016;**25**(23-24):3707-3715. doi:10.1111/jocn.13336

10. Dorsen C, Van Devanter N. Open arms, conflicted hearts: nurse-practitioner's attitudes towards working with lesbian, gay and bisexual patients. *J Clin Nurs*. 2016;**25**(23-24):3716-3727. doi:10.1111/jocn.13464

11. Müller A. Health for all? Sexual orientation, gender identity, and the implementation of the right to access to health care in South Africa. *Health Hum Rights*. 2016;**18**(2):195-208. http://www.ncbi.nlm.nih.gov/pubmed/28559686

12. Grabovac I, Abramović M, Komlenović G, Milosević M, Mustajbegović J. Attitudes towards and knowledge about homosexuality among medical students in Zagreb. *Coll Antropol*. 2014;**38**(1):39-45. http://www.ncbi.nlm.nih.gov/pubmed/24851595

13. Della Pelle C, Cerratti F, Di Giovanni P, Cipollone F, Cicolini G. Attitudes towards and knowledge about lesbian, gay, bisexual, and transgender patients among Italian nurses: an observational study. *J Nurs Scholarsh*. 2018;**50**(4):367-374. doi:10.1111/jnu.12388

14. Ardman E, Anh VM, Thuy DTD, Giang LM. Attitudes and

knowledge of medical students in Hanoi regarding lesbian and gay people. *J Homosex*. 2020;**00**(00):1-16. doi:10.1080/00918369.2020.1804257

15. Kar A, Mukherjee S, Ventriglio A, Bhugra D. Attitude of Indian medical students towards homosexuality. *East Asian Arch Psychiatry*. 2018;**28**(2):59-63. doi:10.12809/eaap181728
16. Ng CG, Yee A, Subramaniam P, Loh HS, Moreira P. Attitudes toward homosexuality among nursing students in a public university in Malaysia: the religious factor. *Sex Res Soc Policy*. 2015;**12**(3):182-187. doi:10.1007/s13178-015-0182-0
17. Francis CI, Nazir ZB, Cheng SJ, Lee DB, Muthelilan A. Study on the levels of piousness and empathy affecting the tolerance towards homosexuality among clinical phase students: a cross-sectional study. *Public Heal Prev Med*. 2018;**4**(3):102-110. http://www.aiscience.org/journal/paperInfo/phpm?paperId=3960
18. Dunjić-Kostić B, Pantović M, Vuković V, et al. Knowledge: a possible tool in shaping medical professionals' attitudes towards homosexuality. *Psychiatr Danub*. 2012;**24**(2):143-151. doi:10.3390/rel1010078
19. Xie Y, Peng M. Attitudes toward homosexuality in China: exploring the effects of religion, modernizing factors, and traditional culture. *J Homosex*. 2018;**65**(13):1758-1787. doi:10.1080/00918369.2017.1386025
20. Barringer MN, Gay DA, Lynxwiler JP. Gender, religiosity, spirituality, and attitudes toward homosexuality. *Sociol Spectr*. 2013;**33**(3):240-257. doi:10.1080/02732173.2013.732903
21. Poteat VP. Individual psychological factors and complex interpersonal conditions that predict LGBT-affirming behavior. *J Youth Adolesc*. 2015;**44**(8):1494-1507. doi:10.1007/s10964-015-0257-5
22. Thanh Nguyen T, Kimura K, Morinaga Y. Homonegative attitudes and their correlates among Vietnamese college students. *Psychol Rep*. 2016;**118**(3):849-860. doi:10.1177/0033294115627526
23. Slootmaeckers K, Lievens J. Cultural capital and attitudes toward homosexuals: exploring the relation between lifestyles and homonegativity. *J Homosex*. 2014;**61**(7):962-979. doi:10.1080/00918369.2014.870848
24. Foong ALS, Liow JW, Nalliah S, Low WY, Samy AL, Khalaf ZF. Attitudes of future doctors towards LGBT patients in conservative Malaysian society. *Sex Cult*. 2020;**24**(5):1358-1375. doi:10.1007/s12119-019-09685-5
25. Halkitis PN. Discrimination and homophobia fuel the HIV epidemic in gay and bisexual men. *Psychol AIDS Exch*.;*Spring*2012;**3**:1, 4-11.
26. Kite ME, Deaux D. Basic and applied social psychology attitudes toward homosexuality : assessment and behavioral consequences. *Basic Appl Soc Psych*. 1986;**75**(2)(October 2014):137-162. doi:10.1207/s15324834basp0702
27. Ng CG, Gill JS, Koh OH, Jambunathan ST, Pillai S. Reliability and validity of the Malay version of homosexuality attitude scale (MVHAS): a study on a group of medical students in Malaysia. *Int Med J*. 2015;**22**(No. 3):1-4.
28. Grant AM, Franklin J, Langford P. The self-reflection and insight scale: a new measure of private self-consciousness. *Soc Behav Personal an Int J*. 2002;**30**(8):821-835. doi:10.2224/sbp.2002.30.8.821
29. Koenig HG, Büssing A. The Duke University Religion Index (DUREL): a five-item measure for use in epidemiological studies. *Religions*. 2010;**1**(1):78-85. doi:10.3390/rel1010078
30. Nurasikin, M. S., Aini, A., Syarinaz, A. A., & Ng C. Validity and reliability of the Malay version of Duke University Religion Index (DUREL-M) among a group of nursing student. *Malaysian J Psychiatry*. 2010;**19**(2):68-72.
31. Sabin JA, Riskind RG, Nosek BA. Health care providers' implicit and explicit attitudes toward lesbian women and gay men. *Am J Public Health*. 2015;**105**(9):1831-1841. doi:10.2105/AJPH.2015.302631
32. Burke SE, Dovidio JF, Przedworski JM, et al. Do contact and empathy mitigate bias against gay and lesbian people among heterosexual first-year medical students? a report from the medical student, CHANGE Study. *Acad Med*. 2015;**90**(5):645-651. doi:10.1097/ACM.0000000000000661
33. Johnson MJ, Nemeth LS. Addressing health disparities of lesbian and bisexual women: a grounded theory study. *Women's Heal Issues*. 2014;**24**(6):635-640. doi:10.1016/j.whi.2014.08.003
34. Nedjat S, Bore M, Majdzadeh R, et al. Comparing the cognitive, personality and moral characteristics of high school and graduate medical entrants to the Tehran University of Medical Sciences in Iran. *Med Teach*. 2013;**35**(12):e1632-7. doi:10.3109/0142159X.2013.826791
35. Benbassat J. Changes in wellbeing and professional values among medical undergraduate students: a narrative review of the literature. *Adv Health Sci Educ Theory Pract*. 2014;**19**(4):597-610. doi:10.1007/s10459-014-9500-1
36. Helmer J, Senior K, Davison B, Vodic A. Improving sexual health for young people: making sexuality education a priority. *Sex Educ*. 2015;**15**(2):158-171. doi:10.1080/14681811.2014.989201
37. Evcili F, Golbasi Z. Sexual myths and sexual health knowledge levels of Turkish university students. *Sex Cult*. 2017;**21**(4):976-990. doi:10.1007/s12119-017-9436-8
38. Sanli Y, Aypar Akbag NN, Arslan GG. (). Young Individuals' Attitudes Towards Sex Education and Related Factors. *Bangladesh J. Med. Sci.*, 2023;**22**(3): 657–666. https://doi.org/10.3329/bjms.v22i3.65344
39. Hamdi N, Lachheb M, Anderson E. Muslim gay men: identity conflict and politics in a Muslim majority nation. *Br J Sociol*. 2018;**69**(4):1293-1312. doi:10.1111/1468-4446.12334
40. Jäckle S, Wenzelburger G. Religion, religiosity, and the attitudes toward homosexuality--a multilevel analysis of 79 countries. *J Homosex*. 2015;**62**(2):207-241. doi:10.1080/00918369.2014.969071
41. Hodson G, Busseri MA. Bright minds and dark attitudes. *Psychol Sci*. 2012;**23**(2):187-195. doi:10.1177/0956797611421206
42. Utaş Akhan L, Ünsal Barlas G. Study of health care providers and attitudes against homosexual, bisexual individuals. *2013*. 2013;**10**(1):11. http://www.j-humansciences.com/ojs/index.php/IJHS/article/view/2509
43. Masron T, Yaakob U, Mohd Ayob N, Mokhtar AS. Population and spatial distribution of urbanisation in Peninsular. *Malaysia J Soc Sp*. 2012;**2**(2):20-29.
44. Pawanteh MR, Kuake JB. Orghe Kelantan: A preliminary study. *Int J Cult Hist*. 2016;**2**(4):184-188. doi:10.18178/ijch.2016.2.4.061
45. de Leeuw ED. Counting and measuring online. *Bull Sociol Methodol Méthodologie Sociol*. 2012;**114**(1):68-78. doi:10.1177/0759106312437290