The sexual health literacy of the student population of the University of Tasmania: results of the RUSSL Study

Steve Simpson, Jr.1, Christine Clifford2, Kaz Ross3, Neil Sefton4, Louise Owen5, Leigh Blizzard1, Richard Turner1,4

1 Menzies Institute for Medical Research, University of Tasmania, Hobart Australia; 2 School of Psychology, University of Tasmania, Hobart Australia; 3 School of Humanities, University of Tasmania, Hobart Australia; 4 School of Medicine, University of Tasmania, Hobart Australia; 5 Sexual Health Service Tasmania, Tasmanian Department of Health and Human Services, Hobart Australia.

Corresponding author

Steve Simpson, Jr.

Menzies Institute for Medical Research

University of Tasmania

Private bag 23

Hobart TAS 7000

Australia

Ph. +61 03 6226 4718

steve.simpson@utas.edu.au

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# Abstract

**Background**

Evidence suggests a varied level of sexual health literacy (SHL) among university student populations. Accordingly, we evaluated the SHL among students at the University of Tasmania.

**Methods**

Students were invited to complete an anonymous online questionnaire. Recruitment was during August/September 2013. SHL was assessed by ARCSHS National Survey of Australian Secondary Students & Sexual Health and the Sexual Health Questionnaire. Predictors of literacy scores were evaluated by linear regression.

**Results**

The study recruited 1,786 participants, or 8.2% of the student population, of similar composition to the general university population.

Female sex, older age, and sexual education and increased communication on sexual topics were significant predictors of literacy scores. Literacy increased with sexual experience (ever sex, earlier age of sexual debut, partner number, diversity of sexual activity).

As hypothesised, students in medical/nursing disciplines had the highest SHL. Less expected were the significant differences by birthplace and religious affiliation, many of which persisted on adjustment for confounders. Compared to Australian/New Zealander students, overseas-born students had significantly lower ARC (-3.6% (95% CI: -5.6, -1.5), p<0.001) & SHS (-4.2% (95% CI: -6.1, -2.2), p<0.001), this driven by Malaysian (ARC: -13.6% (95% CI: -19.9, -7.4), p<0.001; SHS: -10.2% (95% CI: -15.6, -4.9), p<0.001), Indian (ARC: -14.3% (95% CI: -24.2, -4.3), p=0.001; SHS: -10.6% (95% CI: -19.9, -1.4), p=0.025) and Chinese (ARC: -5.7% (95% CI: -14.1, 2.6), p=0.18; SHS: -18.2% (95% CI: -28.6, -7.7), p=0.001) students. Compared to agnostic/atheist-identifying students, those of Buddhist (ARC: -5.4% (95% CI: -10.0, -0.9), p=0.014; SHS: -6.7% (95% CI: -10.8, -2.5), p=0.002), Hindu (ARC: -8.8% (95% CI: -20.2, 2.7), p=0.098; SHS: -12.2% (95% CI: -23.0, -1.4), p=0.027), Muslim (ARC: -16.5% (95% CI: -26.1, -7.0), p<0.001; SHS: -13.4% (95% CI: -21.0, -5.9), p=0.001) and Protestant (ARC: -2.3% (95% CI: -4.3, .0.3), p=0.023; SHS: -4.4% (95% CI: -6.3, -2.6), p<0.001) identifications had markedly lower SHL.

**Conclusions**

This study, one of the first among university students in Australia, found a varied SHL by sex, age, sexual education and sexual experience, as well as by birthplace and religious affiliation. These findings have applications in orientation and education programs at Australian universities.

# Introduction

Students attend university to increase their knowledge and enhance professional opportunities. Regardless of age or area of study, tertiary study is often a transformational experience. It is often assumed that university students have the life skills necessary to see them through their studies and the life beyond. This also includes matters of sexual health and sexuality. However, there is evidence to suggest that sexual health literacy (SHL) is not uniformly distributed, with some groups more deficient than others**(**[**1-10**](#_ENREF_1)**)**. While SHL does not necessarily predict improved sexual health-related behaviour, certainly having knowledge of risk-reduction strategies gives such persons a greater capability of reducing sexually transmissible infection (STI) and unplanned pregnancy than someone without that knowledge, this borne out to some extent in young adult populations([11](#_ENREF_11)). Of particular interest are those students being trained in the medical and nursing professions, for whom comprehension of these matters is not only critical for their own health but also for those of the patients for whom they will provide care. There is evidence which suggests that a surprising portion of medical and nursing students are deficient in sexual literacy**(**[**12-16**](#_ENREF_12)**)**, and that this is carried forward into their professional careers**(**[**17-21**](#_ENREF_17)**)** as a reluctance to discuss sexual matters with patients, or even to bring moral judgements to bear on patients instead of providing neutral care.

Universities have the capacity to provide supplementary orientation and information for students regarding sexual health; however the extent to which this may be needed, and the groups to which it should be targeted are unclear. Evaluating the SHL of the student population and the distribution thereof among demographic and other groups at the University is needed. Studies along these lines have been done in university communities around the world**(**[**2**](#_ENREF_2)**,** [**4-6**](#_ENREF_4)**,** [**9**](#_ENREF_9)**,** [**22**](#_ENREF_22)**).** While some studies have been undertaken in Australia([1](#_ENREF_1), [10](#_ENREF_10), [23](#_ENREF_23)), none have been conducted in nearly a decade, and none have been done at the University of Tasmania. As there is some anecdotal evidence of deficiencies in SHL among medical and nursing students at Australian universities, as well as continued increases in the rates of some STIs in the surrounding community ([24](#_ENREF_24)), some intervention to improve SHL among this population is indicated.

Our primary hypotheses were that regional background and ethnicity/religious affiliation and related parameters would significantly predict SHL score, though the precise directionality were uncertain. Secondarily, we expected that the previously demonstrated greater SHL for female sex, increased age, increased sexual education, increased sexual experience (ever/never sex, same and/or opposite-sex partner number and diversity of sexual behaviours engaged in), study in areas likely to connote increased exposure to topics of relevance to SHL (e.g. medicine, nursing) would be replicated here. Further to this purpose, we have utilised two instruments for the measurement of SHL. One, the ARC Sexual Health Literacy Score, is an instrument used by ARCSHS to assess SHL in secondary students, and can be loosely described as “academic” SHL, querying general knowledge information about HIV/AIDS, viral hepatitis and other STIs, as well as basic sexual health-related facts. The other, the University of Missouri Sexual Health Questionnaire, also queries information about HIV and other STIs, but its inclusion of queries risk-reduction strategies and their relative efficacy at reducing STI and pregnancy risk leads us to regard this as testing more “applied” SHL. Our inclusion of these two similar but distinct instruments allows the assessment of what the participants “know” about SHL and what they think actually “works” in the reality of their own behaviour.

This study of students’ sexual literacy, experience and beliefs will inform any targeted education programs universities may wish to deliver.

# Methods

The Researching University Students’ Sexual Literacy Study (RUSSL) utilised an online and anonymous questionnaire to be completed by current University of Tasmania (UTas) students studying in Tasmania. Participants were invited to participate by email invitations sent to all current students, as well as flyers posted around Tasmanian UTas campuses and outreach using UTas social media. Participants completed the questionnaire during August/September 2013.

SHL was assessed using two instruments-the Australian Research Centre in Sex, Health and Society (ARCSHS) Secondary Students and Sexual Health Survey (ARC), assessed in two domains (knowledge, and HIV/Hepatitis) totalling 31 points([25](#_ENREF_25)), and the University of Missouri Sexual Health Survey (SHS), assessed in three domains (knowledge, STI, and pregnancy) totalling 20 points([26](#_ENREF_26)). The SHS was modified slightly to remove questions which were specific to the USA, with the approval of that questionnaire’s authors. These two instruments were distinct, being designed for different populations and validated in greatly different populations. Thus, while they are positively correlated (r=0.46, p<0.001), we have left them as separate scores, this allowing not only two distinct instruments for each participant but allowing some interpretation of the presence/absence of associations where disparities occur.

Grading of ARC instrument was by reference to the questionnaire’s key. Grading of the SHS instrument was by accepting all levels of correct agreement or disagreement, as appropriate for that question. Total scores were calculated by summating the number of correct answers for each instrument.

Other parameters queried were demographics, place of birth, ethnic & religious affiliations, information about the students’ area of study, their sexual education and experience histories, and information about their sexual and general health behaviours. Groupings for ethnicity, place of birth and religion were based on the information queried (e.g. subtypes of Christianity but not other religions, these judgements based on religious affiliations in Australia by the Australian Bureau of Statistics) and the numbers in subgroups allowing their separate evaluation.

In pursuit of some assessment of the honesty of participants in their responses to the questionnaire, the questionnaire concluded with a block of questions querying the participant’s level of honesty in each of the seven non-SHL assessing instrument sections of the questionnaire, ranging from “completely honest” to “not at all honest”, as well as “rather not say”. A participant ticking anything other than “completely honest” for a section resulted in all their answers for that section being marked as missing. These not completely honest participants comprised a minority of participants (4.3% of first background (demographics, UTas-related parameters), 5.3% of sexual education, 5.0% of sexual history, 3.3% of sexual health, 4.8% of sexual beliefs, 4.0% of sexual health behaviour, and 3.5% of second background (religious, social and other identity-defining parameters).

## Statistical methods

Predictors of SHL scores were assessed by linear regression. As these outcome variables were highly skewed, they were transformed to reduce heteroskedasticity and satisfy the requirements of normality of linear regression; however all coefficients are back-transformed and reported on the scale of the original variable.

For all instances where data was missing, analyses were restricted to persons with complete data.

All analyses were performed using STATA/SE 12.0 for Windows (College Station, TX).

# Results

In this study we recruited 1,786 participants (8.2% of the 2013 student population). Of those providing information on these factors, the cohort was majority female (62.8%), Caucasian (84.5%), and Australian-born (85.8%). Reflecting the distribution of students at UTas, most participants were based at the Hobart campus (67.1%). The distribution of study area was such that most students were in the Arts & Humanities division, followed by Sciences & Mathematics, and then the Medical/Nursing/Allied Health areas. As in Table 1, the distribution of participants in the study cohort compared to the main university student population was not significantly different by sex, age, region of birth, campus or study area. Other cohort characteristics can be gleaned from Supplemental Table 1.

## Distribution and predictors of sexual literacy

The average ARC score was 79.4% (mean: 79.4, SD: 15.8; median: 83.9, IQR: 71.0 – 90.3), while the average SHS score was 78.3% (mean: 78.3, SD: 12.7; median: 80.0, IQR: 70.0 – 90.0). Performance was better on the HIV/Hepatitis subsection of ARC instrument, while similarly the STI subsection of the SHS instrument had slightly higher scores. In both instruments, general knowledge was the section of lower scores, these sections including questions about reproductive physiology and modulators of efficacy of contraceptives and barriers.

Univariable predictors of SHL scores are presented in the text and in-text tables, as well as in Supplemental Tables 1 & 3. Multivariable analyses are presented in detail in Supplemental Tables 2 & 4.

### Demographic characteristics, general

Female sex was a significant predictor of SHL by both instruments, with females doing on average 3.48% higher on ARC and 4.85% higher on the SHS (p<0.001 for both). Associations were mostly unaffected by adjustment for age and sexual education, and reduced only slightly by adjustment for birthplace and age at debut).

SHL as measured by both instruments was strongly positively predicted by age, in a dose-dependent fashion for SHS, though plateauing in effect after age 25 for ARC (p<0.001 for both) . The association with age was unaffected by adjustment for sex and was actually potentiated by adjusting for sexual education. Interestingly adjustment for age at sexual debut had negligible impact on the association of age with either instrument.

Sexual orientation was a significant predictor of both instruments. Compared to heterosexuals, persons identifying as homosexual did on average 4.7% higher on ARC (p=0.003), while persons who were questioning/uncertain of their orientation did 8.1% worse (p=0.003). Similar trends were seen for the SHS but neither was statistically significant. In multivariable models, the association of homosexual orientation with ARC score was robust to all adjustments, but the association of unsure/questioning status was abrogated on adjustment for birthplace and age at sexual debut.

### Demographics: Ethnic identification

Evaluating the distribution of scores by self-reported ethnic identification in Table 2, Africans had significantly lower scores - 11.78% lower than Caucasians on ARC (p=0.004), and 14.57% lower on SHS (p<0.001). East Asians had lower scores compared to Caucasians - 4.46% lower on ARC (p=0.052) and 13.39% lower on SHS (p<0.001). Finally, South Asians also had lower scores – by 5.66% on ARC (p=0.007) and 9.51% on SHS (p<0.001). The negative association of African identification was robust to adjustment for both instruments. The association of East Asian ethnic identification with ARC score was attenuated on adjustment, but the SHS association was largely robust to adjustment. Similar trends were observed for the South Asian associations.

In comparing results between instruments, Africans have similarly low scores for both ARC and SHS, indicating a deficit in both general SH/STI knowledge covered in ARC and in risk reduction strategies covered by SHS. On the other hand, South and East Asians have lower ARC scores, indicating some deficit in their general knowledge, but their deficits in the risk reduction knowledge in SHS is appreciable and significant, indicating that their deficits in general sexual health knowledge are manifest particularly in knowing how to apply that information in actual sexual behaviour.

### Demographics: Religious affiliation

Agnostics and atheists comprised 40.1% of participants, followed by 28.4% unaffiliated but spiritual, and 14.4% Protestant. As in Table 3, three religious affiliations were consistently negatively associated with SHL across both instruments: Protestants, Muslims and Buddhists. Protestants had 2.30% lower ARC (p=0.023) and 4.42% lower SHS scores (p<0.001) than the Atheist/Agnostic reference population. Persons identifying as Muslim had 16.53% lower ARC (p<0.001) and 13.44% lower SHS scores (p=0.001) than the reference population. Finally, persons identifying as Buddhist had 5.38% lower ARC (p=0.014) and 6.65% lower SHS scores (p=0.002) than the Atheist/Agnostic reference population. Catholics, Other Christians, and Hindu groups were associated with significantly lower SHS scores (3.51%, p=0.003; 5.74%, p=0.009; and 12.18%, p=0.027; respectively), but these groups did not have significantly different ARC scores.

The association of Muslim religious affiliation with ARC was attenuated by about 25% by adjustment for age, sex, and sexual education, and reduced further still by adjustment for birthplace and age at sexual debut; the association with SHS was largely unaffected by these adjustments, however. The association of Buddhist religious affiliation with ARC and SHS was largely robust to the adjustments, indicating these associations were independent of the factors in the models. Similarly, the Catholic, Other Christian and Hindu associations with SHS were mostly unaffected by adjustment, though the Hindu association was rendered nonsignificant by adjustment for birthplace and age at sexual debut.

The deficits in SHL between ARC and SHS instruments for Protestants, Muslims and Buddhists were roughly proportional between instruments. The significantly lower SHS scores for Catholics, Christian Other, and Hindu, which were not manifest for ARC for these groups, are suggestive that for these populations there is some knowledge of information regarding sexual health, but the application thereof is limited. This is particularly so for the Catholics, who have a non-significantly higher ARC than Atheists/Agnostics, but a significantly lower SHS.

## Demographics: Region & country of birth

The majority of participants were Australian-born (85.1%), with no evidence of a difference by state of birth in Australia (data not shown). Of those overseas-born, most came from Europe (28.8%) and Southeast Asia (21.5%). Evaluating birthplace as a predictor of SHL in Table 4, persons born outside Australia and New Zealand had 3.6% lower ARC (p=0.001) and 4.2% lower SHS (p<0.001). Evaluating global regions, the Southeast Asia and South Asia regions were significant negative predictor of both ARC (SE Asia: -8.8%, p<0.001; S Asia: -12.4%, p<0.001) and SHS scores (SE Asia: -7.8%, p<0.001); S Asia: -14.8%, p<0.001), while the East-Central Asia region was a significant negative predictor of SHS (-14.5%, p<0.001) but not ARC (-2.9%, p=0.34). Evaluating countries of residence of study participants within each of these regions, specific countries were evident as independent drivers of these associations, specifically Malaysia (ARC: -13.6%, p<0.001; SHS: -10.2%, p<0.001), India (ARC: -14.3%, p=0.001; SHS: -10.6%, p=0.025) and China (ARC: -5.7%, p=0.18; SHS: -18.2%, p=0.001). The associations of overseas-born status were largely robust to adjustment for both instruments. The associations of the Southeast and South Asia regions with ARC and SHS were greatly attenuated by adjustment for age of sexual debut. The East-Central Asia region’s association with SHS was more robust to adjustment, only materially attenuated on adjustment for age of sexual debut.

Overall, deficiencies in SHL for overseas-born students are proportional between the two instruments, as are those for South and SE Asian populations. However, there is a marked difference between instruments for East-Central Asians, the majority of which were Chinese, such that there was no significant difference in ARC but a tremendous deficit in SHS. This suggests that, as with other analyses, this population has the knowledge regarding sexual health, but are unable to apply that knowledge in various risk-reduction scenarios.

### University-specific characteristics

Evaluating specific study areas, students in medicine (+11.49%, p<0.001), nursing (+8.12%, p<0.001) and allied health (+5.48%, p<0.001) had significantly higher ARC scores, all persisting on adjustment for multiple comparisons, though for the SHS, only medicine (+4.64%, p=0.001) and allied health (+2.88%, p=0.041) had significantly higher scores. Study year was significantly positively associated with ARC score, in a dose-dependent fashion for the undergraduates (p<0.001). School year’s association with SHS was more erratic, showing little dose-dependency, and lower magnitude (p=0.001).

The higher ARC scores among medical, nursing and allied health students were largely unaffected by any adjustments, as were the higher SHS scores for medical, allied health and History & Languages students. Likewise the association of study year with both ARC and SHS scores were mostly unaffected by any adjustments, including age. There was some difference in ARC score by campus but this was abrogated on adjustment and was not found for SHS score.

### Sexual education characteristics

The majority of participants reported having some sexual education in life (82.3%), the greatest individual source secondary school (27.0%) but most participants reported multiple sources (44.8%), including primary, secondary and university-level education and other sources. The majority of students reporting sexual education reported content covering a broad range of topics, from basic biology and reproduction/puberty to HIV/STI and pregnancy prevention methods, while only a minority had very Spartan sexual education content. Discussion in the household about sexual matters, on the other hand, was much more reserved, with over half reporting households where such discussion was taboo or discouraged.

Examining course content in Table 5, compared to those with no sexual education those reporting greater diversity of topics covered had significantly higher scores on both instruments. Surprisingly, there was no evidence of a significantly increased SHL by either instrument with an increasing content of sexual education. Of interest, however, those reporting sexual education that was missing core, basic topics, like biology of reproduction and body changes during puberty, had significantly lower scores than those who had no sexual education at all, having 3.31% lower ARC (p=0.017) and 3.20% lower SHS (p=0.012). Finally, those participants reporting a poorer level of communication about sexual topics in their household growing up had significantly lower ARC and SHS scores (p<0.001 for both). Interestingly, however, despite some evidence of dose-dependency for SHS, the deficits in SHL were only material for households where sexual discussion topics were taboo.

In multivariable models, the association of sexual education venue with ARC and SHS score was robust to adjustment for age and sex, but was abrogated on adjustment for sexual education content. Sexual education content’s association with ARC was largely unaffected by adjustment for age and sex, but greatly reduced by adjustment for birthplace and age at sexual debut. The association with SHS slightly attenuated by adjustment for age and sex, but was also greatly reduced by adjustment for birthplace and age at debut. Interestingly, communication in the household growing up remained a potent and independent factor predicting both ARC and SHS score, only slightly reduced by adjustment for sexual education content, and birthplace and age at debut.

### Sexual experience

The majority of our participants reported ever engaging in physical sexual contact (88.5%), while only 0.6% reported only engaging in virtual sexual contact (phone/internet sex or sexting); 11% reported no sexual contact of any kind. Mean age of sexual debut was 16.6 years. None of these characteristics materially differed by sex (data not shown). Of those reporting sexual contact, 98.2% reported sex with an opposite-sex partner and 27.4% with a same-sex partner.

Sexual experience was a significant and potent predictor of SHL by both instruments: those having physical sexual experiences had 7.91% higher ARC and 6.78% higher SHS scores (p<0.001 for both). On the other hand, those reporting having only had virtual sexual experiences had markedly lower scores, over 5% lower, though these associations were not statistically significant.

As in Table 6, an earlier age at sexual debut was a significant and dose-dependent predictor of scores by both instruments (ptrend<0.001 for both). Lifetime opposite-sex partner number was associated in a nearly dose-dependent fashion with higher ARC and SHS scores (ptrend<0.001 for both); this dose-dependency excludes those reporting zero opposite-sex partners, who had significantly higher ARC score (p<0.001). Lifetime same-sex partner number was also positively associated with both ARC ((ptrend<0.001) and SHS (ptrend=0.008), though only up to 6-10 partners, whereupon additional partners had no further impact. Finally, looking at behaviours engaged in, both males and females reporting a greater diversity of sexual behaviours had significantly higher ARC and SHS scores, these associations increasing in magnitude in a dose-dependent fashion (ptrend<0.001 for all).

The associations of ever having had physical sex and age at sexual debut was attenuated somewhat on adjustment for age and sex, and while unaffected by adjusting for sexual education content, adjustment for birthplace attenuated the associations for both scores slightly. The associations of opposite and same sex partner number were mostly unaffected by adjustment for age, sex and sexual education content; however adjustment for birthplace and age at sexual debut reduced these associations by one quarter to one third. Finally, the associations of sexual behaviour diversity with both scores was attenuated slightly on adjustment for age, and while adjustment for sexual education content had no effect, adjustment for birthplace and age at sexual debut greatly reduced the associations for female sexual experience for both scores, and for male sexual experience with ARC score.

# Discussion

This is the first study of SHL among the student population at the University of Tasmania. While there have been studies of students in Tasmania previously as part of ARCSHS National Survey of Australian Secondary Students and Sexual Health Survey, these were confined to secondary education students. While there is some sexual activity among students at this level([25](#_ENREF_25)), the proportions so engaged among university-aged populations is likely much larger, making the assessment of the SHL of students at university very important. Generally the SHL of the student population is adequate, with an average ARC score of 79.4% and an average SHS score of 78.3%. ARC scores were improved in comparison to the last administration of the instrument to secondary students, whose average score was 68.1%([25](#_ENREF_25)).

The results from this study indicate significant variability in the SHL of students by a number of predictive covariates. Of particular interest were the marked and significantly lower SHL scores found for African and South Asian ethnic affiliation, for Protestant, Muslim, Hindu and Buddhist religious affiliations, and among overseas-born students coming from countries in South, Southeast and East-Central Asia. Deficiencies in SHL among Asian students has been noted previously, both in Australia([10](#_ENREF_10)) and in Asia([27](#_ENREF_27)). Differential levels of sexual activity among some religious groups, particularly Muslims, has been noted in previous work([28](#_ENREF_28)), as has a differential attitude towards known sexual risk reduction strategies by religious affiliation and devotion([27](#_ENREF_27), [29](#_ENREF_29)). These associations were largely robust to adjustment for a priori suspected mediators of sexual literacy, namely sexual education and sexual experience, leaving open the question as to what characteristics of these populations underlie the much lower SHL scores found.

Other findings in this study, for example the greater literacy among females, and those of higher age, sexual education and sexual experience, were expected on the basis of other studies([2](#_ENREF_2), [3](#_ENREF_3), [9](#_ENREF_9), [30](#_ENREF_30)) and general knowledge about the effects of education and life experience on sexual literacy. Another factor we suspected would predict sexual literacy was study in a health-related discipline, given their educational exposure to elements of biology and human physiology, to say nothing of sexual and reproductive health in particular. An interesting analysis that we unfortunately did not have the numbers to undertake was whether there were birthplace, ethnicity and/or religious affiliation in the positive impact of medical-related study disciplines on SHL.

Our results are generally in sync with a previous study in university students in Australia([1](#_ENREF_1), [26](#_ENREF_26)), showing significantly lower literacy scores among persons identifying as Asian or having less sexual experience (lower partner number or never engaged in sex). The study by McKelvey([1](#_ENREF_1)) was solely conducted among medical and nursing students, suggesting that the impact of this area of study did not mitigate the impact of student background. We could not evaluate these subgroups among medical/nursing students for want of numbers; however, that these associations persisted in this other study suggests the impact of background on sexual attitudes and knowledge may be robust to university education, even of a medical nature.

The findings of this study may be applied to include supplementary sexual health education and outreach as part of the university orientation process, alongside similarly indicated modules on academic integrity and student safety. Such an orientation module would be expected to be easily passed by those of higher sexual literacy, while being beneficial in exposure for those who need such education. While there is a possibility that some students may desire to opt out of the sexual education module, it is possible that the broad exposure of the student population will have a sympathetic benefit for those who opt out of the education module, a sort of SHL “herd immunity” that may benefit even those who did not complete the education module.

This study is strong on the basis of its broad uptake across a number of demographic domains. For those factors assessed by the University, like age, sex, birthplace, and study area, the study cohort was statistically no different from the distribution of these factors in the general student population. That said, there is some concern that the student groups that were identified as significantly deficient in SHL comprised a smaller proportion of the study cohort than would be expected based on their numbers in the University of Tasmania student population. However, given the assumption that those of more conservative disposition would be less likely to participate in a study of this nature, it is possible that the deficiencies in the participants in this study actually underestimate the true deficits in the parent subpopulations. A larger study which endeavours to oversample the at-risk populations demonstrated in this study is indicated to substantiate these findings. A further issue is the potential to which some overseas-born students’ lesser familiarity with the English language may have adversely impacted upon their performance in the SHL instruments. Despite the fact that all overseas-born UTas students take training in the English language prior to the start of study, and despite our efforts to write the questions in easy-to-understand terminology, there is still a potential that English not being their first language could have hindered their ability to correctly answer questions despite having the knowledge being assessed. Another issue with the study method is that not all persons responded to all questions. This reflects a decision by investigators to give participants the means of skipping some questions they did not want to answer even in an anonymous fashion, lest they discontinue participation and not provide information for other questions. This is a limitation but the majority of participants did complete all questions. Finally, a necessary and unavoidable issue of anonymous questionnaire methods is the honesty of responses by participants. This being so, analysis was restricted to persons who ticked having been honest in their responses to questions in the various subsections of the questionnaire. It is possible that persons would have been dishonest here as well, and there is some potential attrition of participants during the questionnaire before they got to this part of the questionnaire; however one hopes that those being dishonest throughout would constitute a minority of participants.

To conclude, we have undertaken the first study of sexual health literacy among the student population at the University of Tasmania. This study has demonstrated that, while the general SHL of the student population was fair to good, there are subpopulations that are significantly deficient in sexual literacy, including certain ethnic and religious affiliations, as well as the more expected participants who had no or insufficient sexual education or those with less personal sexual experience. While a follow-on study to this one will serve to substantiate the present study’s findings, university administrators might utilise the evidence demonstrated herein to inform sexual education and outreach programs to aid in the health and welfare of the student population.

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Table 1. Selected cohort characteristics in RUSSL cohort and compared to UTas general population. Results are presented as n (%).

|  |  |  |  |
| --- | --- | --- | --- |
|  | RUSSL | UTas | Significance |
| Sex |  |  |  |
|  Male Female Other | 628 (37.0)1,065 (62.8)3 (0.2) | 9,435 (43.5)12,263 (56.4)0 | *p=0.19* |
| Age |  |  |  |
|  17-20 >20-25 >35-35 >35 | 348 (20.4)695 (40.8)222 (13.0)438 (25.7) | 4,550 (21.0)10,075 (46.4)1,755 (8.1)5,318 (24.5) | *p=0.29* |
| Racial/ethnic identification |  |  |  |
|  Caucasian African Australian Aboriginal  East Asian Hispanic Pacific Islander South Asian Mixed | 1,110 (84.5)11 (0.8)47 (3.6)30 (2.3)10 (0.8)4 (0.3)37 (2.8)64 (4.9) |  |  |
| Birthplace region |  |  |  |
|  Australia NZ & Oceania Asia Southeast Asia South Asia Africa Middle East Europe North America South America/Caribbean | 1,403 (85.8)29 (1.8)22 (1.3)50 (3.1)19 (1.2)16 (1.0)4 (0.2)67 (4.1)21 (1.3)5 (0.3) | 16,200 (74.7)286 (1.3)1,364 (6.3)1,346 (6.2)501 (2.3)410 (1.9)299 (1.4)939 (4.3)244 (1.1)98 (0.5) | *p=0.40* |
| Campus |  |  |  |
|  Hobart/Sandy Bay Launceston Cradle Coast | 1,104 (67.1)457 (27.8)84 (5.1) | 13,903 (64.1)6,868 (31.7)927 (4.3) | *p=0.68* |
| Study area Medicine Nursing Other | 158 (9.5)132 (7.9)1,382 (82.7) | 1,738 (8.0) 2,120 (9.8)17,840 (82.2) | *p=0.72* |
| Abbreviations: RUSSL = Research University Students’ Sexual Literacy Study; UTas = University of Tasmania; NZ = New Zealand. |

Table 2. Distribution of SHL instrument scores (ARC, SHS) and subscores, by self-reported ethnic identification.

|  |  |  |  |
| --- | --- | --- | --- |
|  | n (%) | ARC | SHS |
|  Caucasian African Aus Aboriginal  East Asian Hispanic Pacific Islander South Asian Mixed | 1,109 (84.5)11 (0.8)47 (3.6)30 (2.3)10 (0.8)4 (0.3)37 (2.8)64 (4.9) | 83.17 (82.47, 83.86)**-11.78 (-21.01, -2.56)**-1.19 (-4.71, 2.33)-4.46 (-9.16, 0.25)-5.99 (-14.37, 2.40)-5.96 (-19.18, 7.26)**-5.66 (-10.02, -1.29)**-2.03 (-5.12, 1.06) | ***p=0.004****p=0.50**p=0.052**p=0.13**p=0.35****p=0.007****p=0.19* | 80.87 (80.24, 81.51)**-14.57 (-23.09, -6.05)**-1.39 (-4.61, 1.83)**-13.39 (-18.44, -8.34)**+0.00 (-6.70, 6.71)-2.86 (-13.99, 8.28)**-9.51 (-13.72, -5.30)**-1.47 (-4.25, 1.31) | ***p=0.0001****p=0.40****p=4.57x10-9****p=1.00**p=0.62****p=1.64x10-6****p=0.30* |  |  |
| Results presented as: Geometric mean SHL score as 100% (95% CI) for reference, regression coefficients (95% CI) for other levels.Note: Figures in bold are statistically significant (p<0.05).Abbreviations: Aus Aboriginal = Australian Aboriginal; ARC = ARCSHS National Survey of Australian Secondary Students and Sexual Health Survey; SHS = Sexual Health Questionnaire. |

Table 3. Distribution of SHL instrument scores (ARC, SHS) and subscores, by self-reported religious affiliation.

|  |  |  |  |
| --- | --- | --- | --- |
|  | n (%) | ARC | SHS |
|  Agnostic/Atheist None Unaffiliated Catholic Protestant Christian, other Muslim Jewish Buddhist Hindu Pagan Other Multiple | 522 (40.1)3 (0.2)370 (28.4)108 (8.3)188 (14.4)30 (2.3)13 (1.0)2 (0.2)34 (2.6)6 (0.5)12 (0.9)4 (0.3)11 (0.8) | 83.52 (82.53, 84.52)-9.64 (-26.12, 6.84)-0.79 (-2.35, 0.77)+1.39 (-0.95, 3.73)**-2.30 (-4.30, -0.29)**-1.58 (-5.99, 2.83)**-16.53 (-26.06, -7.00)**-0.54 (-16.81, 15.73)**-5.38 (-9.99, -0.87)**-8.77 (-20.19, 2.66)+0.19 (-6.51, 6.79)-13.65 (-29.49, 2.18)+4.81 (-1.43, 11.06) | *p=0.20**p=0.32**p=0.25****p=0.023****p=0.48****p=3.02x10-5****p=0.95****p=0.014****p=0.098**p=0.96**p=0.091**p=0.15* | 82.05 (81.15, 82.95)-5.33 (-18.55, 7.89)-1.42 (-2.84, 0.01)**-3.51 (-5.82, -1.20)****-4.42 (-6.29, -2.55)****-5.74 (-10.04, -1.44)****-13.44 (-21.01, -5.87)**-6.04 (-22.45, 10.37)**-6.65 (-10.77, -2.52)****-12.18 (-22.97, -1.38)**-2.94 (-9.30, 3.42)-12.01 (-25.16, 1.15)+1.88 (-4.19, 7.95) | *p=0.43**p=0.051****p=0.003******p=2.37x10-6******p=0.009******p=0.001****p=0.47****p=0.002******p=0.027****p=0.36**p=0.074**p=0.54* |
| Results presented as: Geometric mean SHL score as 100% (95% CI) for reference, regression coefficients (95% CI) for other levels.Note: Figures in bold are statistically significant (p<0.05).Abbreviations: ARC = ARCSHS National Survey of Australian Secondary Students and Sexual Health Survey; SHS = Sexual Health Questionnaire. |

Table 4. Distribution of SHL instrument scores (ARC, SHS) and subscores, by place of birth.

|  |  |  |  |
| --- | --- | --- | --- |
| Birthplace | n (%) | ARC | SHS |
|  Australia NZ & Oceania Overseas | 1,199 (85.1)27 (1.9)183 (13.0) | 82.73 (82.04, 83.42)+2.00 (-2.41, 6.42)**-3.56 (-5.61, -1.52)** | *p=0.38****p=0.0005*** | 80.68 (80.04, 81.32)+0.80 (-3.31, 4.91)**-4.16 (-6.08, -2.23)** | *p=0.70****p=1.38x10-5*** |
| Birthplace region | n (%) | ARC | SHS |
|  Australia NZ & Oceania East-Central Asia Southeast Asia South Asia Africa Middle East Europe North America South America | 1,199 (85.1)27 (1.9)19 (1.4)45 (3.2)18 (1.3)14 (1.0)4 (0.3)59 (4.2)19 (1.4)5 (0.4) | 82.69 (82.00, 83.38)+2.00 (-2.41, 6.41)-2.91 (-9.05, 3.22)**-8.81 (-13.26, -4.37)****-12.43 (-19.88, -4.98)**+0.29 (-6.02, 6.60)-1.87 (-14.18, 10.44)+0.44 (-2.73, 3.61)-1.40 (-7.02, 4.22)-3.97 (-15.50, 7.57) | *p=0.38**p=0.34****p=2.21x10-5******p=0.0002****p=0.92**p=0.77**p=0.79**p=0.62**p=0.48* | 80.62 (79.99, 81.26)+0.79 (-3.28, 4.86)**-14.46 (-21.77, -7.15)****-7.82 (-11.80, -3.84)****-14.76 (-22.37, -7.14)**-3.65 (-9.96, 2.66)-7.32 (-19.50, 4.85)+1.09 (-1.78, 3.97)+3.07 (-1.71, 7.84)-10.60 (-22.24, 1.04) | *p=0.70****p=9.13x10-6******p=4.17x10-5******p=1.23x10-5****p=0.26**p=0.24**p=0.46**p=0.21**p=0.074* |
| Results presented as: Geometric mean SHL score as 100% (95% CI) for reference, regression coefficients (95% CI) for other levels.Note: Figures in bold are statistically significant (p<0.05).Abbreviations: ARC = ARCSHS National Survey of Australian Secondary Students and Sexual Health Survey; SHS = Sexual Health Questionnaire.Regional allocations: NZ & Oceania = Fiji, New Zealand & Vanuatu; East-Central Asia = China, Hong Kong, Japan, South Korea & Asia, unspecified; Southeast Asia = The Philippines, Malaysia, Singapore, & Thailand; South Asia = India, Nepal, Pakistan & Sri Lanka; Africa = Congo, Ghana, Nigeria, South Africa, South Sudan & Zimbabwe; Middle East = Egypt, Iran & Saudi Arabia; Europe = Croatia, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Poland, Russia, Slovakia, Sweden, Switzerland, the United Kingdom, & Europe, unspecified; North America = Canada & the United States; South America = Argentina, Chile, Colombia, El Salvador and South America, unspecified.  |

Table 5. Distribution of SHL instrument scores (ARC, SHS) and subscores, by sexual education characteristics.

|  |  |  |  |
| --- | --- | --- | --- |
| Sexual education-quality graded by topics covereda | n (%) | ARC | SHS |
|  No sexual education Sex-ed, missing basic  Sex-ed, basic only Sex-ed, extended Sex-ed, advanced *Trend:* | 241 (15.9)160 (10.6)26 (1.7)264 (17.4)824 (54.4) | 80.32 (78.65, 81.98)**-3.31 (-6.06, -0.56)**+3.74 (-1.22, 8.69)+1.96 (-0.30, 4.23)**+2.50 (0.62, 4.37)*****p=2.21x10-5*** | ***p=0.017****p=0.15**p=0.089****p=0.008*** | 78.37 (76.85, 79.90)**-3.20 (-5.70, -0.70)****+5.86 (1.57, 10.15)****+2.24 (0.17, 4.31)****+2.31 (0.59, 4.03)*****p=1.77x10-5*** | ***p=0.012******p=0.007******p=0.034******p=0.009*** |
| How was topic of sex & sexuality discussed in family? | n (%) | ARC | SHS |
|  Free & open  Only questions  Only implicitly  Totally taboo subject *Trend:* | 318 (22.3)301 (21.1)524 (36.8)283 (19.9) | 83.66 (82.33, 84.99)-0.92 (-2.84, 1.00)-1.00 (-2.70, 0.70)**-3.80 (-5.83, -1.77)*****p=0.001*** | *p=0.35**p=0.25****p=0.0002*** | 81.56 (80.32, 82.80)-0.30 (-2.06, 1.47)-1.22 (-2.81, 0.37)**-3.71 (-5.60, -1.81)*****p=0.0001*** | *p=0.74**p=0.13****p=0.0001*** |
| a Sexual education quality was defined on the basis of content covered. Basic concepts were defined as those mentioning body changes during puberty/adolescence and reproductive biology; extended concepts were defined as those mentioning concepts in basic, as well as HIV/AIDS, sexually transmitted infections other than HIV, and abstinence and/or contraception; advanced concepts were defined as those mentioning concepts in basic and extended, as well as abortion, sexual violence and sexual orientation.Results presented as: Geometric mean SHL score as 100% (95% CI) for reference, regression coefficients (95% CI) for other levels.Note: Figures in bold are statistically significant (p<0.05).Abbreviations: ARC = ARCSHS National Survey of Australian Secondary Students and Sexual Health Survey; SHS = Sexual Health Questionnaire. |

Table 6. Distribution of SHL instrument scores (ARC, SHS) and subscores, by sexual experience characteristics.

|  |  |  |  |
| --- | --- | --- | --- |
| Age at first sexual experience | n (%) | ARC | SHS |
|  Never had sexual experience 18-40 17 16 10-15  *Trend:* | 151 (10.9)222 (16.0)337 (24.3)229 (16.5)449 (32.4) | 75.29 (72.98, 77.60)**+4.65 (1.79, 7.51)****+7.07 (4.43, 9.72)****+7.98 (5.20, 10.77)****+9.05 (6.50, 11.60)*****p=1.28x10-13*** | *p=0.001****p=6.48x10-8******p=9.69x10-9******p=2.72x10-13*** | 74.23 (72.13, 76.33)**+5.33 (2.73, 7.93)****+6.05 (3.63, 8.47)****+6.39 (3.84, 8.95)****+7.46 (5.12, 9.79)*****p=1.73x10-8*** | ***p=4.81x10-5******p=5.39x10-7*****p=6.70x10-7*****p=9.54x10-11*** |
| Life number of sexual partners of opposite sex | n (%) | ARC | SHS |
|  Never had sex 0  1-2 3-5 6-10 11-15 16-20 21-50 >50 *Trend:* | 151 (10.7)22 (1.6)342 (24.3)296 (21.0)212 (15.1)137 (9.7)92 (6.5)111 (7.9)45 (3.2) | 75.37 (73.09, 77.65)**+11.99 (6.97, 17.02)****+5.33 (2.69, 7.97)****+5.75 (3.06, 8.43)****+7.50 (4.72, 10.29)****+9.11 (6.13, 12.09)****+11.72 (8.55, 14.89)****+11.28 (8.22, 14.33)****+12.47 (8.63, 16.32)*****p=8.76x10-20*** | ***p=1.73x10-5******p=5.05x10-5******p=1.74x10-5******p=7.35x10-8******p=1.84x10-9******p=9.85x10-13******p=6.32x10-13******p=1.94x10-9*** | 74.33 (72.23, 76.42)+3.15 (-2.21, 8.50)**+5.92 (3.50, 8.34)****+6.80 (4.35, 9.26)****+6.68 (4.10, 9.25)****+6.82 (4.02, 9.61)****+7.37 (4.33, 10.41)****+7.00 (4.10, 9.90)****+8.47 (4.73, 12.22)*****p=6.62x10-7*** | *p=0.26****p=9.92x10-7******p=2.64x10-8******p=2.52x10-7******p=1.74x10-6******p=2.73x10-6******p=2.57x10-6******p=1.96x10-5*** |
| Life number of sexual partners of same sex | n (%) | ARC | SHS |
|  Never had sex 0  1-2 3-5 6-10 11-15 16-20 21-50 >50 *Trend:* | 151 (10.7)913 (64.6)201 (14.2)83 (5.9)33 (2.3)12 (0.9)3 (0.2)6 (0.4)12 (0.9) | 75.39 (73.10, 77.69)**+6.60 (4.17, 9.03)****+8.43 (5.62, 11.24)****+12.26 (8.99, 15.52)****+12.69 (8.35, 17.03)****+13.14 (6.76, 19.53)**+4.28 (-10.28, 18.84)**+11.29 (2.25, 20.34)****+14.81 (8.37, 21.25)*****p=9.02x10-14*** | ***p=2.19x10-8******p=2.16x10-9******p=6.43x10-13******p=1.03x10-7******p=0.0003****p=0.59****p=0.028******p=6.81x10-5*** | 74.32 (72.23, 76.42)**+6.08 (3.86, 8.30)****+8.39 (5.83, 10.95)****+7.75 (4.64, 10.85)****+8.21 (4.04, 12.39)**+4.17 (-2.82, 11.15)+0.68 (-23.14, 24.49)-1.31 (-11.62, 9.00)+3.44 (-3.64, 10.52)***p=0.008*** | ***p=2.20x10-8******p=7.25x10-11******p=1.48x10-6******p=0.0002****p=0.26**p=0.96**p=0.80**p=0.36* |
| Female sexual behaviour categorya | n (%) | ARC | SHS |
|  No physical sex  Physical sex, no detail Basic sexual behaviour Basic sex toy use Anal/homosexual  Other  *Trend:* | 91 (10.1)17 (1.9)244 (27.1)113 (12.5)310 (34.4)127 (14.1) | 78.73 (76.13, 81.32)-1.83 (-8.84, 5.18)**+3.32 (0.36, 6.28)****+6.40 (3.16, 9.64)****+6.34 (3.49, 9.19)****+7.19 (4.04, 10.34)*****p=4.38x109*** | *p=0.60****p=0.025******p=8.74x10-5******p=5.14x10-6******p=4.80x10-6*** | 76.12 (73.52, 78.72)+3.28 (-3.20, 9.75)**+5.57 (2.64, 8.50)****+6.27 (3.02, 9.51)****+6.54 (3.69, 9.38)****+7.53 (4.39, 10.68)*****p=2.97x10-6*** | *p=0.32****p=0.0001******p=0.0001******p=2.97x10-6******p=1.77x10-6*** |
| Male sexual behaviour categoryb | n (%) | ARC | SHS |
|  No physical sex  Physical sex, no detail Basic sexual behaviour Basic sex toy use Anal/homosexual  Other  *Trend:* | 62 (12.5)11 (2.2)144 (29.0)36 (7.2)144 (29.0)100 (20.1) | 69.21 (64.93, 74.48)**+11.51 (1.48, 21.55)****+7.27 (2.33, 12.22)****+9.64 (3.30, 15.97)****+13.06 (8.23, 17.89)****+14.34 (9.33, 19.35)*****p=1.03x10-10*** | ***p=0.035******p=0.003******p=0.003******p=3.41x10-8******p=7.75x10-9*** | 70.92 (67.53, 74.30)+4.65 (-4.27, 13.57)**+5.60 (1.63, 9.57)****+6.16 (0.98, 11.33)****+7.34 (3.44, 11.24)****+6.82 (2.73, 10.91)*****p=0.0007*** | *p=0.31****p=0.006******p=0.020******p=0.0002******p=0.001*** |
| a Sexual behaviour category was defined on the basis of behaviours reported. Basic female sexual behaviour was defined as penile-vaginal contact/intercourse, oral-penile contact, hand-penile contact, hand-vaginal/vulvar contact, and oral-vaginal/vulvar contact; basic female sex toy behaviour was defined as using sexual devices with penile contact or vaginal/vulvar contact; female anal/homosexual sexual behaviour was defined as penile-penile contact, hand-anal contact, oral-anal contact, penile-anal contact (receptive or active), or sexual device-anal contact. b Basic male sexual behaviour was defined as penile-vaginal contact/intercourse, oral-penile contact, hand-penile contact, hand-vaginal/vulvar contact, and oral-vaginal/vulvar contact, basic male sex toy behaviour was defined as using sexual devices with penile contact or vaginal/vulvar contact; male anal/homosexual sexual behaviour was defined as vulvar-vulvar contact, hand-anal contact, oral-anal contact, penile-anal contact, or sexual device-anal contact. Results presented as: Geometric mean SHL score as 100% (95% CI) for reference, regression coefficients (95% CI) for other levels.Note: Figures in bold are statistically significant (p<0.05).Abbreviations: ARC = ARCSHS National Survey of Australian Secondary Students and Sexual Health Survey; SHS = Sexual Health Questionnaire. |