

Article

Health Literacy amongst Health Professional University Students: A Study Using the Health Literacy Questionnaire

Judy Mullan ^{1,*}, Pippa Burns ¹, Kathryn Weston ¹, Peter McLennan ¹, Warren Rich ¹, Shelley Crowther ¹, Kylie Mansfield ¹, Robyn Dixon ², Emma Moselen ² and Richard H. Osborne ³

¹ School of Medicine, University of Wollongong, Wollongong, NSW 2522, Australia; pippa@uow.edu.au (P.B.); kathw@uow.edu.au (K.W.); petermcl@uow.edu.au (P.M.); wrich@uow.edu.au (W.R.); Shelley.Crowther@psa.org.au (S.C.); kylie@uow.edu.au (K.M.)

² School of Nursing, University of Auckland, Auckland 1142, New Zealand; r.dixon@auckland.ac.nz (R.D.); e.moselen@auckland.ac.nz (E.M.)

³ School of Health and Social Development, Deakin University, Geelong 3125, Australia; richard.osborne@deakin.edu.au

* Correspondence: jmullan@uow.edu.au

Academic Editor: Nicky Hudson

Received: 23 February 2017; Accepted: 8 May 2017; Published: 16 May 2017

Abstract: Background: This study aimed to assess and compare health literacy levels in a range of university-based health students. Methods: A survey containing the Health Literacy Questionnaire (HLQ) was administered to students enrolled in university-based medical, allied health or nursing degree programs. The HLQ scores and scale scores were compared across student groups. Results: In total, 374 students (24% response rate) with a median age of 25 years (range: 17–61 years), returned completed surveys. Three students who did not identify their degree programs were excluded from the final analysis which included 371 respondents; 242 graduate-entry medical students (65%), 67 allied health students (18%) and 62 nursing students (17%). Overall, the medical students had the highest score for seven of the nine HLQ scales; while the nursing students had the lowest score for all of the nine HLQ scales. Conclusion: These results show that health literacy profiles are different across student groups. In order to provide excellent patient-centred care, and to successfully look after their own health, a high level of health literacy is required by future health professionals. Health literacy training modules, tailored according to the different needs of the student groups, should therefore be included in university-based health professional degree programs.

Keywords: health professional education; health literacy; health literacy questionnaire; nursing; medicine; allied health

1. Introduction

While health literacy has been defined in a variety of ways [1–3], in essence “health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health” [4]. Survey findings of functional health literacy (e.g., health-related reading ability and numeracy skills) suggest that more than half the population worldwide has difficulty with both reading and using health-related materials [5–8]. Health literacy is also being increasingly recognized as a multidimensional construct, reliant on a combination of functional, interactive and critical literacy levels [9]. All of these are important as they ultimately affect how people interact with, and make decisions about, their healthcare [10].

The concept of health literacy is important because the links between low health literacy and poor health outcomes are well recognised [9]. Low functional health literacy is known to be associated with poor health status; a poor understanding of medical conditions, medical information and preventative healthcare services, as well as increased hospitalizations and subsequent increased healthcare costs [2,11–13]. In addition to poor health outcomes, low health literacy is a serious public health issue known to be associated with the social gradient and health inequalities [14,15]. People with low health literacy, who typically engage in unhealthy lifestyle behaviours, often include those who are less educated, poorer, older and ethnically diverse [16–18].

Health literacy may have an impact on individual factors and circumstances, as well as the responsiveness of health services, healthcare providers and organisations [19–21]. Regardless of their background and education, many people find it difficult to navigate healthcare systems and often cannot understand the information provided to them by healthcare providers and organisations [22]. This inability to understand information makes it difficult for them to effectively manage their healthcare needs. This problem is further exacerbated when healthcare providers [23–26], including medical trainees [27] and nursing students [28], lack the knowledge and skills to address the needs of patients with low health literacy [29]. It has been suggested that a lack of medical and nursing student training about health literacy has contributed to this gap in their knowledge and skills [27,30], as well as their inability to provide high-quality patient-centred care because of poor communication skills [25,31]. Consequently, health literacy has become more commonplace in the curriculum of health professionals [25,32], in the hope that a better understanding of health literacy will enhance doctor-patient communications and help to improve health outcomes [31,33]. This is also reflected in the Australian Commission on Safety and Quality in Health Care report (ACSQHC) [34], which recommends a coordinated, three-pronged approach to improve health literacy focusing on: health systems/organisations, consumers and health professionals. They suggest that this could be achieved by (1) embedding health literacy into the policies and practices of healthcare systems/organisations, thereby ensuring that health information is clear, focused and useable for the consumer; (2) educating consumers about health literacy, and (3) integrating health literacy into the education of health professionals. The third of these recommendations is the focus of this paper, which undertook preliminary investigations into the health literacy levels of students studying to become health professionals. Research that focuses on the health literacy strengths and limitations of health professionals, including students, is largely absent from the literature. This is, therefore, an important research area because we have limited knowledge about how the health literacy levels of students could impact upon their own self-care, as well as the care of their future patients, especially those with low health literacy.

Given that traditional measures of health literacy mainly involve an assessment of reading and numeracy, it could be assumed that most, if not all, health professionals would be highly health literate. However, the growing recognition of the multidimensional nature of health literacy means that this assumption may not hold true. Thus, in order to explore this proposition, the current study sought to determine the health literacy levels of university students enrolled in different health professional training programs using the Health Literacy Questionnaire (HLQ) [35], a validated, comprehensive multi-dimensional measure of health literacy. The HLQ was chosen as it has been designed to identify specific health literacy strengths and limitations, through the examination of nine distinct domains of health literacy, allowing for the identification of profiles of individuals and groups [10].

2. Methods

Students enrolled in a health professional degree at the University of Wollongong, a regional university in New South Wales, Australia, were asked to complete either an anonymous paper-based or online survey (hosted on SoGoSurvey). As this is the first survey of health literacy in this setting, a convenience sample of students from different stages of their degree programs within the disciplines of nursing, medicine and allied health (from the disciplines of exercise science, nutrition/dietetics,

and health sciences) was obtained. The survey was promoted through university Facebook groups, the university's student messaging facility and in lectures. Students were advised that participation was both voluntary and anonymous. When recruitment occurred in lectures, the survey was made available to students by a professional staff member and completed surveys were placed in a sealed box at the front of the lecture theatre. The nature of the survey and the way in which it was administered meant individuals could not be linked to their responses. Human ethics approval was granted by the university's Human Research Ethics Committee (HE14/012).

The survey consisted of two sections; demographic information (seven items) and the Health Literacy Questionnaire (44 items across nine scales) [35]. Each of the nine scales examines a different area of health literacy [10]:

- Scale 1: Feeling understood and supported by healthcare providers.
- Scale 2: Having sufficient information to manage my health.
- Scale 3: Actively managing my health.
- Scale 4: Social support for health.
- Scale 5: Appraisal of health information.
- Scale 6: Ability to actively engage with healthcare providers.
- Scale 7: Navigating the healthcare system.
- Scale 8: Ability to find good health information.
- Scale 9: Understanding health information well enough to know what to do.

Each scale is psychometrically distinct. The HLQ was designed to identify health literacy strengths and limitations of individuals and groups and has previously been shown to be reliable and have good construct validity [36].

As part of the HLQ, participants were asked to rate "How strongly do you disagree or agree with the following statements?" in the first five scales (Scales 1–5). The options provided were: 'strongly disagree', 'disagree', 'agree' and 'strongly agree', which were scored from 1 to 4, respectively. In Scales 6–9 of the HLQ, participants were asked "How easy or difficult are the following tasks for you to do now?" The options for these scales were 'cannot do', 'very difficult', 'quite difficult', 'quite easy' and 'very easy', which were scored from 1 to 5, respectively.

Data were analysed in SPSS (v.21). Cronbach's alpha was calculated as a measure of internal consistency for each of the HLQ scales. Values for the nine scales ranged from 0.80 to 0.90, indicating good internal consistency. Analysis of the data was consistent with the HLQ guidelines [10], and included calculating the mean score (m), standard deviation (SD) and 95% confidence intervals (CI) for each scale by student health professional group. Cohen's d effect sizes were calculated [10,37] using an online calculator (<http://www.uccs.edu/~lbecker/>), and was used to calculate the mean difference between student groups.

3. Results

Completed surveys were received from 374 students (108 online responses), representing an overall 24% response rate and an 82.7% response rate for paper-based surveys. However, as it was possible for students to skip questions, the individual response rate for each question varied. Three students who did not identify their study degree program were excluded from further analyses.

Demographic information for the 371 student responses included in the final analysis is provided in Table 1. Sixty-one percent of responding students identified as female ($n = 228$) and 36% identified as male ($n = 133$). The median age of respondents was 25 years (range: 17–61 years), with the mean age for nursing students (29.8 years) being slightly older than the graduate entry medical students (27.3 years) and more than seven years older than the allied health students (22.5 years). The median year of study for the nursing students was year 2 (range: 1–3 years); year 3 for the medical students (range: 1–4 years) and year 4 for the allied health students (range: 1–4 years). The majority of students

reported being born in Australia ($n = 291$, 78.4%) and speaking English at home ($n = 355$, 95.7%); almost two thirds of the respondents were graduate-entry medical students ($n = 242$, 65%).

Table 1. Demographic data.

Respondent Characteristics	Allied Health ($n = 67$)			Medicine ($n = 242$)			Nursing ($n = 62$)			Total ($n = 371$)
	<i>n</i>	%	Missing Data	<i>n</i>	%	Missing Data	<i>n</i>	%	Missing Data	
Female	50	74.6	2	126	52.1	4	52	83.9	4	228
Mean Age (years)	22.5	-	0	27.3	-	6	29.8	-	2	n/a
Born in Australia	58	86.6	3	182	75.2	2	51	82.3	0	291
English Spoken at Home	64	95.5	0	233	96.3	0	58	93.5	0	355

3.1. Health Literacy Questionnaire

The mean scores for each HLQ scale, inclusive of their standard deviations (SD) and 95% confidence intervals (CI), are shown in Table 2.

3.2. Health Literacy Questionnaire (HLQ) Results for Scales 1–5

HLQ Scales 1–5 scored on a range from 1 to 4 ('strongly disagree' to 'strongly agree') are presented in Table 2. The nursing students scored lowest on all five scales. The medical students scored highest for "2: Having sufficient information to manage my health" and "5: Appraisal of health information", while the allied health students scored highest for "1: Feeling understood and supported by healthcare providers" and "3: Actively managing my health". Both allied health and medical students had the highest scores for "4: Social support for health".

Table 2. Health literacy profiles of allied health, medical and nursing students.

HLQ Subscale	Range	Allied Health (<i>n</i> = 67, 18%)			Medicine (<i>n</i> = 242, 65%)			Nursing (<i>n</i> = 62, 17%)			Total (<i>n</i> = 371, 100%)		
		Mean	SD	95% CI	Mean	SD	95% CI	Mean	SD	95% CI	Mean	SD	95% CI
1: Feeling understood and supported by healthcare providers	1–4	3.18	0.47	3.02, 3.27	3.06	0.65	3.00, 3.17	3.01	0.70	2.82, 3.27	3.07	0.63	3.01, 3.14
2: Having sufficient information to manage my health	1–4	3.29	0.51	3.13, 3.41	3.40	0.47	3.35, 3.47	3.03	0.55	2.88, 3.21	3.33	0.51	3.30, 3.40
3: Actively managing my health	1–4	3.48	0.46	3.36, 3.60	3.19	0.52	3.12, 3.26	2.99	0.65	2.78, 3.16	3.21	0.55	3.16, 3.30
4: Social support for health	1–4	3.24	0.48	3.08, 3.33	3.24	0.50	3.19, 3.31	2.97	0.60	2.77, 3.16	3.20	0.51	3.15, 3.25
5: Appraisal of health information	1–4	3.02	0.48	3.04, 3.16	3.19	0.47	3.13, 3.26	2.89	0.53	2.77, 3.09	3.11	0.50	3.10, 3.20
6: Ability to actively engage with healthcare providers	1–5	3.99	0.50	3.83, 4.11	4.24	0.56	4.17, 4.31	3.90	0.67	3.74, 4.15	4.14	0.60	4.10, 4.20
7: Navigating the healthcare system	1–5	3.92	0.52	3.74, 4.02	4.17	0.59	4.09, 4.25	3.85	0.60	3.75, 4.10	4.10	0.60	4.01, 4.13
8: Ability to find good health information	1–5	4.23	0.47	4.09, 4.37	4.45	0.52	4.39, 4.52	4.15	0.52	4.06, 4.37	4.40	0.53	4.31, 4.42
9: Understanding health information well enough to know what to do	1–5	4.24	0.49	4.10, 4.36	4.48	0.53	4.41, 4.55	4.21	0.50	4.14, 4.43	4.40	0.52	4.34, 4.45

3.3. Health Literacy Questionnaire (HLQ) Results for Scales 6–9

HLQ Scales 6–9 are scored on a range from 1 to 5 ('cannot do' to 'very easy'). The medical students scored highest on each of these scales, whilst the nursing students obtained the lowest scores (Table 2).

Cohen's *d* effect size was calculated as an indicator of the magnitude of difference between groups [15,22] (see Table 3). This showed a medium effect size between the HLQ scores of the medical and nursing students for six of the nine scales. It is notable that for "3: Actively managing my health" there was a large effect size difference between the allied health and nursing students and a medium effect size difference between the allied health and medical students.

Table 3. Differences between allied health, medical and nursing students expressed as Cohen's *d* Effect Size.

Cohen's <i>d</i> Effect Size of Difference Between Student Groups		
1: Feeling understood and supported by healthcare providers		
Allied Health & Medicine	0.211 \diamond	Small effect size
Allied Health & Nursing	0.285 \diamond	Small effect size
Medicine & Nursing	0.075	-
2: Having sufficient information to manage my health		
Allied Health & Medicine	−0.224 \diamond	Small effect size
Allied Health & Nursing	0.490 \diamond	Small effect size
Medicine & Nursing	0.723 \bullet	Medium effect size
3: Actively managing my health		
Allied Health & Medicine	0.591 \bullet	Medium effect size
Allied Health & Nursing	0.870 *	Large effect size
Medicine & Nursing	0.339 \diamond	Small effect size
4: Social support for health		
Allied Health & Medicine	0.000	-
Allied Health & Nursing	0.497 \diamond	Small effect size
Medicine & Nursing	0.488 \diamond	Small effect size
5: Appraisal of health information		
Allied Health & Medicine	−0.358 \diamond	Small effect size
Allied Health & Nursing	0.257 \diamond	Small effect size
Medicine & Nursing	0.599 \bullet	Medium effect size
6: Ability to actively engage with healthcare providers		
Allied Health & Medicine	−0.471 \diamond	Small effect size
Allied Health & Nursing	0.152	-
Medicine & Nursing	0.551 \bullet	Medium effect size
7: Navigating the healthcare system		
Allied Health & Medicine	−0.449 \diamond	Small effect size
Allied Health & Nursing	0.125	-
Medicine & Nursing	0.538 \bullet	Medium effect size
8: Ability to find good health information		
Allied Health & Medicine	−0.444 \diamond	Small effect size
Allied Health & Nursing	0.161	-
Medicine & Nursing	0.577 \bullet	Medium effect size
9: Understanding health information well enough to know what to do		
Allied Health & Medicine	−0.470 \diamond	Small effect size
Allied Health & Nursing	0.061	-
Medicine & Nursing	0.524 \bullet	Medium effect size

Notes: \diamond Small effect size, \bullet Medium effect size, * Large effect size.

4. Discussion

Overall, the medical students recorded the highest scores for seven of the nine HLQ scales, while the nursing students consistently had the lowest scores for each scale. These results are reflected in substantial differences (medium effects size) between the medical and nursing student scores in six of the different HLQ scales (Table 3). This difference in health literacy is likely to reflect, to some degree, the difference in entrance marks required for medical and nursing studies, as well as the younger median year of study of the nursing students. It may also reflect the fact that the medical students in our study were graduate-entry students, who had already undertaken a prior university degree, often in a health or science discipline, as compared to the undergraduate allied health and nursing students.

The limited evidence about health literacy competency in health professionals suggests that increasing and improving health literacy training for all health professionals is needed [25], especially given that they are often not suitably prepared to effectively communicate with patients who have low health literacy [27]. Countries where health literacy has been included in university-based health professional training programs focus mainly on medical education [25,38,39], and appear not to report on the impact of improved health literacy on patient communications and outcomes. It also appears that their approaches have been inconsistent [30] and ineffective [40]. Our results suggest that a targeted health literacy curriculum should be included in all health professional training programs, inclusive of nursing and allied health students. This would potentially benefit the students' ability to communicate with patients and to improve their health outcomes, as well as positively influencing the ability of the students to successfully look after their own health.

The lower health literacy skills of the nursing students in the current study concurs in part with evidence in the literature [33,41] and highlights that nursing professionals may have limited knowledge to support patients with low health literacy. This is clearly a problem which needs to be addressed, especially given that many nursing programs have not included health literacy in their curriculum [25]. At an individual level, it is of concern that the nurses' score for "4: Social support for health" was relatively low. This suggests that the nursing students who participated in the survey may not perceive themselves to be as socially connected as their peers in other health disciplines and may therefore feel comparatively isolated and unsupported if they experience health problems. This has the potential to negatively affect them both on a personal and professional level.

The HLQ scales with the lowest overall scores for all three student groups in the current study were "1: Feeling understood and supported by healthcare providers" (for HLQ Scales 1–5) and "7: Navigating the healthcare system" (for HLQ Scales 6–9). The reasons for these findings are unclear and may relate to the student respondents who had limited personal experience with healthcare services. For the nursing students, in particular, their relatively low scores for HLQ Scale 1, as well as the medium effect size difference between their scores and those of the medical students for "6: Ability to actively engage with healthcare providers" may reflect their sensitivities towards the historic doctor-nurse hierarchy, a perception that may have been strengthened by their experiences in the hospital setting during their training.

Relatively lower scores in "7: Navigating the healthcare system" and the small to moderate differences between the allied health and medical students, and the medical and nursing students, respectively, may also reflect their youth and, presumably, good health with little need to engage with the healthcare system. However, it is of concern if a substantial proportion of future health professionals are entering their professional lives with gaps in their understanding of how the healthcare system operates. Even if they have not engaged personally with the healthcare system, they should be able to assist their patients/clients in doing so. This is obviously an area which needs further attention. Potentially, one of the ways this issue could be addressed is by including clinical placement opportunities earlier in the health degree programs [42] and including community health placements as a component of these earlier placements [43–45]. Another possible solution would be to pair students with patient volunteers from diverse backgrounds, who have serious or chronic medical conditions, an approach used in the Family Centre Experience [46]. As part of this experience,

the student meets with the patient volunteer over a two year period to discuss the impact of their illness on their life, including their experiences with navigating the healthcare system. It is likely that this exposure to the patient lived-experience would positively affect the students' health literacy levels and their ability to navigate the healthcare system.

The limitations identified in "5: Appraisal of health information" for all of the student groups, as well as the small to medium effect size differences between the student groups for this HLQ scale, are not surprising given that this scale contains items with more difficult content [35]. Importantly, however, this finding supports evidence in the literature suggesting that health professionals often lack the confidence to search for and appraise health information [47–49]. This knowledge is important as it highlights the need to teach students studying to become health professionals the research skills required to locate and critically appraise the evidence, in order to become future evidence-based practitioners [50].

The higher scores for allied health students in "3: Actively managing my health" and their responses were skewed to the high end of the scale. This perhaps represents the strong personal or close association of dietetics students with people who are obese and/or living with eating disorders and exercise science students with personal fitness for their clients that attracts them to those courses [51].

According to the evidence, knowledge and training about health literacy is important for health professionals to better communicate with and improve the healthcare outcomes of their patients, especially those patients with low health literacy [25,33,52,53]. While the importance of incorporating health literacy in health professional curricula has received growing attention [25,29,54], there is limited evidence about the gaps in the health literacy knowledge amongst student groups. Our results suggest that different student groups have different health literacy profiles, indicating that a blanket approach to health literacy education may not be appropriate. In addition, our findings suggest that all health students, in particular nursing students, have gaps in their health literacy competencies. For instance, the small to medium differences between the student groups for "2: Having sufficient information to manage my health"; "8: Ability to find good health information"; and "9: Understanding health information well enough to find what to do", suggest that nursing and allied health students would benefit more than the medical students through having these health literacy domains taught within their programs. Furthermore, the medium and large differences between the allied health and medical students, and the allied health and nursing students, respectively, for "3: Actively managing my health", suggest that this is a current strength of the allied health program.

Addressing health literacy within the health curriculum for the different health professions will also help to reinforce the importance of providing appropriate information and resources to patients and clients which are easy to read and understand and, when necessary, to act upon [33,55]. Moreover, it will help to ensure that health professionals are better equipped to communicate with their patients and to involve them in the decision-making process [34], thereby supporting the notion of patient-centred care.

5. Study Limitations

It is acknowledged that medical students were overrepresented in this convenience sample, and that these findings represent the health literacy profiles of health students at varying stages of their degree programs at one university in Australia, and thus may have limited generalizability. Furthermore, it is possible that only the more enthusiastic and interested health students completed the survey. Those who completed the survey may have misrepresented their health literacy levels, which could have impacted the health literacy scores amongst the different student groups. There may also have been an underrepresentation of those from culturally and linguistically diverse backgrounds, including international students, as the tool was only available in English.

It should also be acknowledged that the HLQ scale scores may not be directly comparable because each scale was written to have a mix of items that are easy to answer. Consequently, some scales are harder to score high on (e.g., 5: Appraisal of health information) and some are easier to score high

on (e.g., 1: Feeling understood and supported by healthcare providers) [35]. Importantly, however, the use of the HLQ as a tool to measure the health literacy of the different student groups was found to be both feasible and practicable. The score for each individual scale also provided a detailed and action-orientated picture of the health literacy strengths and limitations amongst the different student groups.

6. Conclusions

This research showed that the health literacy profiles of students who are training to become health professionals differ. Health literacy training modules, tailored according to the needs of the different student groups, should therefore be included in health professional training programs. Furthermore, based on the premise that a high level of health literacy is required to assist health professionals to manage their own care, and the care of their patients, future research should explore whether improved health literacy amongst health professionals translates into improved self-care and patient outcomes.

Acknowledgments: We would like to acknowledge the health students who completed the HLQ survey and that Richard Osborne is funded through a National Health and Medical Research Council (NHMRC) Senior Research Fellowship #APP1059122.

Author Contributions: Each of the authors made substantial contributions to the analysis and interpretation of data. They have also been involved in drafting the manuscript and given final approval of the version to be published. Each author has participated sufficiently in the work to take public responsibility for appropriate portions of the content; and has agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work can be appropriately investigated and resolved.

Conflicts of Interest: The authors declare no conflicts of interest. Ethics approval to conduct the study was provided by the University of Wollongong Human Research Ethics Committee (HE14/012).

References

1. Speros, C. Health literacy: Concept analysis. *J. Adv. Nurs.* **2005**, *50*, 633–640. [[CrossRef](#)] [[PubMed](#)]
2. Ickes, M.J.; Cottrell, R. 2010 Health Literacy in College Students. *J. Am. Coll. Health* **2010**, *58*, 491–498. [[CrossRef](#)] [[PubMed](#)]
3. Sorensen, K.; Van den Broucke, S.; Fullam, J.; Doyle, G.; Pelikan, J.; Slonska, Z.; Brand, H. Consortium Health Literacy Project, European. Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health* **2012**, *12*, 80. [[CrossRef](#)] [[PubMed](#)]
4. World Health Organization. *Health Promotion Glossary*; World Health Organization: Geneva, Switzerland, 1998.
5. Australian Institute of Health and Welfare. *Australia's Health 2012*; AIHW: Bruce, Australia, 2012.
6. Kutner, M.; Greenberg, E.; Jin, Y.; Paulsen, C.; White, S. *The Health Literacy of America's Adults Results From the 2003 National*; Institute of Education Sciences and National Centre for Education Statistics: Washington, DC, USA, 2006.
7. Sørensen, K.; Pelikan, J.M.; Röthlin, F.; Ganahl, K.; Slonska, Z.; Doyle, G.; Fullam, J.; Kondilis, B.; Agraftiotis, D.; Ueters, E.; et al. Health literacy in Europe: Comparative results of the European health literacy survey (HLS-EU). *Eur. J. Public Health* **2015**, *25*, 1053–1058. [[CrossRef](#)] [[PubMed](#)]
8. Canadian Council on Learning. *Health Literacy in Canada; A Health Understanding 2008* (Ottawa 2008); Canadian Council on Learning: Ottawa, ON, Canada, 2008.
9. Nutbeam, D. Defining and measuring health literacy: What can we learn from literacy studies? *Int. J. Public Health* **2009**, *54*, 303–305. [[CrossRef](#)] [[PubMed](#)]
10. Dodson, S.; Good, S.; Osborne, R.H. *Health Literacy Toolkit for Low- and Middle-Income Countries: A Series of Information Sheets to Empower Communities and Strengthen Health Systems*; World Health Organisation, Regional Office for South-East Asia: Delhi, India, 2014.
11. Thai, A.L.; George, M. The Effects of Health Literacy on Asthma Self-management. *J. Asthma Allergy Educ.* **2010**, *1*, 50–55. [[CrossRef](#)]
12. Cho, Y.I.; Lee, S.Y.; Arozullah, A.M.; Crittenden, K.S. Effects of health literacy on health status and health service utilization amongst the elderly. *Soc. Sci. Med.* **2008**, *66*, 1809–1816. [[CrossRef](#)] [[PubMed](#)]

13. Baker, D.W.; Gazmararian, J.A.; Williams, M.V.; Scott, T.; Parker, R.M.; Green, D.; Ren, J.; Peel, J. Functional health literacy and the risk of hospital admission among Medicare managed care enrollees. *Am. J. Public Health* **2002**, *92*, 1278–1283. [[CrossRef](#)] [[PubMed](#)]
14. Berkman, N.; Sheridan, S.; Donahue, K.; Halpern, D.J.; Crotty, K. Low Health Literacy and Health Outcomes: An Updated Systemic Review. *Ann. Intern. Med.* **2011**, *155*, 97–107. [[CrossRef](#)] [[PubMed](#)]
15. Protheroe, J.; Whittle, R.; Bartlam, B.; Estacio, E.V.; Clark, L.; Kurth, J. Health literacy, associated lifestyle and demographic factors in adult population of an English city: A cross-sectional survey. *Health Expect.* **2017**, *20*, 112–119. [[CrossRef](#)] [[PubMed](#)]
16. Adams, R.J.; Piantadosi, C.; Ettridge, K.; Miller, C.; Wilson, C.; Tucker, G.; Hill, C.L. Health literacy: Functional health literacy mediates the relationship between socio-economic status, perceptions and lifestyle behaviors related to cancer risk in an Australian population. *Patient Educ. Couns.* **2013**, *91*, 206–212. [[CrossRef](#)] [[PubMed](#)]
17. Von Wagner, C.; Knight, K.; Steptoe, A.; Wardle, J. Functional health literacy and health-promoting behaviour in a national sample of British adults. *J. Epidemiol. Community Health* **2007**, *61*, 1086–1090. [[CrossRef](#)] [[PubMed](#)]
18. Rowlands, G.; Protheroe, J.; Winkley, J.; Richardson, M.; Seed, P.T.; Rudd, R. A mismatch between population health literacy and the complexity of health information: An observational study. *Br. J. Gener. Pract.* **2015**, *65*, e379–e386. [[CrossRef](#)] [[PubMed](#)]
19. Batterham, R.W.; Buchbinder, R.; Beauchamp, A.; Dodson, S.; Elsworth, G.R.; Osborne, R.H. The OPTimising HEalth LiterAcY (Ophelia) process: Study protocol for using health literacy profiling and community engagement to create and implement health reform. *BMC Public Health* **2014**, *14*, 694. [[CrossRef](#)] [[PubMed](#)]
20. Capecchi, L.; Lorini, C.; Baldasseroni, A.; Porchia, B.R.; Bonaccorsi, G. Health services and systems research. In *8th European Public health Conference 2015, Mico, Milan, Italy, 14–17 October 2015*; European Public Health Association: Utrecht, The Netherlands, 2015.
21. Rowlands, G.; Shaw, A.; Jaswal, S.; Smith, S.; Harpham, T. Health literacy and the social determinants of health: A qualitative model from adult learners. *Health Promot. Int.* **2015**, *32*, 130–138. [[CrossRef](#)] [[PubMed](#)]
22. Davis, T.C.; Wolf, M.S. Health Literacy: Implications for Family Medicine. *Fam. Med.* **2004**, *36*, 595–598. [[PubMed](#)]
23. Schwartzberg, J.; Cowett, A.; VanGeest, J.; Wolf, M.S. Communication techniques for patients with low health literacy: A survey of physicians, nurses, and pharmacists. *Am. J. Health Behav.* **2007**, *3*, S96–S104. [[CrossRef](#)]
24. Powell, C.K.; Kripalani, S. Brief Report: Resident recognition of low literacy as a risk factor in hospital readmission. *J. Gen. Intern. Med.* **2005**, *20*, 1042–1044. [[CrossRef](#)]
25. Coleman, C.A. Teaching health care professionals about health literacy: A review of the literature. *Nurs. Outlook* **2011**, *59*, 70–78. [[CrossRef](#)] [[PubMed](#)]
26. Bass, P.; Wilson, J.F.; Griffith, C.H.; Barnett, D.R. Residents' ability to identify patients with poor literacy skills. *Acad. Med.* **2002**, *77*, 1039–1041. [[CrossRef](#)] [[PubMed](#)]
27. Ali, N.K.; Ferguson, R.P.; Mitha, S.; Hanlon, A. Do medical trainees feel confident communicating with low health literacy patients? *J. Community Hosp. Int. Med. Perspect.* **2014**, *4*. [[CrossRef](#)] [[PubMed](#)]
28. Cormier, C.M.; Kotrlík, J.W. Health Literacy Knowledge and Experiences of Senior Baccalaureate Nursing Students. *J. Nurs. Educ.* **2009**, *48*, 237–248. [[PubMed](#)]
29. Coleman, C.A.; Hudson, S.; Maine, L.L. Health literacy practices and educational competencies for health professionals: A consensus study. *J. Health Commun.* **2013**, *18* (Suppl. 1), 82–102. [[CrossRef](#)] [[PubMed](#)]
30. Ali, N.K. Are we training residents to communicate with low health literacy patients? *J. Community Hosp. Intern. Med. Perspect.* **2013**, *2*. [[CrossRef](#)] [[PubMed](#)]
31. Paasche-Orlow, M.K.; Schillinger, D.; Greene, S.M.; Wagner, E.H. How health care systems can begin to address the challenge of limited literacy. *J. Gen. Intern. Med.* **2006**, *21*, 884–887. [[CrossRef](#)] [[PubMed](#)]
32. Hadden, K.B. Health literacy training for health professions students. *Patient Educ. Couns.* **2015**, *98*, 918–920. [[CrossRef](#)] [[PubMed](#)]
33. Johnson, A. Health literacy, does it make a difference. *Aust. J. Adv. Nurs.* **2014**, *31*, 39–45.
34. Australian Commission on Safety and Quality in Health Care. *Taking Action to Improve Safety and Quality*; Australian Commission on Safety and Quality in Health Care: Sydney, Australia, 2014.
35. Osborne, R.H.; Batterham, R.W.; Elsworth, G.R.; Hawkins, M.; Buchbinder, R. The grounded psychometric development and initial validation of the Health Literacy Questionnaire (HLQ). *BMC Public Health* **2013**, *13*, 658. [[CrossRef](#)] [[PubMed](#)]

36. Elsworth, G.R.; Beauchamp, A.; Osborne, R.H. Measuring health literacy in community agencies: A Bayesian study of the factor structure and measurement invariance of the health literacy questionnaire (HLQ). *BMC Health Ser. Res.* **2016**, *16*, 1–14. [[CrossRef](#)] [[PubMed](#)]
37. Beauchamp, A.; Buchbinder, R.; Dodson, S.; Batterham, R.W.; Elsworth, G.R.; McPhee, C.; Sparkes, L.; Hawkins, M.; Osborne, R.H. Distribution of health literacy strengths and weaknesses across socio-demographic groups: A cross-sectional survey using the Health Literacy Questionnaire (HLQ). *BMC Public Health* **2015**, *15*, 678. [[CrossRef](#)] [[PubMed](#)]
38. Harper, W.; Cook, S.; Makoul, G. Teaching Medical Students about Health Literacy: 2 Chicago Initiatives. *Am. J. Health Behav.* **2007**, *31*, S111–S114. [[CrossRef](#)] [[PubMed](#)]
39. Kripalani, S.; Jacobson, K.L.; Brown, S.; Manning, K.; Rask, K.J.; Jacobson, T.A. Development and implementation of a health literacy training program for medical residents. *Med. Educ. Online* **2006**, *11*, 1–8. [[CrossRef](#)] [[PubMed](#)]
40. Coleman, C.A.; Nguyen, N.T.; Garvin, R.; Sou, C.; Carney, P.A. Health Literacy Teaching in U.S. Family Medicine Residency Programs: A National Survey. *J. Health Commun.* **2016**, *21* (Suppl. 1), 51–57. [[CrossRef](#)] [[PubMed](#)]
41. Macabasco-O’Connell, A.; Fry-Bowers, E.K. Knowledge and perceptions of health literacy among nursing professionals. *J. Health Commun.* **2011**, *16* (Suppl. 3), 295–307. [[CrossRef](#)] [[PubMed](#)]
42. Karani, R.; Fromme, H.B.; Cayea, D.; Muller, D.; Schwartz, A.; Harris, I.B. How medical students learn from residents in the workplace: A qualitative study. *Acad. Med.* **2014**, *89*, 490–496. [[CrossRef](#)] [[PubMed](#)]
43. Dickson, C.A.W.; Morris, G.; Cable, C. Enhancing undergraduate community placements: A critical review of current literature. *Br. J. Community Nurs.* **2015**, *20*, 184–189. [[CrossRef](#)] [[PubMed](#)]
44. Koskinen, L.; Aijo, M. Development of an integrative practice placement model for students in health care. *Nurse Educ. Pract.* **2013**, *13*, 442–448. [[CrossRef](#)] [[PubMed](#)]
45. Turkeshi, E.; Michels, N.R.; Hendrickx, K.; Remmen, R. Impact of family medicine clerkships in undergraduate medical education: A systematic review. *BMJ Open* **2015**, *5*, e008265. [[CrossRef](#)] [[PubMed](#)]
46. Kumagai, A.K. The patient’s voice in medical education—The Family Centered Experience Program. *Am. Med. Assoc. J. Eth.* **2009**, *11*, 228–231.
47. Walker, B.F.; Stomski, N.J.; Hebert, J.J.; French, S.D. Evidence-based practice in chiropractic practice: A survey of chiropractors’ knowledge, skills, use of research literature and barriers to the use of research evidence. *Complement. Ther. Med.* **2014**, *22*, 286–295. [[CrossRef](#)] [[PubMed](#)]
48. Sadeghi-Bazargani, H.; Tabrizi, J.S.; Azami-Aghdash, S. Barriers to evidence-based medicine: A systematic review. *J. Eval. Clin. Pr.* **2014**, *20*, 793–802. [[CrossRef](#)] [[PubMed](#)]
49. Ebenezer, C. Nurses’ and midwives’ information behaviour: A review of literature from 1998 to 2014. *New Libr. World* **2015**, *116*, 155–172. [[CrossRef](#)]
50. Mullan, J.R.; Weston, K.M.; Rich, W.C.; McLennan, P.L. Investigating the impact of a research-based integrated curriculum on self-perceived research experiences of medical students in community placements: A pre- and post-test analysis of three student cohorts. *BMC Med. Educ.* **2014**, *14*, 161. [[CrossRef](#)] [[PubMed](#)]
51. Hughes, R.; Desbrow, B. Aspiring dietitians study: A pre-enrolment study of students motivations, awareness and expectations relating to careers in nutrition and dietetics. *Nutr. Diet.* **2005**, *62*, 106–109. [[CrossRef](#)]
52. Coleman, C.A.; Fromer, A.A. A health literacy training intervention for physicians and other health professionals. *Fam. Med.* **2015**, *47*, 388–392. [[PubMed](#)]
53. Toronto, C.E.; Weatherford, B. Registered Nurses’ Experiences With Individuals With Low Health Literacy: A Qualitative Descriptive Study. *J. Nurses Prof. Dev.* **2016**, *32*, 8–14. [[CrossRef](#)] [[PubMed](#)]
54. Mogford, E.; Gould, L.; DeVoght, A. Teaching critical health literacy in the US as a means to action on the social determinants of health. *Health Promot. Int.* **2011**, *26*, 4–13. [[CrossRef](#)] [[PubMed](#)]
55. Chen, A.M.; Noureldin, M.; Plake, K.S. Impact of a health literacy assignment on student pharmacist learning. *Res. Soc. Adm. Pharm.* **2013**, *9*, 531–541. [[CrossRef](#)] [[PubMed](#)]

