A radiation therapist’s guide to health literacy: A narrative review

Toni Kelly, BAppSci(MedRadTech) RT,1,2 Yolanda Surjan, BAppSci(MedRadTech), GCertHlthProm, MHLthSc(ED) PhD,1 Marianne Rinks, PhD, 2 & Helen Warren-Forward, BSc, PhD1

1School of Health Sciences, University of Newcastle, Australia
2Illawarra Shoalhaven Local Health District, Australia

Keywords
barriers, health literacy, patient-centred care, radiation therapist, screening

Abstract
Radiation therapist (RT) communication plays an essential part of patient-centred care in achieving better patient outcomes within radiation oncology. Patients present from a range of social circumstances, education levels and cultural backgrounds, all of which may significantly impact their level of health literacy (HL). Using literature sourced from databases such as EMCare Nursing & Allied Health Database, MEDLINE(R) and APA PsycInfo, this narrative review explores HL definitions, international comparison rates and indications of individual low HL. It also reviews HL assessments as well as exploring enablers and barriers to HL from the RT perspective. Strategies from both the individual or organisational perspective are provided for RTs to begin or continue their HL interest. By educating the radiation therapy profession about health literacy and making small changes in interpersonal interactions, there is the opportunity to impact patients’ experiences and outcomes significantly.

Introduction
Patient-centred care has, over the last two decades, become internationally recognised as imperative to high-quality health care.1 A customised approach for care considering unique patient needs, concerns and preferences may lead to more effective and productive health outcomes. The eight dimensions of patient-centred care encompass family and friends’ involvement, care coordination, respect for patients’ preferences, physical comfort, access to care, continuity and transition, emotional support, information, communication and education.2 Within the radiation therapy environment, the patient must understand their diagnosis and treatment to the best of their ability. For radiation therapists (RTs), the understanding and knowledge of health literacy (HL), as a mechanism to assist in this process, is necessary to deliver patient-centred care. This narrative review aims to offer insight into the definition, environment, screening tools, enablers and barriers of HL relevance for RTs and provide recommended strategies for improved patient outcomes.

Methods
Search Strategy
To identify relevant articles, the following electronic databases were searched: EMCare Nursing & Allied Health, MEDLINE (R) All including Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R) and APA PsycInfo. Combinations of the following search terms (keyword and MeSH) were used: ‘health literacy or health knowledge’, ‘attitudes’, ‘practice’, ‘strategy’, ‘barrier’, ‘communication barriers’, ‘barrier.mp.’, ‘radiation therapy.mp.’, ‘radiotherapy’, ‘patient education’, ‘patient outcome assessment’, ‘assessment.mp.’, ‘screen’. The search strategy had limits set for humans and the English language. Reference lists of all retrieved papers were manually searched to identify any articles not located by the electronic search.

Study selection
Information provided in the title, abstract and keywords was assessed to make a decision about the article’s
suitability for inclusion. Where there was insufficient information in the title and abstract to determine suitability for inclusion, the full paper was retrieved and reviewed.

Results
The results of the literature search were divided into six themes:

- Health literacy definitions
- Individual health literacy
- Health literacy environment
- Health literacy screening and assessment tools
- Enablers and barriers of health literacy
- Health literacy and the role of the radiation therapist

Health literacy definitions
In the 1990s, HL focussed on reading literacy and patient comprehension. It is now commonly separated into two components; individual HL and the HL environment.

Individual HL is defined as the skills, knowledge and capacity of an individual to understand, evaluate and follow health information or advice. Individuals with low HL may misunderstand information relating to disease and disease processes, treatment options and healthcare navigation, leading to poorer healthcare outcomes. Cancer patients with low HL may have trouble understanding bladder and bowel preparation instructions necessary for some radiotherapy treatments and the implications of non-compliance. Outcomes from non-compliance result in repeated bladder scanning and imaging before treatment, adding extra time to their appointment and extra radiation dose from unnecessary repeated imaging.

The HL environment is the infrastructure, policies, procedures and employees working within the health system. Each of these has the potential to impact how health-related information is understood and accessed by individuals. While these aspects of the HL environment could be categorised as organisational, researchers have further evolved the HL model to provide a health care professional (HCP) hierarchical definition and patient perspective model of HL (Table 1). Zarcadoolas et al. characterised a multi-dimensional HL model featuring four central domains; fundamental, science, civic and cultural HL. In comparison, Nutbeam expressed a hierarchy of HL, beginning with functional, moving to communicative, with the highest achievable HL being critical literacy skills. Jordan et al. identified HL from the patient perspective identifying seven HL abilities, whereas Edwards et al. developed a five-stage model demonstrating an HL trajectory. Guzys argues that public health literature places considerable importance on the concept of critical HL. However, the focus still sits on assessing the individual instead of evaluating HL at the societal level to provide better health outcomes.

Health literacy definitions within radiation oncology align with the Nutbeam model, acknowledging a hierarchy of HL. While relevant, when teaching HL theory and skills to RTs, Kelly et al. suggest a more organisational approach to HL where both the individual HL and HL environment are acknowledged.

Individual health literacy
HL is currently an internationally recognised issue with large international individual HL disparities. Table 2 provides examples of global variations of individual low HL. Australia’s low HL rate of approximately 60% according to the Adult and Life Skills Survey (ALLS) measured by the Australian Bureau of Statistics (ABS) in the 2006 census results in a large proportion of the population lacking an understanding of a modern healthcare system’s complex demands. In 2018, the ABS collected data through the National Health Survey, known as the Health Literacy Questionnaire (HLQ) where 44 items were classified into nine domains (Table 3). The Australian government recognises that outcomes from the HLQ and ALLS are different and cannot be compared directly. Similarly, care is needed when comparing Australian HL results with international low HL statistics due to differing methodologies and timeframe differentials. Therefore, The Netherlands reports high levels of HL with 25% of the population demonstrating an excellent level of HL and 1.8% indicating inadequate or low HL. Similarly, Ireland’s population recorded 21% demonstrating excellent HL and 10% with inadequate or low HL. International HL variation is difficult to quantify; however, Mantwill et al. suggest racial/ethnic disparities are acting as a proxy for predictors of health disparities. Australia maintains a high migrant population with 26.3% of people born overseas, many of which have English as a second language. The Netherlands has only 4.75% of foreign nationals in their population, and Ireland has 12.7%, both much lower rates than Australia.

The World Health Organisation recommends competencies that validate an individual to be classified as ‘health literate’ (Table 4). These competencies are categorised into four dimensions of health information processing: the ability to access, understand, process and apply all domains of health care, disease prevention and health promotion. Expectations that individuals demonstrate HL over such broad topic areas could
arguably be deemed as ambitious. For example, individuals employed in health, such as nurses diagnosed with cancer, do not necessarily have radiation therapy HL and therefore may not understand radiation therapy associated concepts and jargon.

Indicators of limited Individual Health Literacy

Patients may use a variety of methods in an attempt to hide their low HL. Montgomery\textsuperscript{28} and Quinn et al.\textsuperscript{11} propose examples of concealment that include incomplete form filling, inability to explain the purpose of treatment,
missed appointments and demonstrating avoiding body language when asked to read something. Smith et al. suggest that verbal cues including general language ability, absence of questions, issues with comprehension and limited responses to questions also indicate low HL. Non-verbal cues that may alert RTs of a low HL status can include negative facial expressions, inability to self-care and inability to tolerate new information. Proxies for HL difficulties such as socio-demographic features, residing in a remote location, lower socio-demographics, level of education, ethnicity, non-English speaking background (NESB) or English as a second language (ESL) and current level of employment can also alert to lower HL. Quinn et al. add that the use of illegal drugs, alcohol overuse and older age may also impact HL status.

Health literacy environment

Approaches to organisational HL require a solid and committed leadership approach, with managers modelling what HL should look like within their organisation. It is essential to empower all individuals within the organisation to play their role. Significant pre-planning and upskilling of HCPs with knowledge of HL and a commitment to improving all aspects of HL within the organisation are essential. Empowering RTs to begin or continue the conversation around organisational HL within their facility using published resources may improve the patient experience. To enhance organisational HL, the United States Institute of Medicine has published ten attributes that define a health literate organisation (Table 5). To embed such features, it is essential to generate stakeholder ownership. Periodic collaboration, including monthly meetings with stakeholders and communication of meeting action items to all staff, will also improve HL.

Health literacy screening and assessment tools

HL screening involves the assessment of an individual’s level of HL. Comparisons of various tools in a range of settings help inform efficiency and efficacy when performing HL assessments. As noted by Moore, tests or screening tools are distributed into four main classifications: word recognition tests, reading comprehension tests, functional HL tests and more informal methods. The focus within this narrative will be on functional and informal HL testing.

Functional HL

Functional HL is the ability to demonstrate comprehension and act upon health information. The Test of Functional Health Literacy in Adults aims to measure patient comprehension by interpreting information on a prescription label categorising results as inadequate, marginal or adequate. Another HL assessment tool, the Newest Vital Sign, assesses HL using a nutrition label and individuals’ ability to answer six questions within three minutes. The Cancer Message Literacy Test-reading (CMLT-r) and CMLT-listening help measure comprehension of written and spoken cancer prevention and screening information, respectively. While these tests have a place to determine a patient’s HL level, there is a reluctance to use any official testing in radiation oncology. Williams et al. state that ‘radiation oncology departments are not suitable to sit literacy tests as patients are dealing with a cancer diagnosis, and alternative informal methods for identifying HL in this setting are required’. pp. S12.

Informal tests

Informal tests involve observing patient behaviours, including not completing forms or requesting help completing forms where the reason is they have forgotten spectacles. Examples within radiotherapy include patients with low HL missing scheduled treatments as they may not fully comprehend the treatment requirements and patients not adhering to recommended skincare guidelines due to a lack of understanding, such as wearing makeup in the treatment region.

Emotions surrounding HL screening

Shame, anxiety and embarrassment are concealed emotions associated with low HL. The burden of low...
HL can stigmatise patients, contributing to feeling fearful. Parikh et al. reported from their study in Atlanta, Georgia, that 39.7% of 202 patients identified as having low functional HL also admitted feelings of shame. Parikh suggests HCPs should be informed of the problems of low HL within their particular setting, including those identified through clinic registration processes (such as providing demographic details), understanding of verbal information and written materials and be acutely aware of the possibility of shame and embarrassment this group of patients may have.

Farrell et al.40 using qualitative semi-structured interviews from an eleven patient study within a primary care setting, in the United States, report phrases such as ‘how often’ and the word ‘help’ were acknowledged as potentially embarrassing. Screening was preferred in a private room, where 73% of participants felt the patient was responsible to initiate a discussion about HL.40

Jordan et al.7 suggest that most HL assessments are performed as the HCP evaluates the patient; however, there should be a consideration from the patient perspective. Using Patient-Reported Outcomes (PROs) to ask patients about their abilities, identifying specific patient needs and customising information based on answers would fit a patient-centred care approach more closely.7 PROs can reduce patient shame and embarrassment often associated with HL testing.99 Conversely, HCP’s education around low HL should be sensitive to patient’s needs, reducing the stigma associated with low HL. Within the radiotherapy setting, Quinn et al.11 interviewed 16 RTs across Ireland and reported most RTs felt there was no shame associated with low HL within radiation therapy patients generally; however, documenting in the patient notes could induce some level of embarrassment.11 If it is determined the patient is part of the 'hidden population' with low HL, RTs must constantly, but discreetly, check the patient understanding without inciting shame or embarrassment.11

Enablers and barriers of health literacy
Edwards et al. suggest the ‘communication styles of HCPs either facilitate information exchange and enable empowerment or sometimes act as a barrier to information exchange and disempower patients’.8 Paradoxically, the HCP becomes the hinge point based on the assessment of the patient’s level of HL; if accurate, they will provide information at a rate the patient can understand by checking in during the information giving process. If overestimated, they may further confuse the patient. HCP’s must know this critical point for awareness, understanding and ability to act in the provision of patient-centred care.

Enablers
Edwards et al.8 affirm several points to enhance the patient experience, including personal motivation, emotion management and involving family within consultations. Patients who can seek information on the Internet may understand their diagnosis from an emotional perspective, reducing anxiety.8 Involving family to act as HL interpreters provides a support mechanism for patients.8 Hughson et al.41 suggest utilising technology to improve the patient experience, including adopting smartphone applications to reduce the HL gap and hospital developed resources (with the patient and carer access) can contribute to positive HL patient experiences.41

Barriers
Barriers to HL are categorised into patient barriers, HCP barriers and organisational barriers.
Table 5. The ten attributes of health literate organisations.

| Dimensions of a Health Literate Organisation |
|---------------------------------------------|
| 1. Has leadership that makes health literacy integral to its mission, structure and operations. |
| 2. Integrates health literacy into planning, evaluation measures, patient safety and quality improvement. |
| 3. Prepares the workforce to be health literate and monitors progress. |
| 4. Includes populations served in the design, implementation and evaluation of health information and services. |
| 5. Meets the needs of populations with a range of health literacy skills while avoiding stigmatisation. |
| 6. Uses health literacy strategies in interpersonal communications and confirms understanding at all points of contact. |
| 7. Provides easy access to health information and services and navigation assistance. |
| 8. Designs and distributes print, audio-visual and social media content that is easy to understand and act on. |
| 9. Addresses health literacy in high-risk situations, including care transitions and communications about medicines. |
| 10. Communicates clearly what health plans cover and what individuals will have to pay for services. |

Reproduced with permission from: Brach C et al.30

Patient barriers

Edwards et al.8 propose patient barriers may include decreased motivation, rejection of diagnosis, general attitudes towards one’s health and reduced help-seeking behaviour. Emotional barriers (shock, fear and anxiety) can prevent connecting with information provided, and within a cancer setting, this is not unusual. Unpleasant memories from a family or friend receiving a similar diagnosis can surface providing a barrier to future information processing. Finally, the embarrassment of the diagnosis can surface providing a barrier to future memories from a family or friend receiving a similar diagnosis. Checking for patient understanding using the teach-back method of asking the patient to repeat in their own words what they need to understand or do can be an issue for some HCPs.

Organisational barriers

Farmanova et al.49 identify pitfalls commonly made at an organisational level when implementing an HL strategy. Knowing these barriers ahead of organisational HL strategy implementation may help prepare effective organisational change within any facility, including radiotherapy departments. The pitfalls are divided into three categories; organisational and leadership, design and planning improvement interventions and human resources. Drawbacks within the first category include prioritisation of health activities and none or minimal buy-in from the leadership team. The design and
improvement category’s challenges include no change champions, a deficiency of policies and procedures supporting HL practice, and a lack of time and resources. The final category cites unclear staff roles, inadequate training and unawareness of HL.

**Health literacy and the role of the radiation therapist**

Low HL is generally associated with poor outcomes for at-risk patients. Low HL can be crucial within radiation therapy where an increased risk of patient morbidity may arise due to poor adherence to treatment regimens as a result of reduced understanding. When overwhelmed by anxiety or worry, it may prove inevitable that individuals may be at risk of low HL, particularly when hearing new or distressing information. Effective HCP communication has the power to diminish worry or anxiety, and this can assist with improving outcomes during a difficult time. Therefore, RTs need to provide clear, concise education to patients about their treatment across a range of common issues, such as side effects, skincare and nutrition.

RT awareness of HL and low HL is still a significant issue. Communication skills training inclusive of HL statistics, strategies and practice is paramount to reduce the gap of patients misunderstanding of their treatment.

**Effective health literacy strategies for radiation therapists**

Smith et al. present strategies to be used by RTs to manage and respond to patients of different HL statuses, to deliver adequate/ clear information and reduce patient anxiety (Table 6). These strategies are categorised into three activities; timing of information, tailoring information to match the HL level and enhancing understanding. This table does come with a caveat that RTs must have a perspective of the patient’s HL level prior to enacting these strategies. Strategies are then categorised into the RTs perceived levels of the patient HL to promote the most efficient interaction.

Williams et al. offer communication strategies specifically for RTs when managing low HL patients, beginning with speaking in plain English. It is essential to ensure contextual radiation therapy jargon is translated into language a 12- to 14-year-old could understand. Kelly et al. suggest some options; ‘erythema’ can be explained as a reddening of the skin, ‘toxicities’ can be described as side effects that make you sick and ‘bolus’ is material added to the skin to trick the radiation into depositing the dose closer to the skin surface. A worthwhile exercise is an RT group...
session to arrive at more straightforward explanations for more commonly used jargon that may require additional explanation to patients.

The teach-back method to check for understanding for information patients need to remember or retain is also suggested.4 Two examples of phrasing include ‘so I can be sure I have explained your first treatment session information clearly, could you please tell me what you need to remember?’ and ‘before you go, I want you now to tell me what are the main instructions to prepare your bladder for treatment each day, so I can be sure I have explained them correctly?’ Reproduced with permission from: Smith SK et al. 12

### Conclusion

This article has explored HL from an RT perspective to assist with understanding the impact of low HL within the profession. Knowledge of low HL international statistics and HL barrier awareness is the beginning to improving patient outcomes. Identifying patient indicators of low HL and implementing known HL techniques are small manageable daily changes to promote patient-centred care. From an organisation viewpoint, evaluation and assessment of current HL policy need to be identified by managers and HL champions motivated to drive and create practice change. Changes, when executed well, endeavour to improve the entire patient experience.

### Acknowledgement

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

### Conflict of Interest

The author declares no conflict of interest.

### References

1. Australian Commission on Safety and Quality in Health Care. Patient Centred Care: IMPROVING Quality and Safety Through Partnerships with Patients and Consumers. ACSQHC, Sydney, 2011.
2. Gerteis M, Edgman-Levitan S, Daley J, Delbanco T. Through the Patient’s Eyes: Understanding and Promoting Patient-centered Care, 1st edn. Jossey-Bass, San Francisco, 1993.

---

**Table 6. Continued.**

| Activity                      | Strategies used by radiation therapists                                                                 |
|-------------------------------|--------------------------------------------------------------------------------------------------------|
|                               | **Patient perceived to have higher health literacy**                                                  |
|                               | - Provide information about the technical aspects of radiotherapy                                     |
|                               | - Addressing ‘why’ rather than ‘what’ questions                                                       |
|                               | - Greater use of medical terminology/concepts, but avoided using highly specialised technical terms.  |
|                               | - Talking to them ‘at their level’ and ‘not talking down’                                             |
|                               | **Enhancing understanding**                                                                           |
|                               | - Repetition and asking the person to repeat back to the radiation therapist what they have understood |
|                               | - Encouraging question asking                                                                        |
|                               | - Reminders and prompts regarding scheduled appointments, medication and self-care.                  |
|                               | - Check up on information processing throughout treatment and reinforcing the essential aspects       |
|                               | - Inviting family members or support person with higher literacy to attend the consultation to help  |
|                               |   reinforce information to the patient                                                               |
|                               | - Going through written information with the patient and checking understanding                      |

Reproduced with permission from: Smith SK et al. 12
3. Speros C. Health literacy: concept analysis. *J Adv Nurs* 2005; 50: 633–40.
4. Australian Commission on Safety and Quality in Health Care. Health literacy: Taking Action to improve safety and quality. Sydney, 2014.
5. Zarcadoolas C, Pleasant A, Greer DS. Understanding health literacy: an expanded model. *Health Promot Int* 2005; 20: 195–203.
6. Nutbeam D. The evolving concept of health literacy. *Soc Sci Med* 2008; 67: 2072–8.
7. Jordan JE, Buchbinder R, Osborne RH. Conceptualising health literacy from the patient perspective. *Patient Educ Couns* 2010; 79: 36–42.
8. Edwards M, Wood F, Davies M, Edwards A. The development of health literacy in patients with a long-term health condition: the health literacy pathway model. *BMC Public Health* 2012; 12: 130.
9. Guzys D, Kenny A, Dickson-Swift V, Threlkeld G. A critical review of population health literacy assessment. *BMC Public Health* 2015; 15: 215.
10. Smith SK, Petrak LM, Dhillon HM, Taylor J, Milross CG. Are radiation oncologists aware of health literacy among people with cancer treated with radiotherapy? *Eur J Cancer Care (Engl).* 2014; 23: 111–20.
11. Quinn F, Smith SK, Dhillon HM, Gillham C, Craig A. What do radiation therapists know about health literacy and the strategies to improve it for patients? A qualitative study. *Support Care Cancer* 2019; 27: 649–57.
12. Smith SK, Zhu Y, Dhillon HM, et al. Supporting patients with low health literacy: what role do radiation therapists play? *Support Care. Cancer* 2013; 21: 3051–61.
13. Nutbeam D. Building health literacy in Australia. *Med J Aust* 2009; 191: 525–6.
14. Kelly T, Arnold B, Surjan Y, Rinks M, Warren-Forward H. Radiation therapist health literacy training: A qualitative study exploring perceived barriers and attitudes. *Radiography* 2020; 26: 294–301.
15. Kelly T, Arnold B, Surjan Y, Rinks M, Warren-Forward H. Radiation therapist health literacy training: Does learning alternate communication methods translate into improved confidence in patient interactions? *Radiography* 2020; 26: 220–6.
16. Paasche-Orlaw MK, McCaffery K, Wolf MS. Bridging the international divide for health literacy research. *Patient Educ Couns* 2009; 75: 293–4.
17. Australian Bureau of Statistics. National Health Survey: Health Literacy Survey 2019 [10/5/21]. Available from: https://www.abs.gov.au/statistics/health/health-conditions-and-risks/national-health-survey-health-literacy/latest-release#data-download
18. Coelho R. Perceptions and knowledge of health literacy among healthcare providers in a community based cancer centre. *J Med Imaging Radiat Sci* 2018; 49: S11–S12.
19. Sorensen K, Pelikan J, Röthlin F, et al. Health literacy in Europe: Comparative results of the European health literacy survey (HLS-EU). *Eur J Pub Health* 2015; 25: 1053–8.
20. Levin-Zamir D, Baron-Epel OB, Cohen V, Elhayany A. The Association of Health Literacy with Health Behavior, Socioeconomic Indicators, and Self-Assessed Health From a National Adult Survey in Israel. *J Health Commun.* 2016; 21(sup2): 61–8.
21. Nakayama K, Osaka W, Togari T, et al. Comprehensive health literacy in Japan is lower than in Europe: a validated Japanese-language assessment of health literacy. *BMC Public Health* 2015; 15.
22. Paiva D, Silva S, Severo M, Moura-Ferreira P, Lunet N, Azevedo A. Limited health literacy in Portugal assessed with the newest vital sign. *Acta Med Port* 2017; 30: 861–9.
23. Public Health England DoH. Local action on health inequalities. Improving health literacy to reduce health inequalities. 2015.
24. Ersanilli E. Focus Migration Country Profile: Netherlands. Germany: Institute for Migration Research and Intercultural Studies (IMIS) of the University of Osnabrück; 2014.
25. Central Statistics Office Ireland. Population and Migration Statistics Ireland: Central Statistics Office Ireland; 2019 Available from: https://www.cso.ie/en/releasesandpublications/er/pme/populationandmigrationestimatesapril2019/
26. Mantwill S, Monestel-Umaña S, Schulz PJ. The Relationship between Health Literacy and Health Disparities: A Systematic Review. *PLoS One* 2015; 10: e0145455.
27. Simon-Davies J, McGann C. Top 10 countries of birth for the overseas-born population since 1901. In: Statistics and Mapping section, editor. Australian Parliamentary Library 2018.
28. Montgomery L. Supporting radiation therapy patients with limited health literacy. *J Med Imaging Radiat Sci* 2015; 46: 102–7.
29. Ennis K, Hawthorne K, Frownfelter D. How physical therapists can strategically effect health outcomes for older adults with limited health literacy. *J Geriatr Phys Ther* 2012; 35: 148–54.
30. Brach C, Keller D, Hernandez L, Baur C, Parker Ruth, Dreyer Benard, Schyve Paul, Lemerie Andrew J, Schillinger Dean. Ten Attributes of Health Literate Health Care Organisations. Institute of Medicine, Washington DC, 2012.
31. Jenkins WD, Zahnd WE, Spenner A, et al. Comparison of cancer-specific and general health literacy assessments in an educated population: Correlations and modifying Factors. *J Cancer Edu* 2016; 31: 268–71.
32. Haun J, Luther S, Dodd V, Donaldson P. Measurement variation across health literacy assessments: implications
for assessment selection in research and practice. *J Health Comm* 2012; 17(Suppl 3): 141–59.

33. Welvers A, Rosenberger KD, Corbridge SJ. Health literacy assessment of detained individuals and correctional officers within a large urban jail: Optimizing health education. *J Nurs Care Qual* 2020; 36: 84–90.

34. Assessing MV, Literacy H. Assessing health literacy.

35. Parker RM, Baker DW, Williams MV, Nurss JR. The test of functional health literacy in adults: a new instrument for measuring patients’ literacy skills. *J Gen Intern Med* 1995; 10: 537–41.

36. Weiss BD, Mays MZ, Martz W, et al. Quick assessment of literacy in primary care: the newest vital sign. *Ann Fam Med* 2005; 3: 514–22.

37. Mazor KM, Roblin DW, Williams AE, et al. Health literacy and cancer prevention: two new instruments to assess comprehension. *Patient Educ Couns* 2012; 88: 54–60.

38. Williams R, Moeller L, Willis S. Barriers and enablers to improved access to health information for patients with low health literacy in the radiotherapy department. *Radiography* 2018; 24(Supplement 1): 11–5.

39. Parikh NS, Parker RM, Nurss JR, et al. Shame and health literacy: the unspoken connection. *Patient Educ Couns* 1996; 27: 33–9.

40. Farrell TW, Chandran R, Gramling R. Understanding the role of shame in the clinical assessment of health literacy. *Fam Med* 2008; 40: 235–6.

41. Hughson JA, Marshall F, Daly JO, Woodward-Kron R, Hajek J, Story D. Health professionals’ views on health literacy issues for culturally and linguistically diverse women in maternity care: barriers, enablers and the need for an integrated approach. *Aust Health Rev* 2018; 42: 10–20.

42. Dale RG, Hendry JH, Jones B, Robertson AG, Deenan C, Sinclair JA. Practical methods for compensating for missed treatment days in radiotherapy, with particular reference to head and neck schedules. *Clin Oncol (R Coll Radiol)* 2002; 14: 382–93.

43. Lambert M, Luke J, Downey B, et al. Health literacy: health professionals’ understandings and their perceptions of barriers that Indigenous patients encounter. *BMC Health Serv Res*, 14: 614.

44. Thompson SC, Cheetham S, Baxi S. The enablers, barriers and preferences of accessing radiation therapy facilities in the rural developed world – a systematic review. *BMC Cancer* 2017; 17: 794.

45. Chan S, Spina SP, Zuk DM, Dahi K. Hospital pharmacists understanding of available health literacy assessment tools and their perceived barriers for incorporation in patient education – a survey study. *BMC Health Serv Res* 2020; 20(1): 401.

46. Jager AJ, Wynia MK. Who gets a teach-back? Patient-reported incidence of experiencing a teach-back. *J Health Commun*. 2012; 17(Suppl 3): 294–302.

47. Nantsupawat A, Wichaikhum O, Abhicharttibutra K, Kunaviktikul W, Nurumal M, Poghosyan L. Nurses’ knowledge of health literacy, communication techniques, and barriers to the implementation of health literacy programs: A cross-sectional study. *Nursing & health sciences*. 2020; 22: 577–85.

48. Samuels-Kalow M, Hardy E, Rhodes K, Mollen C. "Like a dialogue": Teach-back in the emergency department. *Patient Educ Couns* 2016; 99: 549–54.

49. Farmanova E, Bonneville L, Bouchard L. Organizational health literacy: review of theories, frameworks, guides, and implementation issues. *Inquiry-J Health Car* 2018; 55. https://doi.org/10.1177/0046958018757848

50. Amalraj SMD, Starkweather CMPH, Nguyen CBS, Naeim AMDP. Health literacy, communication, and treatment decision-making in older cancer patients. *Oncology* 2009; 23: 369–75.

51. Koay K, Schofield P, Jefford M. Importance of health literacy in oncology. *Asia Pac J Clin Oncol* 2012; 8: 14–23.

52. Royal College of Physicians and Surgeons of Glasgow. Health Literacy and Communication Techniques 2019 Available from: https://rcpsg.ac.uk/college/this-is-what-we-stand-for/policy/consent/health-literacy-and-communication-techniques.

53. Silverman J, Kurtz S, Draper J. Skills for communicating with patients, 2nd edn. Radcliffe Publishing LTD, Oxon UK, 2005.

54. National Health Service UK. The Health Literacy Place: The Knowledge Network; 2020 [cited 2020 20th December]. Available from: http://www.healthliteracyplace.org.uk/.