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Australian elective surgery patients' pre-operative preparation, health literacy, learning preferences and knowledge resource needs: A cross-sectional survey

Abstract

Aim: To investigate self-reported health literacy levels, learning preferences and knowledge resource needs of Australian elective surgery patients.

Background: Surgery contributes significantly to global health care, but surgical waitlists, cancellations and delay remain major challenges for health care systems. Pre-operative preparation and patient education about the surgical journey are essential to reducing these disruptions. Unfortunately, preparation and education are limited by short timeframes and one-size-fits-all approaches. Limited information exists about Australian surgical patients' health literacy levels, learning preferences and knowledge resource needs.

Design and methods: This cross-sectional waiting room survey investigated patient health literacy, preferred education mode and learning styles among elective surgery patients. Data were collected from patients using existing validated questionnaires and open-text questions. Quantitative data were analysed descriptively, and qualitative data were themed using an iterative open-coding approach. The study is reported using the EQUATOR (Enhancing the QUAlity and Transparency Of health Research) guidelines.

Results: The study had 100 participants, 68 living in metropolitan areas, 93 having access to a smartphone and 62 possessing adequate health literacy levels. The top surgical challenge was understanding preparation and recovery instructions. Most participants were visual learners preferring face-to-face, digital formats, booklets or leaflets to receive educational information. Half of the participants sought additional surgical preparation information; of those, 60 per cent used the internet.

Conclusion: This study found that many Australian surgical patients have limited health literacy, prefer visual learning and seek information outside of hospital resources. These findings suggest that clinicians should engage with patients to tailor education, provide different forms of learning materials and explore digital formats for education.

Patient or public contribution: This study was designed using insights from a patient representative during intervention development.

Keywords: surgery, patient education, health literacy, pre-operative, preparation, learning styles, elective

Introduction

Surgery is a vital aspect of health care that contributes to 30 per cent of the overall global burden of disease[1]. However, despite the increasing demand for surgery, health care services continue to face challenges when developing systems that effectively manage surgical waitlists, streamline operational activity and minimise patient cancellations and delays. Consequently, patients suffer from poor health outcomes, while the health care system incurs significant financial loss due to poor operational efficiency.

The surgical journey is complex, requiring patients to navigate care through various health care teams and locations. Robust systems are needed to ensure patients are adequately educated regarding their surgical procedure and to understand the intricacies of the stages of the surgical journey, from waiting list to at-home recovery. While a wealth of literature is available that discusses the importance and complexities of patient education, more information is needed to investigate the health literacy levels, learning preferences and knowledge resource needs of Australian surgical patients.

Background

Patient education plays a crucial role in improving the outcomes of surgery for patients. Defined as planned educational methods that aim to empower patients to manage their disease effectively, patient education provides patients with the knowledge, skills and self-awareness needed to engage in self-management, modify their lifestyle behaviours and participate in decision-making[2–4].

The perioperative journey comprises three phases – pre-operative, intra-operative and post-operative. Education during the pre-operative phase, the time before surgery, offers an opportunity to optimise patients' physical, psychological and social health before surgery, which can lead to better surgical outcomes. This period offers a unique opportunity for prehabilitation, which includes health optimisation interventions aimed at reducing the length of hospital stay, decreasing surgery-related morbidity and expediting the return to normal function[5,6].

The significance of pre-operative preparation in reducing surgical delays and cancellations cannot be overemphasised. The consequences of surgical cancellations and delays can be severe, both for patients and hospitals. Patients may suffer physical and mental health consequences, while hospitals may experience financial loss and reduced operating room efficiency[7]. Surgical cancellations are a global problem, with cancellation rates reported as between two and 40 per cent in developed countries, and as high as 73 per cent in low-to-middle income countries[7]. Inadequate pre-operative education and preparation can result in surgery being cancelled or delayed in several ways – patients may not adhere to fasting instructions or may fail to stop anticoagulation medications, patients may also arrive late to surgery or fail to notify the hospital of their inability to attend. According to Dimitriadis, Iyer and Evgeniou[8], these issues are some of the leading causes of avoidable surgical cancellations and delays.

The effectiveness of pre-operative education can be affected by time restraints and patient factors. The limited time frame for traditional pre-operative patient preparation has been identified as a major obstacle to effective education interventions, as a clinicians' ability to provide individualised, patient-centred education becomes limited[8,9]. According to Dimitriadis et al.[8], poor communication and patients' inability to understand or recall information are factors that contribute to non-compliance with pre-operative instructions. This is consistent with other studies reporting that pre-operative assessment and education occur on or soon before the day of surgery when a patient is apprehensive and incapable of fully comprehending information[10,11]. To be effective, patient pre-operative education must take into account patients' health literacy levels, learning-style preferences and perioperative knowledge resource needs.

Patient education is not a one-size-fits-all concept and must be developed to meet the individual needs of patients. Educational materials are often provided to patients with the assumption that they have the same level of knowledge and understanding as health care staff, but this is rarely the case[12].

Patient education should take into account patients' level of health literacy. Health literacy is a term referring to the extent that a patient is able to understand and make decisions based on health information[13]. In addition, written educational materials should be written for an appropriate reading level to ensure that patients can comprehend the content[14].

Furthermore, while resource content is important, a patients' learning style must also be taken into consideration, as patients will have an affinity with either a visual, auditory or kinesthetic learning style, or a combination of these styles.

In recent years, computerised forms of patient education have been increasingly recognised for their potential to improve health care

outcomes. In 2016, van der Meij et al.[15] reported that computerised patient education has positive effects on patient physical and psychosocial function, pain and satisfaction with care. Additionally, e-health solutions have been found to be effective in improving patient engagement in self-managed care, as well as enabling care to be tailored to a preferred method, providing timely and validated clinical information and incorporating patient-reported outcomes in clinical practice[16]. Furthermore, the benefits of e-health interventions extend beyond patient education, with numerous positive outcomes reported in the areas of medication adherence, diabetes management, smoking cessation and lung function[17–20].

There is currently limited published data specifically relating to the needs of Australian patients regarding pre-operative education. This study aims to investigate the self-reported health literacy levels, learning preferences and knowledge resource needs of patients undergoing elective surgery at an Australian metropolitan tertiary hospital. This study intends to identify the deficits and opportunities of the current pre-operative education processes to improve the provision of surgical education and patient health outcomes.

Methods

Design

The study used a descriptive, cross-sectional waiting room survey study design. The study was conducted and is being reported against the EQUATOR (Enhancing the QUAlity and Transparency Of health Research) reporting guidelines, 'STROCSS2021: Strengthening the reporting of cohort, cross-sectional and case-control studies in surgery'[21].

Setting and sample

The study took place in the surgical day care unit (SDCU) department of a large, Australian, tertiary, referral hospital that provides comprehensive elective and emergency surgical services to metropolitan and rural regions state-wide. The hospital performs more than 26 000 operations annually in general surgery and surgical specialities including vascular, orthopaedic, maxillo-facial, ophthalmology, thoracic, urology, burns, plastics and reconstructive, neurosurgery, gynaecology and obstetrics, and ear, nose and throat.

Recruitment and data collection were completed between April 2022 and June 2022. Participants were patients aged 18 years and over, undergoing elective surgery on the same day as their admission and able to complete the survey in English. Patients who were unable to complete the survey in English or did not have any support to assist were excluded from the study. Recruitment was undertaken in SDCU by the research team investigators and SDCU registered nurses that were orientated to the study.

Data collection

Data were collected continuously over a three-month period using convenience sampling, until the desired sample size was captured. A sample of 100 patients was selected, which provides a point precision of +/- 10 per cent[22]. Participants were provided with an electronic device that contained the survey tool or a paper-based version of the survey depending on the participant's preference. Participants were assisted by relatives, SDCU staff or the investigators if required.

Instrument

A survey instrument was designed to investigate self-reported patient health literacy, preferred methods of receiving educational information and an assessment of learning styles. The survey was based on two existing validated questionnaires – the Brief Health Literacy Screening (BHLS) tool[23,24] and the Learning Channel Preference Checklist (LCPC)[25,26].

The BHLS was used to measure health literacy. The BHLS is a validated tool comprising four questions that ask individuals to read and interpret common medical terms and concepts. The tool aims to promptly evaluate an individual's level of health literacy[23,24].

An abridged version of the LCPC, a learning style questionnaire, evaluated preferences for education methods[25–27]. The abridged learning style questionnaire consists of a scoring system in which responses to questions were tallied and categorised by learning style (visual, kinesthetic and auditory). The category with the highest score indicated an informal assessment of the participant's preferred approach to learning and receiving information.

The survey also included questions about participant smartphone use and perspectives on preparation for surgery, and optional open-text sections for participants to provide additional feedback and free-text comments. Open-ended questions were used to investigate preparation for surgery and difficulties encountered in relation to surgery because they allowed participants to document opinion and experiences in their own words, as opposed to selecting responses from a predefined list of options.

Table 1: Participant demographics and clinical characteristics

Variable		Number of participants (N=100)
Gender	female	52 (52%)
	male	44 (44%)
	prefer not to answer	4 (4%)
Age in years (missing = 1)	18–24	14 (14%)
	25–34	11 (11%)
	35–44	16 (16%)
	45–54	18 (18%)
	55–64	24 (24%)
	65 and over	16 (16%)
Ethnicity	Aus/NZ/A&TSI only	79 (79%)
	Aus/NZ/A&TSI plus other	8 (8%)
	other	13 (13%)
Location	metropolitan	68 (68%)
	regional	28 (28%)
	rural/remote	4 (4%)
Language	English only	91 (91%)
	English/bilingual	9 (9%)
Previous surgery	no	41 (41%)
	yes	59 (59%)
Previous surgery at the same hospital	no	21 (21%)
	yes	32 (32%)
	missing / not applicable	47 (47%)
Access to a smartphone	no	7 (7%)
	yes	93 (93%)
Confidence with smartphone apps (n=93)	very unconfident	4 (4%)
	not confident	5 (5%)
	somewhat confident	20 (22%)
	confident	23 (25%)
	very confident	41 (44%)

Aus = Australian, NZ = New Zealander, A&TSI = Aboriginal and Torres Strait Islander

Analysis

Participants' responses were provided using a mostly quantitative multimodal approach. Responses to the health literacy questions were provided using a 5-point Likert-type scale, with the total scores ranging between 4 and 20. Scores were categorised into three health literacy levels – limited (4–12), marginal (13–16) and adequate (17–20). Limited health literacy indicates patients are not able to read most low literacy health materials, need repeated oral instructions and should be provided with material composed of illustrations or video tapes. Marginal health literacy indicates patients may struggle with patient education materials and need assistance. Adequate health literacy indicates patients are able to read and comprehend most patient education materials.

Responses to the learning style questions were categorised by learning style, either visual, auditory or kinesthetic, and a score for each style was tallied. The learning style with the highest score indicated an informal assessment of the participant's preferred approach to learning and receiving information.

Participant access to a smartphone device was evaluated on a 5-point Likert-type scale. Patient's perspective of their surgery preparation and challenges encountered were assessed using a combination of 5-point Likert-type scale, categorical, dichotomous and free text options.

Completed questionnaires were entered into a digital format via Microsoft Excel. Data were analysed using the statistical software RStudio[28]. Missing data were reported as a percentage of totals. All data were anonymised and treated confidentially.

The free-text responses were collated and grouped thematically using an iterative open-coding approach.

Results

Participants

A total of 100 patients participated in the survey with a mean age of between 45 and 54 years old. Just over half the participants (52%) were female, nearly all participants spoke only English (91%) and had access to a smartphone (93%), and most participants (68%) lived in a metropolitan area. Patient demographics and clinical characteristics are presented in Table 1.

Smartphones

Nearly all participants (93%) indicated they had access to a smart phone. Of these 93 participants, 84 (91%) reported a level of confidence in using applications, with 20 (22%) reporting they were somewhat confident, 23 (25%) reporting they were confident and 41 (44%) reporting they were very confident.

Surgical challenges

The challenges most often reported by participants were understanding surgery preparation instructions (15%, n = 13), knowing what to expect when in hospital (14%, n = 12) and understanding recovery instructions for when discharged home (13%, n = 11).

Health literacy levels

Figure 1 shows the number of participants categorised into the three health literacy levels based on responses to the BHLS questions. More than half the participants (62%) were categorised as having adequate health literacy, 26 participants (26%) were categorised as having marginal health literacy and 12 (12%) were categorised as having limited health literacy.

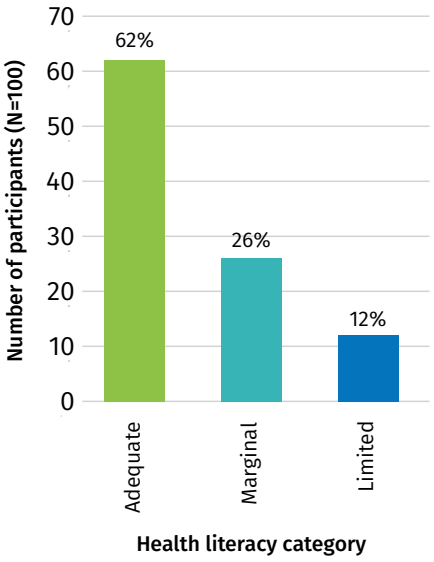

Figure 1: Health literacy level of participants

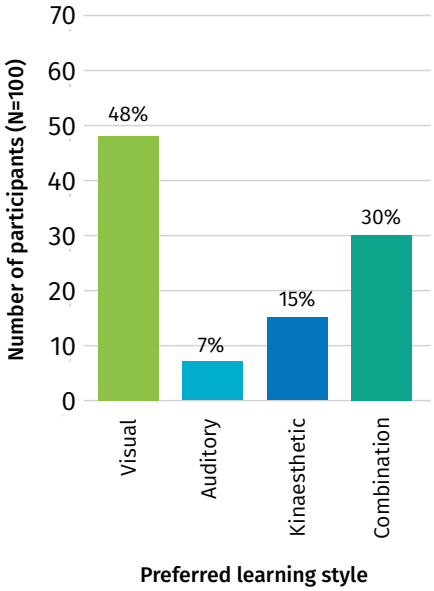

Figure 2: Preferred learning style of participants

Learning preferences

Figure 2 shows the number of participants that preferred each of the three learning modalities (visual, auditory or kinaesthetic) as well as the number of participants that preferred a combination of modalities. Responses to the learning style questions indicated that 46 participants (48%) were visual learners, 14 (15%) were kinaesthetic learners and 7 (7%) were auditory learners. Twenty-nine participants (30%) had equal scores for two or more modalities.

Participants also indicated their preferred method/s for receiving educational information. Participants could choose more than one response and 61 participants (61%) indicated that face-to-face delivery was a preferred method, 46 (46%) indicated digital delivery, 44 (44%) indicated booklets and 20 (20%) indicated leaflets.

Surgical preparation

Table 2 summarises participant perspectives on preparation for surgery. Of the 100 participants in the study, only 37 (37%) reported that they felt very prepared for surgery. Nearly two thirds of participants (63%) reported that they did not feel completely prepared for surgery, and half the participants (50%) indicated that they sought additional information to prepare for their surgery. Of those 50 participants, 30 (60%) stated that they used the internet to source information.

Participants reported a variety of methods by which they received their pre-operative educational information – 47 participants (50%) received a booklet, 24 (26%) received a leaflet, 16 (17%) received digital information and 6 (6%) received verbal information.

Table 2: Participant perspectives on preparation for surgery

		Number of participants (N=100)
Level of preparedness for surgery	Very unprepared	0 (0%)
	Somewhat unprepared	6 (6%)
	Neither prepared nor unprepared	10 (10%)
	Somewhat prepared	47 (47%)
	Very prepared	37 (37%)
Attended preadmission clinic appointment	no	12 (12%)
	yes, in person	60 (60%)
	yes, on the phone	16 (16%)
	yes, via telehealth	12 (12%)
Sought additional information to prepare for surgery	no	50 (50%)
	yes	50 (50%)
Received education booklet, *Surgical pathway*	no	27 (27%)
	yes	73 (73%)
Would have liked to receive the education booklet (n=27)	no	7 (26%)
	yes	20 (74%)
Method of delivery of the education booklet (n=72*)	in person	65 (90%)
	in the mail	4 (6%)
	QR code	3 (4%)
When the booklet was received (n=71**)	Less than 2 weeks ago	22 (31%)
	2–4 weeks ago	23 (32%)
	1–3 months ago	19 (27%)
	More than 3 months ago	7 (10%)

*73 participants received the booklet, there was 1 missing response about method of delivery.

**73 participants received the booklet, there were 2 missing responses about when it was received.

Discussion

A large proportion of the population surveyed were categorised as having either marginal or limited health literacy. The BHLS tool is a self-reporting tool and therefore may not be an accurate representation of the patient's true health literacy level. However, these health literacy findings are consistent with previously reported global data. A systematic review by Roy et al.[13] of 51 studies across ten countries found that a third of patients (32%) had limited health literacy. Chang et al.[29] also conducted a systematic review of 51 studies assessing health literacy levels, similarly found that a third of patients (34%) reported low health literacy.

It is well known that low health literacy has negative impacts on surgical outcomes and is strongly associated with extended length of stay, complications and reduced adherence to pre-operative instructions[13]. It is suggested that health care teams need an awareness of health literacy to provide patients with beneficial education resources they can understand[13]. An understanding of the surgical patient's health literacy level and availability of a range of educational resources developed to support each level will allow for equity of health outcomes. To ensure effective communication with patients and minimise the risk of miscommunication, experts recommend using universal health literacy precautions, including assuming that all patients and caregivers may have difficulty comprehending health information, and communicating in ways that are easy to understand[30].

Although the methods used to assess health literacy are reliable and the hospital context provides a broad patient cohort regarding

geographic location and surgical specialty, it must be noted that health literacy results may vary due to differing cohort characteristics. It is well documented that health literacy levels are impacted by many elements, including a person's age, anxiety level, education level and socioeconomic status[31–34]. It is therefore recommended that future studies are conducted in an Australian context, focussing specifically on the relationships between these elements and health literacy to gain a greater insight into health literacy levels throughout Australia.

This study found that nearly half of the participants (48%) identified as visual learners. This is similar to the common belief that the general population consists of 65 per cent visual learners, 30 per cent auditory learners and 5 per cent kinaesthetic learners[35]. There is little information available directly relating to learning styles of surgery patients. Visual learners rely heavily on images and non-verbal cues, such as body language, when trying to understand educational information they receive[36].

Although there is an abundance of information available to use when educating patients, the resources provided to patients often remain a reflection of the choices and learning styles of their health care providers[37]. Based on the findings of the current study that the visual learning style was the most common style, health care providers should consider incorporating more visual aids and non-verbal cues when educating patients about their surgical procedures. It is recommended that health care providers use various forms of visual media, such as diagrams, videos and pictures, to supplement traditional verbal explanations of medical information to meet the needs of visual learners. It is essential that health care providers, when developing patient education materials, acknowledge patients will have a variety of preferences and learning styles, and education provision requires a multimodal approach.

Half of the participants reported that they searched for additional information regarding their surgical journey, mostly on the internet. This finding is consistent with global data which suggests that 50 to 80 per cent of adults with internet access use it for health care purposes[37]. The internet can, undoubtedly, support a patient's health journey but only if it is used properly. Easy access to online health information has increased the risk of unreliable information which can lead to negative health outcomes and actions that contradict the advice of health care providers[38]. According to Arif et al.[39], experts suggest health care providers guide patients in selecting high-quality online health information. To mitigate the risks of negative outcomes from patients using unreliable or misleading online health information, health care providers should accept that many patients seek information on the internet and recommend reliable sources of information as well as guiding patients to navigate the internet safely[38].

Dimitriadis et al.[8] attributed patient non-compliance to inadequate pre-operative instructions including poor communication and patient inability to understand or recall information. This is consistent with the current study that found that the challenges most often reported by patients were difficulty understanding their preparation instructions and not knowing what to expect during the surgical journey. These challenges could be exacerbated by patient information resources that do not take the health literacy or learning styles of the intended recipients into account and resources that contain inadequate information.

In light of these challenges, health care providers and policy makers should prioritise the development of patient education resources that are comprehensive, accessible and tailored to patients' different health literacy levels, learning styles and preferred method/s for receiving educational information. Additionally, future research could investigate the effectiveness of patient education interventions that use multiple modalities, such as multimedia and interactive technologies, to enhance patient understanding and engagement.

More than half the participants in the current study (61%) indicated that their preferred method for receiving educational information was face-to-face. The majority of participants reported receiving pre-operative education as a booklet or leaflet (71%) and only a handful (6%) reported receiving verbal pre-operative education. Seventeen per cent of participants reported receiving educational information in a digital format. Interestingly, 46 per cent of participants indicated they would prefer to receive digital pre-operative education.

According to Waller et al.[40] eHealth platforms have potential to address information gaps across all surgical journey phases, with interventions targeting each phase to allow for continuity of care, support care delivery models, engage providers and patients, and deliver self-assessment and self-management tools. E-health interventions in the context of surgery have proven beneficial; there is a strong association between pre-operative physical and psychological

preparedness and improved post-operative outcomes[41]. Nearly all participants in the current study (92%) had access to a smartphone and many (64%) reported feeling confident in using a smartphone. Given this, it would be appropriate to suggest that digital education provision should be further explored by health care providers.

The strengths of this study include the broad range of data collected due to the survey instrument designed by the research team and the generalisability of data as a result of the setting – a large, Australian, tertiary, referral hospital – that provided access to patients in multiple surgical specialties. A potential limitation of this study is the use of convenience sampling which, due to its non-random nature, may limit the generalisability of the results. An additional limitation of the study relates to data collection occurring prior to undertaking surgery – participants may not have felt comfortable providing responses that they believed could present them in an unfavourable manner.

Conclusion

This study found that more than a third of Australians undergoing elective surgery have marginal or limited health literacy, nearly two thirds are visual learners, half feel they need more information than is provided in hospital education resources, and nearly half would prefer to receive pre-operative education in a digital format. To develop effective surgical education resources for patients, it is recommended that clinicians cater for a low level of health literacy and engage with the end-users of their surgical services to identify the desired content and preferred methods for receiving educational resources. It is also recommended that educational resources cater for all three learning styles – visual, auditory and kinaesthetic. Further research should focus on the development, provision and evaluation of surgical education materials in a digital format.

Declaration of conflicting interests

The authors have declared no competing interests with respect to the research, authorship and publication of this article.

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