# Preoperative Instructions, Health Literacy, and Medication Adherence

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## Abstract

Health literacy is defined as the "degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Ammerman et al., 2017, p.542). Patients who do not understand their instructions as it relates to their medications cannot be expected to adhere to a difficult medication regimen. Evidence reveals that interventions aimed at addressing health literacy increased medication compliance. The purpose of this pilot research study was to determine nurses' beliefs and practices in assessing health literacy and medication adherence in the ambulatory surgical setting. This study utilized a 22-question Qualtrics survey tool. Questions contained in the survey addressed topics related to current assessment practices and nurse demographics. Our findings reveal that 76.5% of participants believe that it is important to assess patient's literacy when providing preoperative instructions. It was noted that 47.1% of nurses do not assess their patient's literacy level. A total of 52.9% participants reported that patients with low literacy levels were less likely to comply with preoperative instructions regarding medication adherence. Research confirms that nurses believe that assessing health literacy is important prior to teaching patients about preoperative instructions. The evidence from this research study demonstrated that patient adherence to preoperative medication instructions is reduced in patients with low health literacy. Patients' health literacy should be assessed when giving perioperative instructions and health literacy resources should be utilized when providing patients with instructions to improve medication adherence.


Keywords: health literacy, medication adherence, preoperative instructions, perioperative complications

Preoperative Instructions, Health Literacy, and Medication Adherence

## Topic Review

There has been much discussion regarding the impact of health literacy on the patient's ability to manage chronic health issues as well as follow instructions in preparation for surgical procedures. Currently a majority of surgical procedures are being performed in the ambulatory surgical setting. The literature reveals that there is a lack of studies examining health literacy in the perioperative setting (De Oliveira, McCarthy, Wolf & Holl, 2015). In the perioperative setting it is important for patients to follow directions regarding preparation for procedures. It is also imperative for patients to understand and follow preoperative instructions regarding their medications.

There is a need to incorporate education into all phases of the perioperative process, beginning in the preoperative period. Nonadherence may stem from patients not understanding their preoperative instructions, which may lead them to guess about instructions they do not understand, which in turn leads to perioperative complications (Liebner, 2015). Patients with conditions such as hypertension and diabetes who were not adherent with preoperative medications were more likely to spend time in the post-anesthesia recovery unit (PACU) due to perioperative complications compared to those patients that were adherent (Notaras, Demetriou, Galvin, & Ben-Menachem, 2016). According to De Oliveira et al., (2015) "the lack of interventions to address limited perioperative health literacy call for an extreme need to develop a research agenda in order to minimize the effects of poor health literacy in the care of surgical patients" (p.5). The result of 1,605 patient surveys done by Renew, Bolton, Alvarado and De Ruyter (2014) demonstrated that there were multiple deficiencies in patient's preoperative instructions that were not in accordance with the Institute for Clinical Systems Improvement (ICSI) recommendations, such as providing verbal but omitting written

instructions to preoperative patients. In the surgical setting "patient outcomes are tied directly to the provision or lack of patient education" (Liebner, 2015, p.417) underscoring the importance of patients' understanding of instructions.

Health literacy is linked to adherence in health care and is defined as the "degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Ammerman et al., 2017, p.542). Patients who do not understand their instructions as it relates to their medications cannot be expected to adhere to a medication regimen. Low literacy has been identified as a barrier to health literacy which may lead to inadequate healthcare management and poorer health outcomes (Ammerman et al., 2017). Miller (2016) has revealed compelling evidence of an association between low literacy and low health literacy and their relationship to poor blood pressure management and medication adherence.

Low health literacy is associated with poor adherence to preoperative instructions which may pose a hazard to patient safety. In addition, surgical disparities may also be linked to low health literacy (De Oliveira et al., 2015). The impact of poor health literacy has been identified as a major factor in medication nonadherence, thus improving health literacy has become a research priority for the American Medical Association, the Centers for Disease Control and Prevention, the Institute of Medicine, the National Institutes of Health, and US Department of Health and Human Services (Jones, Treiber, & Jones, 2014, p. 529).

The focus of this literature review and the overarching goals of this project are to provide insight into interventions that will improve the preoperative patient's health literacy and improve adherence to their preoperative medication regimen.

## Problem Statement and Research Question

Patients who do not understand their instructions as it relates to their medications cannot be expected to adhere to a medication regimen. Low literacy has been identified as a barrier to health literacy which may lead to inadequate healthcare management and poorer health outcomes (Ammerman et al., 2016). The barrier of low health literacy also affects patients in the ambulatory surgery center setting. According to Pfeifer, Slawski, Manley, Nelson, & Haines (2016), medication adherence is critically important due to the perioperative complications that can occur and the occurrence of same-day surgery cancellation. These complications can include hypo/hypertensive crisis or severe hypoglycemia issues. Moreover, if a patient's surgical day is cancelled, this can affect the facility tremendously by contributing to a loss of revenue, time and resources provided by that facility. There is a $100 billion-dollar overall cost to facilities when patients have poor medication adherence (Pfeifer et al., 2016). In addition, when surgical cancellations occur there is a delay of medical treatment to patients as well as the cost associated with more resources repeatedly being used. Inadequate communication between patient and provider may lead to inadequate medication adherence in the patient. When a provider does not properly assess health literacy, it may result in a lack of comprehension regarding health care instructions which may compromise a patient's care. It is important to explore the cause of this gap to strengthen the interaction between provider and patient.

Problem statement: Low health literacy coupled with lack of understanding of preoperative instructions and poor medication adherence are major contributing factors to poor patient outcomes in the ambulatory surgery setting. The research question that seeks to address this issue is: What are the beliefs, attitudes, and practices of nurses in the ambulatory surgical center setting regarding health literacy as they relate to patient's preoperative medication

instructions? It is hoped that the results of this study will improve nurses' knowledge and contribute to a change in the practice of providing clear and easily understood information to patients using techniques designed to improve health literacy, resulting in improved preoperative medication adherence and better patient outcomes.

## Literature Search

The databases searched for this literature review were Academic OneFile, Academic Search Complete, CINAHL Complete, Cochrane Library with Systematic Reviews, Medline, NIH, Nursing Reference Center PLUS, PubMed, and PsycINFO. Search terms included barriers, health literacy, low literacy, medication adherence, medication compliance, preoperative instructions, perioperative complications, and standardized instructions. The ancestry approach was also utilized in identifying sources for the literature search. Our literature review revealed a common theme regarding the relationship among the issues of literacy, health literacy and medication adherence and studies that addressed these topics were included in the review. If a study did not address adherence issues or did not discuss potential barriers to medication adherence or health literacy, then it was excluded from our literature review. Priority was given to systematic reviews, meta-analyses, and studies with larger numbers of patients.

## Synthesis of Evidence

### Medication Adherence

Medication compliance, now more commonly referred to as medication adherence, is an issue that arises from a combination of "dynamic interaction between patients and health-care providers" (Costa, Giardini, Savin, Menditto, Lehane, Laosa,... & Marengoni, 2015, p. 1). Ho, Bryson, and Rumsfeld (2009) define adherence as the "active, voluntary, and collaborative

involvement of the patient in a mutually acceptable course of behavior to produce a therapeutic result" (p. 3028). Medication adherence is vitally important in the perioperative setting and patient's failure to adhere with medication instructions may result in perioperative complications or cancellation of procedures (De Oliveira et al., 2015). Typical medication adherence issues are patient failure to take antihypertensive or cardiac medications prior to their procedure or failure to discontinue anticoagulant and diabetes medications per preoperative instructions.

Adherence implies the mutual management of goals by the patient and provider (Ho et al., 2009). Socioeconomic status has been identified as a key factor in determining rates of medication adherence, with 32.1% of persons with a low-income subsidy considered nonadherent, compared with 25.4% of persons with no income subsidy (Ritchey, Anping, Powers, Loustalot, Schieb, Ketcham,.,... Hong, 2016). Nonadherence was slightly higher among older age groups and female patients and when a second class of antihypertensive medication was added (27.2%) compared with a single class (23.2%), and was somewhat lower among patients taking a fixed-dose combination antihypertensive (Ritchey et al., 2016). Healthcare system-related factors that were associated with nonadherence included having numerous antihypertensive prescribers as well as increasing the number of antihypertensive medications prescribed (Ritchey et al., 2016). Patients who are adherent to their antihypertensive medications are more likely to achieve blood pressure control which translates to a 38% decrease in their risk of suffering a cardiovascular event (Hilleman, 2014). This data reinforces the importance of medication adherence in reducing cardiovascular events both intra and postoperatively.

**Patient Beliefs/Behaviors**

Patients who have negative beliefs about medications, as assessed via medication adherence surveys, were less likely to be adherent to their prescribed medications (Gatti,

Jacobson, Gazmararian, Schmotzer, & Kripalani, 2009). Other risk factors determined to adversely affect adherence were patients less than 65 years of age and those with low medication self-efficacy. Patient's negative beliefs about medications need to be addressed by health care providers during encounters and that time together is an opportunity to educate patients about the importance of medication adherence (Gatti et al., 2009). Also, tailoring interventions to address low health literacy may improve adherence and negative disease-related outcomes.

**Impact of Low Literacy and Nonadherence**

The effect of medication nonadherence on facility costs is cited by Pfeifer, Slawski, Manley, Nelson, and Haines (2016), who reported that "medication compliance is said to be critically important due to the perioperative complications that can occur and the occurrence of same-day surgery cancellation" (p.48). Cancelled surgical procedures can affect the ambulatory surgical center (ASC) tremendously by contributing to loss of revenue, time and resources provided by that facility. There are reports of $100 billion-dollar cost to facilities when patients have poor medication adherence (Pfeifer et al., 2016). The loss of revenue underscores the need to ensure that patients understand and adhere to their preoperative instructions.

A meta-analysis by Miller (2016) revealed that the health literacy of a patient is positively correlated to the adherence of medical treatment especially in patients who have a cardiovascular disease such as hypertension. There was a positive correlation at a 95% confidence interval that health literacy and patient medication adherence have an association and a statistical significance, $p < 0.001$. People with lower levels of literacy have a 14% higher risk of nonadherence to medications compared to a higher literacy group (Miller, 2016). Jacobson et al., (2014) compared literacy levels of study subjects (N=423) in their analysis, and found almost half of them had low literacy (N=192) compared to those with adequate literacy (N=231). A

lower literacy rate directly affects the ability of the patient to understand the effects of hypertension, the importance of self-management, and medication adherence.

A systematic meta- review examined associations between literacy and medication adherence (Brainard, deWinter, Gebeoers, Jansen, Loke, Reijneveld, & Salter, 2015). Seventeen studies were examined and the most common interventions to address low literacy included writing in a larger font size, using simpler terminology, and decreasing the amount of text in the instructions. Several other factors such as race affected medication adherence, and the authors found that health literacy was often lower in black communities in low income areas (Schoenthaler, Butler, Chaplin, Tobin, & Ogedegbe, 2016). Another analysis found that there was an increase in adherence when health literacy issues were addressed (Brainard et al., 2015). These interventions and others were explored in subsequent studies, and the results are clear: increased medication adherence is positively correlated with increased interventions aimed at educating the patient.

**Addressing Health Literacy**

It is the responsibility of healthcare providers to "understand the beliefs, values and cultures that are influencing the ways health-related information are being shared and received by patients" and furthermore, they need to ensure that patients understand the information (Lai, Goto & Rudd, 2105, p. 282). Addressing a patient's health literacy and their willingness to change, as well as barriers to self-management have been identified as important factors to address in the literature concerning medication adherence.

One way of improving medication adherence is to engage patients in medication regimen decision-making using motivational counseling techniques and educating patients about the risks associated with uncontrolled blood pressure (Gwadry et al., 2013). Measures to improve patient

comprehension of instructions include providing written materials at or below a sixth-grade reading level that are short and simplified, utilizing large fonts with ample white space (Jones, Treiber, & Jones, 2014).

In the ambulatory surgery setting it is important to provide education in all phases of the perioperative process, especially in the preoperative period "Patients who do not comprehend the information presented are more likely to be noncompliant or to guess about what they do not understand, with potentially harmful results to their health" (Liebner, 2016, p.418) which reinforces the consequences of not properly educating the patient preoperatively. Liebner (2016), implemented a quality improvement project which favored the use of a web based blog using pictographs and large font size identifiers in instructions for patients with low health literacy. This intervention helped to address the many of learning styles including visual, auditory, and tactile learning styles that patients were able to identify with, and early preliminary results of the intervention were favorable.

Organizing information into categories with simple labels may aid recall of information up to 50% and the use of pictures is effective for patients with low literacy or non-English speaking (Vetter et al., 2014). Verbally reviewing written instructions underscores the importance of the patient following the instructions and the most important information should be presented in plain language and reviewed either at the beginning or the end of the visit. Combining written and oral instructions to promote adherence is ideal. According to Vetter et al. (2014), the combination of written and verbal medication instructions increased patient recall from 34% to 55%. Standardizing electronic health record (EHR) instructions using the patient's reconciled medication list is a best practice recommended by Pfeiffer et al. (2016) that improves medication adherence using plain language and clear directions. In terms of special populations,

African Americans, the elderly, and those with multiple comorbidities may require more attention when providing preoperative instructions (Vetter et al., 2014).

Emphasis has been placed on training health care providers in health literacy, but "it is equally important to build the health literacy skills of staff that are the face of the organization, such as receptionists and billing clerks" (Brach, C., Keller, D., Hernandez, L., Baur, C., Parker, R., Dreyer, B.,…Schillinger, D., 2012, p.8) There is a need to emphasize health literacy in all aspects of patient education and to "build a care environment and culture that effectively integrates health literacy in its activities" (Lai et al., 2014, p. 281).

## Critique

Overall, many of the authors of the studies presented in this paper sought to identify barriers to medication adherence in the preoperative period. Limitations of quantitative studies overall may miss the reasons for medication nonadherence. A rigorous qualitative study may uncover underlying themes and beliefs of patients and reasons for not following preoperative medication instructions. There is an overarching theme in the literature of the patient/provider making joint decisions regarding their care. This model of care is consistent with the health belief model which incorporates patient education regarding disease state, self-management, and consequences of lack of self-management.

The literature review demonstrated the recognition of the importance of health literacy, providing clear pre- and postoperative instructions to patients and the link to health outcomes. The need for further research in health literacy and adherence has been identified. Vetter et al., (2016), noted limitations of their study in that study participants relied on their memory in recalling medications they were taking. This information could be compromised if the participants do not have a reliable memory of all the medications they are taking, which could

affect data collection, and in turn affect the overall study results. Another limitation noted by Vetter et al., 2016, was the knowledge of the staff, who were aware that they were participating in a study, which could impact their bias resulting in a Hawthorne effect and therefore affect data collection results.

Outcomes data is limited, as Liebner's (2015) pilot study demonstrated, and there was no concrete numerical information provided. Pfeifer et al. (2016), data collection was performed at only one facility, so it is not known whether this intervention would be transferable to other facilities. Due to a low sample size of studies, De Oliveira et al., (2015) had limited results and this can skew the results that have already been collected. Schoenthaler et al., (2016) found a positive correlation between racial and health disparities, but failed to identify ways to remove the disparities. Although each study has its limitations, there was ample evidence that low health literacy is a major factor in medication adherence in the ambulatory care setting. This research project will address these issues and an objective is to increase provider knowledge that will result in changes in practice leading to better medication adherence for the perioperative patient in the ambulatory care setting.

## Research Project

The information collected in this review underscores the need to address barriers to medication adherence in the preoperative period and provide the focus of our research project. This project is aimed at addressing low health literacy and identifying other barriers to medication adherence in the preoperative patient. The researchers of this project intend to identify and address barriers that inhibit patient's understanding of and adherence to preoperative instructions, focusing on medication adherence.

An anonymous questionnaire was administered to a convenience sample of 57 nurses to gain insight into the ASC nurse's beliefs, attitudes, and practices regarding health literacy and the provision of preoperative instructions. The goal of this project is to determine current nursing practices regarding the incorporation of principles of health literacy into patient instructions. Furthermore, this research aims to increase the knowledge of the ASC nurse to facilitate patient understanding of preoperative instructions and in turn to improve patient's adherence.

**Design, Sample, and Procedure**

A 22- question survey was designed to assess nurses' knowledge, attitudes, beliefs, and practices regarding health literacy as it relates to patients receiving preoperative instructions. The questions were validated by a Simmons nursing professor as well as several nurses that are employed as consultants in ASCs. The questions focused on ASC nurses' attitudes, beliefs and practices regarding health literacy and their awareness and use of health literacy resources when providing preoperative instructions to patients. Qualtrics sent the survey link via email to a convenience sample of 57 members of a nurse manager's group employed in an ASC. Many of the sample participants have obtained a Bachelor of Science degree or higher (76%, n=13). The average length of time that the nurses were employed in the ASC setting was 16 years, and the most common procedures performed in the centers were endoscopic, general, ophthalmologic, plastic, orthopedic and other.

Table 1.

Study Participant Demographic Characteristics

| | Total (N=17) | Actual Survey Representation |
|---|---|---|
| **Educational Preparation** | | |
| Diploma | 1 | 5.9% |

| | | |
|---|---|---|
| Associate's | 3 | 17.7% |
| Bachelor's | 8 | 47.1% |
| Master's | 4 | 23.5% |
| Doctoral | 1 | 5.9% |
| Total | 17 | 100% |
| **Procedures Performed** | | |
| Endoscopic | 7 | 41.1% |
| Ophthalmic | 5 | 29.4% |
| Plastics | 4 | 23.5% |
| Other | 6 | 35.2% |
| **Total** | **17** | **100%** |

## Results

The results of this study were collected anonymously over a two-week period via Qualtrics, responses were supplied from 17/57 ASC nurse managers, producing a return rate of 26%. Descriptive statistical data was supplied by Qualtrics. Many of the nurse respondents (76%, n=13) hold a Bachelor of Science degree or higher and have practiced in the ambulatory surgical setting for an average of 16.3 years. 88.24% (n=15) of nurses convey that they provide both written and verbal instructions to patients prior to their procedure, which is the standard of care.

Most of the nurses (53%, n=9) reported that they gear their preoperative instructions toward patients with low health literacy and an additional 41% (n=7) are not sure if they provide instructions that are formulated for patients with low health literacy. Although 76% (n=13) describe their patient's health literacy as adequate, it is remarkable that 47.06% (n=8) do not

assess health literacy and an additional 17.65% (n=3) are not sure if they assess. Also, many nurses (88%, n=15) are not aware of resources available to enhance health literacy and improve patient instructions and adherence, but 76% (n=13) agree that it is important to consider a patient's level of health literacy when providing preoperative instructions to them. In addition, (76%, n=13) nurses report that they have never utilized resources regarding patient health literacy to provide easily-understood directions to their patients.

Table 2.

Knowledge, Attitude, and Practices of Nurses

| **Question** | **Total (N=17)** | | | **Actual Survey (%)** | | |
|---|---|---|---|---|---|---|
| | **Yes** | **No** | **Not Sure** | **Yes** | **No** | **NS** |
| Do you assess your patient's health literacy? | 6 | 8 | 3 | 35.2 | 47.1 | 17.6 |
| Do you find that patients with low literacy comply less with their instructions regarding taking their anti-hypertensive medications? | 9 | 6 | 2 | 53 | 35.3 | 11.8 |
| Are you aware of health literacy resources available for your center to use free of charge? | 2 | 15 | 1 | 11.8 | 88.2 | 5.9 |
| Have you ever utilized resources regarding patient health literacy to provide easily understood instructions? | 2 | 14 | 1 | 11.8 | 82.3 | 5.8 |
| **Total** | **17** | | | **100%** | | |

NS= Not Sure

## Conclusions

Our research study concurs with the literature that low health literacy is a major reason patients' do not follow instructions, nor adhere to medication guidelines. There is a disconnect

between those that are providing instructions to patients and the patient's understanding of instructions, which influences adherence. Often patients do not understand preoperative instructions and guess at what they are supposed to do preoperatively which may lead to them erroneously taking or omitting medications that are necessary prior to surgery, resulting in an increase in perioperative complications or cancellation of their procedure. The results of our nurse manager survey indicate that nurses working in the ASC understand the importance of health literacy and its impact on patient's understanding of preoperative instructions and medication adherence. However, many nurses are not assessing their patients' health literacy, or they may overestimate their patient's health literacy and they are also not aware of health literacy resources available to them as health care providers.

## Recommendations

The authors of this pilot study recommend that more research be performed that examines the association of health literacy and outcomes in the outpatient perioperative setting. The researchers also hope to promote more research on the appropriate assessment of patient's health literacy in the outpatient setting. Furthermore, the researchers recommend that facilities conduct in-services on techniques to assess patient's health literacy and provide education on resources that are available for patients that require additional literacy resources. Changes to current practice include assessing patient health literacy and incorporating health literacy techniques to facilitate understanding of preoperative instructions and improve medication adherence and perioperative outcomes.

## Implications for nursing practice

How can we expect those that provide preoperative instructions to patients to assess health literacy without meeting the patient? Creating instructions that are geared toward patients

with low health literacy should be a goal of all surgical centers. Providing a general template for preoperative instructions that includes the use of color, plenty of white space with instructions written simply as a “Don't take”, “Do take” and “May take” section for as needed medications is a simple and effective way to convey instructions to patients preoperatively. Pictographs such as stop and go signs may also be used to reinforce messages. The use of both written and verbal instructions is the most effective means of providing instructions to patients, thus creating an opportunity to verbally reinforce important information to patients when the nurse speaks to the patient either on the telephone or in person prior to their procedure. The teach-back method is a simple and effective means of assessing a patient’s understanding of their instructions, which entails asking a patient to repeat their instructions such as asking them which medications they will take the morning of surgery with a sip of water to uncover gaps in patient understanding.

Disseminating information regarding health literacy to health care providers is important, and this pilot study underscores the need for future research to provide guidance for instructing patients at a health literacy level that is suitable for the general population. Providing patients with instructions that integrate health literacy may yield the best results in terms of reducing perioperative complications as well as reducing the cost burden to facilities that must cancel surgical procedures due to lack of patient adherence.

The role of the nurse practitioner (NP) includes the role of educator, and with that in mind, implications for the NP include being aware of the role that health literacy plays in patient understanding of all instructions. NPs must be mindful that their verbal instructions should reinforce written instructions to the patient. The verbal information is an opportunity for feedback from the patient and may be useful in identifying and overcoming barriers to adherence. After all, the relationship between the NP and the patient is one of mutual

collaboration and addressing health literacy in both written and oral communication will serve to strengthen that important relationship.

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