Promoting Patient Engagement during Hospitalization for Acute Myocardial Infarction

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Abstract

Background: Higher levels of patient engagement are associated with improved patient outcomes, but patient engagement is rarely studied in acute cardiology populations. Promotion of patient engagement during hospitalization after acute myocardial infarction (AMI) may play a role in improving cardiac rehabilitation (CR) participation.

Objective: The purpose of this study was to examine the feasibility of utilizing a CR-specific question prompt sheet (QPS) to promote patient engagement during hospitalization for inpatients diagnosed with AMI.

Methods: A descriptive correlation study was conducted over eight weeks on two cardiovascular units at an academic medical center. A convenience sample of 32 (*N*) inpatient adults with AMI and 4 (*N*) physicians participated. Patients received a CR-specific QPS with encouragement to ask questions, supplemented by education for physicians and nurses. Patient engagement was measured by observed question-asking behavior and Patient Involvement Questionnaire (PIQ).

Results: Twenty of the 32 patients asked questions during rounds with a median of one question (IQR 2) for the length of stay. Although question-asking behavior and PIQ scores were not found to be statistically different in those intending to attend CR compared to those who were not, patients who expressed positive intention, tended to have higher PIQ scores. The majority of patients who received endorsement from physician or clinical nurse endorsed positive intention to attend CR, with relationship between CR nurse endorsement and intention to attend approaching significance (X^2 [1, N=13] =5.318), Exact 2-sided, p= .077). Patients reported the QPS helped them ask questions, but some physicians perceived it increased duration of rounds.

Conclusion: Although a CR-specific QPS may be helpful and trends suggest potential to increase patient engagement, further research is needed to determine the feasibility and effectiveness of the QPS in promoting patient engagement for patients hospitalized with AMI.

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Patient engagement is a fundamental part of patient-centered care and quality improvement in healthcare (Institute for Healthcare Improvement, 2017; Institute of Medicine, 2001). Despite endorsement by national healthcare organizations and financial implications related to the Affordable Care Act (Millenson & Macri, 2012), research is limited on interventions to promote patient engagement in acute illness during hospitalization. A recent report on interventions to promote patient engagement in the hospital setting concluded that current intervention strategies aimed at the patient or family (individual-level) are lacking, or, if present, are often not "attuned" to the needs and experience of the patient and family (Maurer, Dardess, Carman, Frazier, & Smeeding, 2012, p. 5). This has resulted in little "concrete, actionable support" for patients and their families to engage (Maurer et al., p 5).

The implications of a poorly engaged patient population may be devastating with increasing evidence that patients with lower levels of engagement are at higher risk for hospitalization and emergency room utilization (Kinney, Lemon, Person, Pagoto, & Saczynski, 2015), as well as increased healthcare costs compared to those who are more engaged (Greene, Hibbard, Sacks, Overton, & Parrotta, 2015; Hibbard, Green & Overton, 2013). Patients with higher levels of engagement are also recognized to have increased adherence to treatment regimens and health-related behaviors (Greene & Hibbard, 2012; Hibbard, Mahoney, Stock, & Tusler, 2007; Mosen et al., 2007; Skolasky, 2008), increased patient satisfaction (Mosen et al., 2007), and improved patient outcomes over time (Greene et al., 2015; Hibbard et al., 2007).

Although patient engagement is studied in chronic disease management, (Hibbard, Greene, & Overton, 2013; Kinney et al., 2015; Mosen et al., 2007), this topic is rarely explored in the acute phase of illness such as acute myocardial infarction (AMI) (Arnetz et al., 2010).

Research indicates self-management and adoption of secondary and tertiary prevention strategies post AMI, such as cardiac rehabilitation (CR), are essential in preventing adverse outcomes (Smith et al., 2011). As a guideline-directed therapy (Balady et al., 2011; Smith et al., 2011) CR demonstrates numerous benefits including decreased mortality, morbidity, hospitalization, and improved health-related quality of life (Anderson et al., 2014; Dunlay, Pack, Thomas, Killian, & Roger, 2014). Despite these benefits, CR continues to be underutilized with current national participation rates ranging from 23% to 52% (Doll et al., 2015; Dunlay et al., 2014). Promotion of patient engagement during hospitalization may play a role in improving patient outcomes in the AMI population through increasing CR participation.

One way to promote patient engagement is to encourage patients to ask questions. Recognized as a behavior of engaged patients (Mauer et al., 2012), question asking is endorsed by the Agency for Healthcare Research and Quality (AHRQ) as a method to promote patient engagement (AHRQ, 2012; Clancy, 2008). Although some patients are naturally inclined to ask questions, others will not due to fear, not knowing what to ask, or insufficient health literacy thereby requiring additional support (Maurer et al., 2012). Healthcare providers and organizations have a responsibility to provide the opportunities, knowledge, and skills necessary for patients and families to become engaged (Mauer et al., 2012), which may be facilitated through question asking.

In the outpatient setting, and in predominantly oncology populations, providing patients with a list of questions ("question prompt sheet," henceforth "QPS"), demonstrates some success in increasing patient question asking and information sharing from the provider (Sansoni, Grootemaat, & Duncan, 2015). The use of a QPS in promoting patient engagement and participation in CR for patients hospitalized with diagnosis of AMI should be further explored.

Purpose and Research Question

The purpose of this study was to examine the feasibility of utilizing a CR specific QPS to promote patient engagement in interprofessional bedside rounds for inpatients with AMI. This study aimed to answer the following questions:

- Does a CR-specific QPS help patients diagnosed with acute myocardial infarction ask questions about CR and post-MI care?
- Do inpatients diagnosed with AMI who receive a QPS report engagement in their care?
- Is patient engagement related to intention to attend CR post-discharge?
- Is endorsement of CR related to intention attend CR?

Literature Review

In an attempt to understand the potential role of patient engagement during hospitalization for acute myocardial infarction, this review of literature analyzed three different topic areas: patient education in the AMI population, patient engagement in the AMI population, and the effectiveness of question prompt sheets to facilitate patient engagement. These areas are central to the development of this study and shed light on current practices and gaps in care.

Education Literature Review

A review of the literature was conducted on the education practices and information needs of AMI patients from 2000 to 2017 and included database search of CINAHL, PubMed, and Grey literature. Search strategy included the following terms: “patient education”, “information needs”, “acute coronary syndrome”, “myocardial infarction”, and “cardiac rehab” with no limits for date or study design. Inclusion criteria included: (a) patient education related to post-MI care or coronary artery disease, and (b) evaluation of patient knowledge, perception, preferences or health behavior as an outcome. Exclusion criteria removed (a) non-English language studies, and (b) pediatric (age ≤ 19 years old) populations. Ancestry searches of pertinent review articles were conducted to identify any additional studies. Five studies met criteria, including two systematic reviews (Ghisi, Abdallah, Grace, Thomas, & Oh, 2014; Scott and Thomas, 2003), two qualitative studies with focus groups (Astin, Closs, McLenachan, Hunter, and Priestley, 2008; Decker et al., 2007), and one quasi-experimental prospective, longitudinal study (Stewart, Abbey, Shnek, Irvine, & Grace, 2004).

Timing of education.

In a systematic review, 22 studies (total of 42 studies, including 23 RCTs) provided education post discharge, with 11 of those studies providing education at CR. Only six studies provided education intervention prior to discharge, two of which were RCTs (Ghisi et al., 2014). A qualitative analysis of 19 participants assessed patient preferences in involvement and desired types of information and reported patient needs for information increased as they took on a more active role in their care, which was highest post discharge (Decker et al., 2007). However, Astin et al. (2008) qualitative analysis reported timing depended on patient preference with some wanting education during the acute phase. Others reported being in shock during the acute event and preferred to have education on the 3rd day of hospitalization or during the early recovery phase. Timing and intensity of interventions were poorly reported and highly varied from five-to-ten minutes to three hours and provided at intervals ranging from daily to every six months (Ghisi et al., 2014). The timing and structure of CR can help to address the post-discharge information needs expressed by patients.

Methods and topics of education.

When receiving information AMI patients preferred information to be individualized, easily understood education, and adapted to patient preferences, which may also be gender and age specific (Astin et al., 2008; Decker et al.,2007; Stewart et al., 2004). In line with patient preferences, Ghisi et al. identified 37 studies out of 42 studies that provided individual education interventions (88%), but it is unclear whether providing information in an individual format was synonymous with individualization of information (2014). Decker et al. reported that all the patients in the study preferred education to be given with printed materials where another qualitative study reported patients preferred a face-to-face education but supplemented by written material for reference (Astin et al., 2008).

Most patients wanted "as much information as possible" regardless of age or gender (Stewart et al., 2004, p. 46), particularly about risk factors, cardiac anatomy/physiology, and life style changes (Astin et al., 2008; Scott &Thompson, 2003; Stewart et al., 2004). Ghisi et al. (2014) review of interventions reflected patient desire for more information about risk factors, particularly nutrition (26 studies) and exercise (19 studies). Information identified as the most important by patients did not always coincide with the views of those providing the education (Scott &Thompson, 2003) and sometimes perception of education did not meet patients' expectations (Stewart et al., 2004). Stewart et al. also reported patients felt they did not receive enough information about certain topic areas including the role of each doctor in treatment, their prognosis, future treatment choices, family support for lifestyle changes, and cardiac rehab. By providing patients with a QPS, patients can acquire the knowledge and skills to ask questions about the topics they are interested in and need more information about. As CR encompasses a great deal of risk factor management and education, promotion of participation in CR post-discharge education is essential to addressing the future information needs of AMI patients.

Role of educator.

Preference for educator varied across studies. In one study evaluating health information needs of 906 patients after AMI, patients reported their physicians to be the most desirable provider to obtain health information from, followed by the nurse (no statistics provided) (Stewart et al., 2004). However, education interventions in the literature were often provided by nurses or multidisciplinary teams (Ghisi et al., 2014). The literature also suggests that these preferences may be influenced by gender and setting. Inpatient physicians and nurses were viewed to be the least helpful in providing education (Stewart et al., 2004) and in one small study, women preferred physicians as educator (61.7%) whereas men slightly preferred nurses as educator (43.7% vs 40.9%) (Ashton, 1997, as cited in Scott & Thompson, 2003). Astin et al. (2008) echoed results of other studies with high variability in preference for educator. In light of patient preferences and the poor perception of inpatient practitioners, an opportunity exists for physician and nurses alike to enhance education of MI care, particularly during hospitalization.

Education outcomes.

Although all the studies in this review discussed characteristics of MI education, only one systematic review reported on education outcomes. Overall, educational interventions provided to MI patients had a positive effect on patient knowledge, patient satisfaction, and adoption of health behaviors (physical activity, dietary habits, and smoking) with a null or positive effect on psychosocial well-being (Ghisi et al., 2014). Patients who were more satisfied with provision of health information also had statistically significant (F [10] = 3.25, p=.001) greater self-efficacy, were more engaged in preventive health behaviors, and were more satisfied with their health care (Stewart et al., 2004). Recognition of the multiple benefits of providing education emphasizes the importance of not only providing education prior to discharge, but the need to look for opportunities to encourage patients to receive and seek more information, such as a CR program.

Limitations of education literature.

Application of these findings must take the limitations of each study into account. First and foremost, this literature review is limited by the small number of studies. Ghisi et al. (2014) review was limited by the heterogeneity of interventions, frequency of self-reported measures in the individual studies, and multi-modal approaches which may confound the association between which aspect of the intervention resulted in the desired outcome. Scott and Thompson's (2003) review was limited by date of publication (the majority of studies published prior to 2000), failure to report inclusion study designs, and predominance of white male sample demographics. Despite rigorous qualitative design, both Decker et al. (2007) and Astin et al. (2008) are limited in external validity due to the qualitative nature of the study. Decker et al. is further limited by biased sample characteristics (mostly white, male participants) and sample size (Decker et al., 2007 Stewart et al. (2004) study is limited in application by the high attrition rate (31%), the predominantly white, male sample, and self-reported health behaviors.

Summary and gaps in literature.

In summary, by addressing patients' information and education needs specific to MI care through a QPS, patients can be provided the opportunity to gain skills to be engaged, as well as gain knowledge and confidence to act on this information. A QPS may help patients ask more questions and may encourage participation in CR. CR is a vehicle for further individualized education and risk-factor modification, about which patients have already expressed a desired for; the significance of CR education prior to discharge seems clear in ensuring patient information needs are met. The acute nature of AMI and the trend towards shorter hospital stays

(Venkatesa et al., 2016) create a unique challenge for education, which also highlights the importance of providing this information prior to discharge. Further research is needed to explore when is the best time to provide education to AMI patients during hospitalization and when inpatients are most likely to seek information.

Patient Engagement Literature Review

A second review of literature was performed on the topic of patient engagement in patients diagnosed with AMI. A literature search was conducted of PubMed, CINAHL, and grey literature using search strategy ("myocardial infarction" OR "acute coronary syndrome" OR "cardiovascular disease") AND ("patient engagement" OR "patient involvement" OR "patient activation”). Studies were included if: (1) measured an outcome of patient engagement, and (2) main sample population included myocardial infarction, acute coronary syndrome, or cardiovascular disease. All study designs were considered without date limits, and articles were excluded if not available in English or exclusively focused on outcomes of surgical patients who received coronary artery bypass surgery. Ancestry searches of pertinent review articles were pursued to identify any additional studies.

Six studies met inclusion criteria with over half of the studies classified as descriptive correlational design (Arnetz, et al., 2010; Bertoni, Donato, Graffigna, Barello, & Parise, 2015; Erskine et al., 2017; Peters and Keeley, 2017). Bertoni et al. (2015) and Erskine et al. (2017) utilized a longitudinal design. Mitchell et al. (2014) performed a secondary analysis of a previous RCT and Witt, Benson, Campbell, Sillah, and Berra (2016) conducted a non-randomized quasi-experimental study. The focus of this review is the patient outcomes related to patient engagement, but a quick review of the measurements of patient engagement is necessary

Instruments.

Of the instruments measuring patient engagement in the AMI population, the Patient Activation Measure (PAM-22 or PAM-13) was utilized in all but one study (Bertoni, Donato, Graffigna, Barello, & Parise, 2015; Erskine et al., 2017; Mitchell et al., 2014; Peters and Keeley, 2017; Witt, Benson, Campbell, Sillah, and Berra, 2016). The PAM was developed as a 22-item Guttman-like scale that measures the patient's knowledge, skill, and confidence for self-management. Although this scale has demonstrated high rates of reliability and validity in multiple patient populations and languages (Hibbard & Greene, 2013), versions included in this review ranged from 6 to 22 questions, with both Mitchell et al. (2014) and Peters and Keeley (2010) using an alternative version ("PAM-8" and "PAM-10" respectively) without reporting adequate validity or reliability. The broad categories and questions of this instrument allow for use in diverse populations, but were not specific enough to assess particular outcomes like participation at CR.

Arnetz et al. (2010) utilized the Patient Involvement Questionnaire which was specifically developed to measure involvement of patients receiving care for AMI. The instrument was originally 53 four-point Likert-scale questions divided into six subscales and has demonstrated adequate validity and internal reliability (Cronbach α = 0.75 or higher) for each scale (Arentz, Höglund, Arnetz, & Winblad, 2008). Arnetz et al. (2010) only used three of six scales in a follow-up study and still maintained the instrument's validity and reliability. Although this instrument has not been validated to the extent of the PAM, the unique design and validation in the AMI population lends this instrument to be better suited for a study focused on promoting patient engagement in AMI to encourage CR participation.

Outcomes.

Despite the consistency in measurement of patient engagement, the primary outcomes of each study varied considerably and included: healthcare utilization (Mitchell et al., 2014; Peters & Keeley, 2017), health behavior outcomes and treatment adherence (Arnetz et al., 2010; Peters & Keeley, 2017; Witt et al., 2016), attendance at cardiac rehab (Witt et al., 2016; Arnetz et al., 2010), health-related quality of life (Erskine et al., 2017), and peer support/relationship factors (Witt et al., 2016; Bertoni et al., 2014). Overall, the studies found higher levels of engagement were associated with increased health-related quality of life and lower levels of engagement were associated with increased healthcare utilization and adverse outcomes, consistent with the more broad patient engagement literature. Social support and positive relationship with partners was associated with higher levels of engagement and adoption of health behaviors.

Erskine et al. (2017) (*N*=1042) examined the relationship between patient activation and health-related quality of life after hospitalization for acute coronary syndrome at one, three, and six months post-discharge. Fifty percent of the sample was categorized into the lowest levels of patient activation (Level 1 and Level 2). Patients with higher scores of physical health-related quality of life ($p<0.001$), mental health-related quality of life ($p<0.001$), and disease-specific health-related quality of life (as measured by Seattle Angina Questionnaire) ($p<0.001$) were more likely to have higher activation levels.

These positive correlations were counterbalanced by patients with the lowest levels of activation who were found to be OR 1.95 times (95% CI [1.05-3.62]) more likely to experience a clinically meaningful decrease in general mental-health related quality of life than the most activated patients (Level 4) at 1 and 6 months post discharge. And OR 2.69 times (95% CI [1.36-5.3]) and OR 2.18 times (95% CI [1.17-4.05]) of experiencing a clinically meaningful decline in disease-specific quality of life over six months. No statistical significant association was found for lower patient activation levels and physical health-related quality of life. External validity this study is limited by high attrition rate (53%) and lack of diversity in sample (87% white; 61% male) with significant differences in excluded patients compared to included.

Mitchell et al. (2014) (*N*=695) explored the role of patient activation in 30-day hospital readmissions status for patients with cardiopulmonary diseases. Primary outcome of the sum of all unplanned hospital utilization within 30 days found patients with lower levels of activation were 1.75 (Level 1) to 1.5 (Level 2) times the risk of reutilization of the hospital within 30 days compared to participants in Level 4 (Incident Rate Ratio [IRR] 1.75, 95% CI [1.18, 2.60], $p<0.001$ and IRR 1.5, 95% CI [1.06, 2.13], $p<0.001$ respectively). Patients at Level 3 also had a 1.30 times higher rate of reutilization (IRR 1.3, 95% CI [0.94, 2.13], $p=0.03$) compared to patients at the highest Level 4. Lower levels of patient engagement were also associated with low health literacy, less education, disabled or retired, or higher levels of depressive symptoms (Mitchell et al., 2014).

Witt et al. (2016) (*N*=157) conducted a quasi-experimental design to assess the impact of peer-support on quality of life, social support, emotional and physical health of women with cardiovascular disease participating in peer support group. Fifty-nine percent of the 157 women who participated in the online survey reported referral to CR, with 98% of those referred attending at least one session, and 89% completing the program; 89% of participants also reported taking their medication “all the time”. Women who reported high level of social support (as documented by the ENRICHED Social Support Inventory) were > 2 times more likely to report a high level of patient activation (OR 2.23, 95% CI [1.04, 4.76], $p=0.012$) (no confidence interval reported). Limitations of this study include small sample size, self-reported measures, and sample bias (self-selected, only female participants, predominately wealthier, with higher education) decreases external validity.

Bertoni et al. (2015) (N=146; 36 singles; 64 in couple relationship; 46 partners) conducted a descriptive correlational study to evaluate the individual and relational factors affecting patient engagement status post an acute cardiac event. The relationship with the partner had the potential to have both a positive and negative effect on patient engagement. Over protective, depressed, or poor understanding/perception of disease severity could negatively influence the patient's level of engagement (r=-.37, p< 0.05; r=-.52, p < 0.01 r=-.36, p<0.05; and r= -.30, p<.0.05 respectively). On the other hand, Bertoni et al. identified that patients who had a partner perceived their illness to be less severe and tended to be more engaged in their health care than single patients (t=-2.83, df=93, p=0.006 and t=2.04, df=90, p=0.044 respectively).

Of note, patients who were less depressed (r= -.27; p<0.01), more confident in managing their health (self-efficacy) (r=.50, p<0.001), or felt more informed about their disease (r=.33, p<0.01), were more likely to be engaged in their health compared to those that were not (Bertoni et al., 2015). This again highlights how providing patients with information is a key part of promoting engagement. Small sample size, exploratory study design, older age of sample, and four instruments lacking acceptable validity (Cronbach $\alpha < .70$) limit interpretation.

Findings from this study suggest interventions to promote patient engagement should include emphasis on reaching patients without a partner who are less likely to be engaged, provide education on illness knowledge and illness severity to promote confidence in the patient, and include the patient's partner in the intervention to facilitate healthy partner role that promotes engagement. All of these can be addressed by using a QPS in the acute care setting that not only provides education about CR, but also could potentially help individuals who lack a support system be more engaged. Also it should be noted that CR itself can provide a second layer of support after discharge making recommendation to attend even more imperative

Peters and Keeley (2017) (*N*=93) evaluated level of patient engagement and association with adverse clinical outcomes including unplanned readmissions, emergency department visits, and medication errors at first follow-up at MI clinic (10 days post discharge). This study identified significant associations between lower PAM and the defined adverse clinical outcomes (OR 1.63, 95% CI [1.020-1.109], *p*=0.00441), as well as continued tobacco use (OR 1.060, 95% CI [1.005-1.118], p=0.0325). Younger age (OR 0.953, 95% CI [0.914, 0.994], *p*=0.0244), female gender (OR 13.676, 95% CI [3.211, 58.251], *p*=0.0004), and increased burden of comorbidities (OR 2.738, CI [1.675, 4.475] were also identified as predictors of the primary outcome. Findings from this study reiterate the association between increased healthcare utilization and lower patient engagement levels. This study also identifies vulnerable subpopulations, such as females, that are at higher risk for lower engagement who may benefit from targeted interventions to promote engagement and improve outcomes.

The implications of this study are limited by small sample size and potential for selection bias. The criteria of female gender as a predictor of increased adverse clinical outcomes is subject to scrutiny with a wide confidence interval. This finding warrants further exploration and validation in future research. Another weakness of the study is the authors used a modified version of the PAM (PAM-10) without reporting reliability and validity.

Arnetz et al. (2010) (*N*=591) conducted a descriptive correlation study to evaluate the impact of patient involvement during hospitalization for AMI on health behavior outcomes 6 to 10 weeks post discharge, including attendance at CR. Using three of the six validated subscales (Patient needs, Information, and Treatment plan) from the Patient Involvement Questionnaire, Arnetz et al. evaluated the level of involvement associated with select medical, behavioral, and secondary prevention outcomes. Patients with more cardiac symptoms post-discharge had lower scores on their perception of involvement during hospitalization in the areas of Patient Needs for symptom of *shortness of breath* ((Mann-Whitney U, Z=-2.0, $p<0.05$) and Information for symptom of *angina* (Mann-Whitney U, Z=-2.9, $p<0.01$).

The study reported that patients who were less satisfied with how their needs were met (lower Patient Needs scores) during the hospitalization were more likely to attend CR than those who had higher scores ($p<0.01$). No association was found between patient in-hospital involvement and medication compliance. For secondary prevention outcomes of smoking cessation and achieved blood pressure control, a statistically significant association was noted for patients with lower scores on the Patient Needs scales and treatment scale respectively ($p<0.05$ in both respects), but in secondary analysis with logistic regression, the associations were weak

In contrast with Witt et al.'s findings, this study found an association with lower patient engagement and CR participation. Further research is needed to better understand this relationship. Although the authors used robust statistical analysis and utilized a patient-specific validated instrument, high attrition rate (24%), and recall bias from patient self-administered surveys conducted six to ten weeks post discharge are notable limitations.

Summary and gaps in patient engagement literature.

In summary, as consistent with other patient populations, lower patient activation or engagement in the AMI population is associated with increased healthcare utilization and adverse outcomes, making promotion of patient engagement a key aspect of post-MI care. As none of the studies measured patient engagement during hospitalization and only one study assessed the effect of an intervention (peer support) (Witt et al., 2016), future research is needed to explore the role of patient engagement for inpatients and in response to evidenced-based interventions, such as a QPS. These studies also highlight inconsistent findings of the relationship between patient engagement and CR participation, warranting further research. Continued testing of both the PAM and the Patient Involvement Questionnaire in the inpatient setting may also shed light on how inpatient engagement may change over time and influence outpatient outcomes, including CR participation. This study can explore the use of a QPS in the inpatient setting and the role of patient engagement in encouraging CR participation, which in addition to patient engagement, may improve patient outcomes in this population.

Question Prompt Sheet Literature Review

The third and final review of the literature on use of a question prompt sheet was conducted spanning research from 2007 to July 2017. Electronic databases PubMed, CINAHL, Cochrane Library, and Google Scholar were searched using the following terms: “question prompt list,” “question prompt sheet,” “patient questions,” “question asking,” and “asking questions.” Review limited by date (as above), because of the volume of literature on this particular topic, and age (≥ 19 years). Ancestry search of pertinent articles was pursued to identify any additional studies. Due to the lack of literature related to a QPS in cardiology patients after 2007, any cardiology studies identified were included regardless of publication date. For the purposes of this review, “question prompt list” and “question prompt sheet” terms are interchangeable. Inclusion criteria for literature review as follows:

- Evaluate the effect of a QPS on patient question-asking behavior, patient participation, or patient engagement in patient-provider interaction. Or studies that assessed the feasibility or usefulness of a QPS.
- QPS intervention administered to patient in paper/written form.

- One of the outcomes measured number of questions asked by patient in response to QPS.

Exclusion criteria for literature review includes:

- QPS administered via internet, phone app, or computer application.
- QPS designed specifically to increase participation in clinical trials.
- Studies focused on the development rather than efficacy of QPS.
- QPS use in the pediatric setting, mental health, or focused only on caregiver participation.

Of the 839 articles identified in the initial search 15 studies met inclusion criteria for this review (Figure 1). Although a Google Scholar search resulted in 687 using only the first two search terms listed in search strategy, only 31 were selected by relevancy search of titles/abstract. Study designs included four systematic reviews (Dimoska, Tattersall, Butow, Shepherd, & Kinnersley, 2008; Henselmans, de Haes, & Smets, 2013; Kinnersley et al., 2007; Sansoni et al., 2015), with Kinnersley et al. (2007) including a meta-analysis. Eight RCTs (Bolman, Brug, Bär, Martinali, & van den Borne, 2005; Clayton et al., 2007; Eggly et al., 2016; Galliher et al., 2010; Martinali, Bolman, Brug, van den Borne, & Bar, 2001; Shirai et al., 2012; Smets, van Heijl, van Wijngaarden, Henselmans, & van Berge Henegouwen, 2012; van Weert, Jansen, Spreeuwenberg, van Dulmen, & Bensing, 2011), two pre/post quasi-experimental studies (Dimoska et al., 2012; Yeh, Cheng, Chung, & Smith, 2014), and one qualitative descriptive study (Brandes et al., 2014) were also included.

Sample characteristics.

Oncology patient populations predominated the study samples (Brandes et al., 2014; Clayton et al., 2007; Dimoska et al., 2008; Eggly et al., 2016; Henselmans et al., 2013; Shirai et al., 2012; Smets et al., 2012; van Weert et al., 2011; Yeh et al., 2014). Two of the systematic reviews (Kinnersley et al., 2007; Sansoni et al., 2015) and one RCT (Galliher et al., 2010) included heterogeneous patient populations, and only two studies evaluated a QPS in patients with cardiology diagnoses (coronary artery disease [CAD]) (Bolman et al., 2005; Martinali et al., 2001). All but one study was conducted in the outpatient setting (van Weert et al., 2011).

Sample sizes (*N*) of the RCTs, quasi-experimental and descriptive studies ranged from 30 to 832 patients, and in the seven studies reporting clinician participation in the intervention, a range of one to 48 providers participated. Sample size reporting was inconsistent across the systematic reviews, but Dimoska et al. (2008) reported *N*=2,159 from 15 studies (including 9 RCTs) with study sample size ranging from 60 to 479, and Kinnersley et al. (2010) reported *N*=8,244 (33 RCTs) with sample sizes ranging from 50 to 318.

Mean age of all studies that reported this demographic was 56.5 years (Brandes et al., 2014; Dimoska et al., 2008; Eggly et al., 2013; Yeh et al., 2014). None of the studies approached balanced minority representation and Eggly et al. (2013) strictly recruited black patients and white providers. Study samples were predominantly male with exception of Dimoska et al. (2012), with one study and one systematic review approaching equal gender representation (Brandes et al., 2014; Dimoska et al., 2008). Three RCTs did not report baseline demographics (Bolman et al., 2005; Martinali et al., 2001; van Weert et al., 2011).

Interventions.

The QPS interventions included in the systematic reviews were heterogeneous. The types of interventions included QPS alone, QPS plus coaching or communication intervention, QPS combined with physician-endorsement, or patient-initiated question list (Dimoska et al., 2008; Sansoni et al., 2015; Henselmans et al., 2013; Kinnersley et al., 2010). Henselmans et al. (2013)

also included non-QPS interventions as part of their review. Kinnersley et al. (2010) was the only review to organize studies by when the intervention was delivered: immediately prior to consultation or sometime before the day of consultation.

Of the RCTs, quasi-experimental and descriptive studies, QPS interventions were either implemented in isolation or paired with a coaching or communication intervention for patients with or without provider education. Only Clayton et al. (2007) included physician endorsement of QPS. The majority of the studies looked to prepare patients for an upcoming appointment or consultation. The number of questions on the QPS varied broadly from three to 112 questions with five studies failing to report the length of the QPS (Dimoska et al., 2012; Henselmans et al., 2013; Kinnersley et al., 2007; van Weert et al., 2011). Three studies focused on feasibility of the QPS (Dimoska et al., 2012; Shirai et al.,2012; Yeh et al.,2014).

Primary outcome for systematic reviews.

For primary outcome of question-asking behavior, all four systematic reviews found some improvement in number of questions asked in the intervention groups who received QPS compared to control, particularly with specific topics of questions and physician endorsement (Dimoska, et al., 2008; Henselmans, et al., 2013; Kinnersley et al., 2007; Sansoni et al., 2015). Dimoska et al. (2008) reported patients who receive a QPS asked statistically more questions than those in control in three out of six studies.

On the other hand, Sansoni et al. (2015) (*N*=42 studies) found no statistical difference in number of questions asked in 10 out of 20 single/ multiple intervention studies (comparing QPS to control or additional intervention). Four studies with five interventions demonstrated statistically significant differences in question asking among patients who received QPS. Another study found that the number of questions increased with the addition of a broader, patient-written QPS, as compared to a pre-scripted list, however this was not statistically significant (Thompson, 1990 as cited in Sansoni et al., 2015). Physician endorsement accompanied the QPS in four out of five studies that reported more questions or concerns, with one study reporting no difference. Of the 10 combined intervention studies (QPS plus coaching or communication intervention) that measured total questions asked, six studies with seven interventions demonstrated a significant increase in question asking in the QPS group. In this review it is important to note that a higher percentage (70%) of studies that endorsed or encouraged patients to use QPS (combined interventions) noted a statistically significant difference compared to those studies who did not (29%).

Henselmans et al. (2013) (*N*=46 studies, 24 RCTs) systematic review of oncology patients observed eight out of the total 11 studies measured question-asking behavior, and three of those eight studies demonstrated statistically significant increase in the number of questions asked by the QPS intervention group. Henselmans et al. (2013) was the only systematic review to assess the impact of QPS on patient participation (e.g. reporting pain, patient-controlling behaviors, or expression of concerns) and found the intervention groups had statistically higher levels of participation in five of the six studies. In Kinnersley et al. (2007) (*N*=33 RCTs), six of the 17 studies analyzed question asking as an outcome, and demonstrated a small, but statistically significant increase in question asking in the intervention group compared to the control. This finding was confirmed by the meta-analysis (Standardized Mean Difference [SMD] 0.27, CI 95% [0.19, 0.36]).

Primary outcome for individual studies.

Of the 11 individual studies in this review, six measured number of questions asked (Clayton et al., 2007; Eggly et al., 2016; Galliher et al., 2010; Shirai et al., 2012; Smets et al., 2011; van Weert et al., 2011) and four of the six studies (Clayton et al., 2007; Eggly, et al., 2016; Smets et al., 2011;van Weert et al., 2011) reported statistically significant increases in the overall number of questions asked in patients who received QPS compared with control or usual care. Eggly et al. (2016) found a significant difference in increased frequency counts of patient questions or concerns (p=0.02) between those who received a QPS and usual care, however no significant difference was noted when coaching was added to the QPS (p=0.86). Clayton et al. (2007) was the only study to include physician endorsement in QPS intervention finding that patients were 2.31 times more likely to ask questions than the control (95% CI [1.68-3.18], $p <$ 0.0001). Of note, the level of physician endorsement appeared to have a dose-effect on question asking ($X^2 = 34.36$, p<0.0001) (Clayton et al., 2007).

Topics of questions asked.

Three systematic reviews (Dimoska et al., 2008; Henselmans et al., 2013; Sansoni et al., 2015) and three individual studies (Shirai et al., 2012; Smets et al., 2011; van Weert et al., 2011) explored the content of question asked. Of the systematic reviews, two of the three cited an increase in questions asked about particular topics like prognosis or treatment in the majority of studies, even when statistically significant differences in overall question asking was not identified (Dimoska et al., 2008; Henselmans et al., 2013). Sansoni et al. (2015) reported prognosis, followed by treatment/tests, were the most common topic areas reported in the studies reviewed. Whereas two individual studies (Smets et al., 2011; van Weert et al., 2011) found statistical significant increases in questions asked about treatment and procedures for patients who received a QPS compared to no QPS, another study reported no significant differences (Shirai et al., 2012).

Secondary outcomes.

Patient satisfaction, information recall, anxiety, and consultation duration were the other most common outcomes measured and reported in this literature review.

Patient satisfaction.

Of the three systematic reviews that reported on patient satisfaction the findings were mixed, with either a null or positive effect identified overall (Henselmans et al., 2013; Kinnersley et al., 2015; Sansoni et al., 2015). One found no difference in patient satisfaction between QPS and controls (Henselmans et al., 2013), Sansoni et al (2015) found inconsistent evidence to determine the impact of a patient QPS on patient satisfaction, and the Kinnersley et al. (2015) meta-analysis identified a small, but statistically significant increase in patient satisfaction (SMD 0.09, CI 95% [0.03, 0.16]). The systematic reviews acknowledged many of the studies that measured patient satisfaction had high satisfaction across control and intervention groups so a "ceiling effect" may have limited ability to detect statistical significance (Sansoni et al., 2015; Henselmans et al., 2013). Six individual studies (Bolman et al., 2005; Clayton et al., 2007; Martinali et al., 2000; Shirai et al., 2012; Smets et al., 2011; Yeh et al., 2014) measured patient satisfaction and found no statistical difference in patient satisfaction with use of QPS.

Information recall.

The impact of QPS on information exchange and information recall was variable, with mixed results across systematic reviews and individual studies. However, more information recall or perceived exchange was noted in studies where the QPS was endorsed. Sansoni et al. (2015) identified combined interventions of QPS with coaching had more positive effects on knowledge recall, along with when physician encouraged use of the QPS, but evidence was insufficient for the use of a QPS alone. In Dimoska et al.'s (2008) review only one of the three studies that measured information recall saw an increase, but only when QPS was endorsed.

Henselmans et al. (2013) found no difference in knowledge recall between QPS and control groups. Interestingly, the meta-analysis identified a small, but nonsignificant decrease in knowledge in two of the five studies measuring this outcome, with no difference noted in the other three (SMD -0.34 95% CI [-0.94 to 0.25]) (Kinnersley et al., 2015). Kinnersley et al. acknowledged these findings may be confounded by the controls in those studies.

Of the three individual studies that measured information exchange and information recall (Bolman et al., 2005; Clayton et al., 2007; van Weert et al., 2011), only one found statistically significant recall improvement for specific topics of hygiene and symptoms to report ($p < 0.05$) (van Weert et al., 2011), one identified higher conceptual knowledge in the control group compared to the QPS (Bolman et al., 2005), and Clayton et al. (2007) found no difference between QPS and control. Considering that Clayton et al.'s study also included endorsement of QPS, these findings are in contradiction with the results of the systematic reviews.

Anxiety.

Similar to the impact of a QPS on patient satisfaction, research findings on patient anxiety as a result of the QPS were somewhat mixed, but the majority of studies reporting a null or positive effect. Patient anxiety was measured with a variety of different instruments, but the Spielberger State-Trait Anxiety Inventory was the most common. Kinnersley et al. (2010) found a non-statistical trend in decreased anxiety for patients who received QPS intervention just prior to consultation, Sansoni et al.'s review (2015) bore inconsistent findings across studies, and the other two reviews cited no difference (Dimoska et al., 2008; Henselmans et al., 2013). Only three individual RCTs measured patient anxiety, with Clayton et al. (2007) finding no difference between intervention and control. Bolman et al. (2005) and Martinali et al. (2001) both identifying decreased anxiety in the intervention groups ($F\ (2,102) = 4.30$; $p = 0.04$ and $F\ (1, 94)$

=56.15; *p*=0.02 respectively). However, Bolman et al. only identified this difference at the first appointment and in subsequent appointments the QPS did not see any impact anxiety. Yeh et al. (2014) also measured anxiety and found an overall decrease of anxiety from pre-to post-consultation (*p*<0.005).

Duration of consultation.

The impact of QPS on length of consultation was also variable across systematic reviews and individual studies, but the majority of studies cited null or some increase in length of consultation. Dimoska et al. (2008) identified five studies that measured consultation length with three out of five showing no difference between QPS and control, and one each demonstrating an increase and decrease in consultation length. Sansoni et al. (2015) identified six studies that lengthened consultation (notably most of these studies also had positive findings for question-asking behavior), 11 studies showed no difference, and two studies demonstrated shorter consultation in the intervention groups. Henselmans et al. (2013) echoed Dimoska's findings of mixed results and Kinnersley et al. (2007) noted only three of 17 studies with statistically significant increase in length of consultation for QPS intervention, with meta-analysis revealing a small, but not significant increase (SMD 0.10 95% CI [-0.05 to 0.25]).

Four RCTs evaluated the QPS impact on length of consultation and two studies found no difference between QPS and control group (Smets et al., 2011; Eggly et al., 2016). Clayton et al. (2007) found QPS increased consultation by 7 minutes (*p*=0.002), and Bolman et al. (2005) had mixed results with first consultation showing a significant decrease in consultation time and the third consultation showing a significant increase in consultation time.

Usefulness and feasibility.

Five studies evaluated some or all aspects of usefulness and feasibility of QPS for patients during consultations with the majority of studies reporting positive feedback from patients and physicians without affecting workflow (Bolman et al., 2005; Brandes et al., 2014; Dimoska et al., 2012; Shirai et al.,2012; Yeh et al., 2014). Many patients and their caregivers found the QPS easy to use (Bolman et al., 2005; Brandes et al., 2014; Dimoska et al., 2012; Martinali et al., 2000), reported the QPS helpful in facilitating question asking (Brandes et al., 2014; Shirai et al., 2012; Yeh et al., 2014), and endorsed that they would use it again in future encounters (Shirai et al., 2012; Bolman et al., 2005).

Studies also reported QPS had no negative effects on physician workflow or consultation (Yeh et al., 2014; Dimoska et al., 2012). Dimoska et al. (2012) noted over half the clinicians found the QPS made communication easier and did not affect consultation duration. Dimoska et al. (2012) also reported of the 139 patients surveyed post-consultation, 89% reported using it and 44% reported referring to it a least once during the consultation. Consistent with patient education and information needs reviewed earlier, Brandes et al. (2014) found patients individualized the QPS to meet their information needs and rarely asked questions directly from QPS.

Limitations of QPS literature.

The results of these studies should be applied with knowledge of their limitations as only Kinnersley et al. (2010) approached strong study design with Cochrane review protocol and meta-analysis. Dimoska et al. (2008) results should be interpreted in context of older population (average age study > 50 years old) and potential bias since the same author was responsible for publishing half of the studies in the review. Sansoni et al. (2015) review's methodology with rapid review weakened the rigor of the study design and the absence of report of study designs included in the review warrants scrutiny. Henselmans et al. (2013) review is limited by the significant variance in study types, lack of demographics information, and limited search strategy. Smets et al. (2011) suffered from unclear blinding protocols in the study design. Other limitations included poor descriptions of randomization technique (Clayton et al., 2007; Martinali et al., 2001; Smets et al., 2011), selection bias with clustered/stratified randomization (van Weert et al., 2011; Galliher et al., 2010), and lack of physician blinding (Clayton et al., 2007; Martinali et al., 2000). Inherently, the QPS intervention was difficult to blind from physicians, particularly if endorsement was part of the intervention (Clayton et al., 2007). Bolman et al., 2005 demonstrated poor randomization technique with significant gender differences between groups. The external validity of the RCTs, quasi-experimental and descriptive studies is also limited to oncology populations, with only three studies evaluating a QPS in patient with non-oncology diagnoses (Bolman et al., 2005; Martinali et al., 2001; Galliher et al., 2010).

Results of studies in which patients and providers self-reported participation are susceptible to recall bias and the Hawthorne effect when patients and providers were observed (Bolman et al., 2005; Galliher et al., 2010; Martinali et al., 2001; Shirai et al., 2012). Several of the studies in this review lacked power (Brandes et al., 2014; Galliher et al., 2010; Shirai et al., 2012; Smets et al., 2011; Yeh et al., 2014) or focused on specific culture or ethnicity (Eggly et al., 2016; Shirai, et al., 2012) which limits the external validity of these findings.

Study design of pre/post-test single group (Dimoska et al., 2012; Yeh et al., 2014), lack of power analysis (Bolman et al., 2005; Martinali et al., 2001; van Weert et al., 2011), and high attrition or missing data (Brandes et al., 2014; Bolman et al; 2005; Smets et al., 2011), were also notable limitations. Brandes et al. (2014) and Yeh et al. (2014) were prone to selection bias with only one provider involved in study. Galliher et al. (2010) lacked inter-rater reliability between coders and two studies were missing adequate description of control interventions (Clayton et al., 2007; Bolman et al., 2005).

Summary and Gaps in QPS Literature.

The QPS literature suggests the potential to increase patient question asking and participation in consultation, particularly when related to specific patient needs (treatment and prognosis), combined with coaching, and when endorsed by a provider. Although the results of these studies were not unanimous in the effectiveness of a QPS to improve question asking behavior, several studies, including the meta-analysis of 33 RCTs demonstrated that a QPS can increase patient question asking and participation in consultation. The specific questions asked by patients more frequently in response to a QPS reflected the topics identified in education literature in which patients expressed wanting more information about prognosis and future treatment options.

A consistent null or positive effect on both patient satisfaction and anxiety infers that a QPS is a safe intervention with potential to influence the patient experience, a key part of patient-centered care. A QPS should not be used for education alone, as the literature suggests no increases in knowledge or recall of information, but there are strong indications QPS influences patient-provider communication, which enhances patient-centered care. The literature also supports the feasibility of this intervention in that both patients and providers find it: helpful in encouraging patients to ask questions, easy to use, and, generally, not increasing physician workload. As evident by the literature reviewed, these outcomes are based on mixed findings and limited to the outpatient setting which warrants further exploration in the inpatient setting.

Another gap exists in using this type of intervention with acute cardiology populations. Only one study was conducted in the inpatient setting (van Weert et al., 2011), and two different studies evaluated patient engagement in patients diagnosed with coronary artery disease with lack of significant results (Bolman et al., 2005; Martinali et al., 2001). This review demonstrates a unique opportunity wherein the gaps of literature regarding use of a QPS in the inpatient setting with cardiology populations should be explored.

A CR-specific QPS paired with physician endorsement and nurse education has the potential to address these gaps in literature and promote patient engagement during hospitalization for patients' diagnosed with AMI. Furthermore, because of the influence of patient engagement on the patient's proactivity in their own care, some educational benefits may be observable due to the activation of patients' knowledge, confidence, and skill.

Theoretical Framework

In considering how to promote patient engagement, Bandura's social cognitive theory offers assistance (Bandura, 1986). This theory suggests that a behavior, such as asking questions, is affected by the dynamic relationships between personal, environmental, and behavioral factors (Figure 2). If a patient perceives they are capable of asking questions, known as self-efficacy, and has the knowledge and skills to enact that behavior, patients may be more inclined to ask questions. As this model highlights, the patient's decision to participate in a behavior does not occur in isolation, but rather is influenced by responses of the healthcare team, family, and friends. Responses to the patient's questions can either negatively or positive reinforce question-asking behavior.

Methods

Patient-centered care is essential to improve patient outcomes and decrease healthcare costs. Promotion of patient engagement, as a necessary part of patient-centered care, can help patients and families develop the knowledge, skills, and confidence to become "active" in managing their health. Research demonstrates higher levels of engagement can lead to improved patient outcomes and adoption of health-related behaviors, making the development of interventions to promote patient engagement a priority. A CR-specific QPS for patients hospitalized with AMI has potential to promote patient engagement and influence patient intention to attend CR post-discharge.

Purpose

The purpose of this study was to examine the feasibility of utilizing a CR-specific QPS to promote patient engagement in interprofessional bedside rounds for inpatients with AMI. The study team hypothesized that individuals with higher levels of engagement would be more likely to express intention to attend CR.

Definitions

The following definitions are included to provide clarity and understanding of the study:

- Cardiac Rehabilitation (CR): A multidisciplinary program designed to improve the overall health of individuals with cardiovascular diagnoses through prescribed and individualized exercise programs, cardiac risk factor modification, and psychosocial counseling (Mampuya, 2012). CR traditionally has three phases. For the purposes of this study, CR will indicate Phase II unless otherwise indicated. Phase II is an outpatient program initiated within first few months after a cardiac event or surgery and is physician prescribed with supervised exercise.
- Patient Engagement: (1)” understanding the importance of taking an active role in one’s health and health care”, (2) having the “knowledge, confidence, and skill” to manage health, and (3) using the knowledge, confidence, and skills to enact health-promoting behaviors (Simmons et al., 2014, p.9).

- Question Prompt Sheet (QPS): A list of questions provided to the patient by the care team, where the patient selects which questions they want to ask their licensed independent provider (Sansoni et al., 2015).
- Acute Myocardial Infarction (AMI): Includes Non-ST elevated and ST-elevated MI with or without percutaneous intervention including both type 1 (atherosclerotic plaque rupture) and type 2 (myocardial injury with necrosis secondary to condition other than coronary artery disease) (Thygesen et al., 2012).

Research Design and Setting

A descriptive correlational study was implemented on two acute care cardiology units (58 bed) at a rural academic medical center in Southeast United States. This study was conducted as part of a patient care initiative to provide all AMI patients on the two units with education about CR and encourage question-asking behavior. Common diagnoses on these units included AMI, heart failure, peripheral vascular disease, arrhythmias, stable heart transplant, and left ventricular assist devices. The acute cardiology service on these two units historically provides care to approximately 15 AMI patients per month with high month-to-month variability. The interprofessional team that conducts daily structured bedside rounds on these two units includes an attending, fellow, and resident physicians, clinical nurse, social worker, case manager, and pharmacist. Interprofessional rounds are conducted Monday through Friday from 9:00am to 11:30am with exception of holidays and weekends. The acute cardiology service is divided into four different teams with two attendings; one heart failure and one acute cardiology. Each team has an intern and resident physician. All the physicians on the acute cardiology serve (ACS) rotate off service approximately every one to three weeks.

Bedside interprofessional rounds last approximately six to ten minutes per patient and are primarily focused on discussing the plan of care and discharge needs. The intern or resident leads the initial presentation of the patient and plan-of-care outside the room, and then each discipline is given the opportunity to discuss priorities or concerns. After interprofessional team collaboration, the entire team enters the patient's room and introduces themselves to the patient. The resident or intern then presents the plan of care to the patient and asked if the patient had any questions. If a patient is off the floor or in the bathroom, the team skips the bedside portion of rounds understanding that members of the team would return to discuss particular aspects of the plan when the patient was available.

Approval for the implementation of study (Figure 3) and institutional consent for chart review (Figure 4) were obtained from hospital administration. Internal Review Board approval was obtained from institution (Figure 5).

Sample

A convenience sample included adult patients (age ≥ 19 years old) hospitalized with primary or secondary diagnosis of AMI admitted to the ACS between October to December. Patients were determined eligible if they met the following criteria: (1) adults hospitalized with primary or secondary diagnoses of AMI, (2) admitted to the acute cardiology service from October to December, (3) English-speaking, and (4) able to read questions on QPS back to observer. Patients were excluded if they were: (1) non-English speakers, (2) altered mental status (e.g. diagnoses of dementia per chart review, positive screening for delirium with score ≥ 2 on Nursing Delirium Screening-delirium screening tool (NuDESC) (Hargrave et al., 2017) within past 48 hours, or clinical nurse concern regarding change in patient mental status), or 3) primary medical team a non-ACS service.

A convenience sample of physicians was also recruited to participate in study. Physicians had to be English-speaking and providing patient care on the acute cardiology service. Any physician not meeting those two criteria was excluded. All physicians on the acute cardiology service and nurses on both units were invited to voluntarily participate in supplementary education regarding CR, patient engagement, and QPS.

Procedures

Study was conducted prospectively over eight weeks beginning with physician education at the end of October.

Question prompt sheet.

A twelve-question QPS (Figure 6) was developed at the sixth-grade reading level with the input from an attending cardiologist, patient education services, CR and hospital nursing staff using evidenced-based literature (AACVPR, 2018; AHA, 2016; Neubeck et al., 2011; Smith et al., 2011; Thomas et al., 2010). Two questions from the American Heart Association patient resources on CR were included with copyright permission obtained (American Heart Association, 2017). Participants potentially eligible for the study were identified by the charge nurses prior to morning rounds and eligibility confirmed by researcher with chart review. The shift managers on each unit received basic training on the study protocol through written instructions prior to implementation. Eligible patients were provided education regarding CR and QPS by either the researcher or one of three trained observers before the beginning of morning rounds. Patients were encouraged to ask questions about CR or other aspects of their care during rounds.

Physician and nursing education.

In addition to the QPS for the patient, the physicians and nursing staff received education regarding CR, patient engagement, and the QPS. Physician education was provided through five-minute verbal presentation with handouts weekly for seven out of the eight weeks of the study period. They were encouraged to endorse CR to the patient and family during rounds and refer patients to the QPS to encourage patient engagement.

Nursing staff on both units received a five-minute verbal presentation and handout during morning huddle or individualized teaching sessions. This education was provided prior to and during the first two weeks of the study. Nurses were also asked to help research team identify eligible patients. Nurses who were unable to attend these sessions received an emailed version of the presentation. Nurses were encouraged to discuss CR and the QPS with their patients and encourage patients and families to ask questions.

Measures

Patient engagement was measured by: (1) observed number and type of questions asked patient or family during morning rounds, and (2) number of questions asked about other topics related to MI care, and (3) patient perception of patient engagement as measured by Patient Involvement Questionnaire. Further data collection included observed physician statements of endorsement of CR and QPS at patient bedside, demographics of patients and physicians, patient and physician self-reported perception of intervention, and patient self-reported intention of attending CR post-discharge. The methods of measurement included direct observation, chart review, physician, and patient self-administered questionnaires.

Data collection.

Observation

Physician endorsement and patient question-asking behavior were measured with direct observation during rounds. Only one observer was present on a given day to observe eligible patients. The observer stood with the interprofessional team during the rounds outside the room, and then observed bedside rounds from the doorway once team entered patient room. The observers received training on the study protocol prior to implementation. Although three observers were trained, only one observer and the researcher conducted observations. No simultaneous observations were conducted during study period. Eligible patients and physicians providing care to eligible patients were observed under waiver of consent to prevent alteration of behavior and ensure data validity.

To control for variability in observation practices, a standardized observation checklist was developed (Figure 7) and team members received standardized training about the observation protocol. Prior to the start of the study the researcher and observers practiced observations with the checklist during the rounding process to compare observations, resolve any incongruences, and test checklist feasibility. Patients were observed every day during the rounding process for the entire length of stay. Physician endorsement of CR was marked as present or not present and endorsement of QPS was coded as absent, basic, or extensive, mirroring methodology incorporated into a previous study (Clayton et al., 2007).

Questionnaires

Two subscales of the Patient Involvement Questionnaire (PIQ) measured patient engagement. (Arnetz et al., 2008; Arnetz et al., 2010). This 53-question four-point Likert scale instrument was designed to assess patient perceptions of involvement during hospitalization while receiving care for acute myocardial infarction care and has demonstrated good validity and internal reliability in all six subscales (Arnetz, et al., 2008; Arnetz et al., 2010). The subscales of Information, Patient Needs, and Treatment Planning subscales were found to have higher and significant correlation to patient readiness (self-reported) for discharge (Arnetz et al., 2008).

The Patient Needs subscale refers to the degree to which patients' needs were fulfilled related to questions asked, understanding information, respect, and opportunity to discuss treatments and medications (Arnetz et al., 2010). Treatment Planning refers to the "patient's role in discussing examinations and treatment options, treatment goals and participating in planning post-discharge care" (Arnetz et al., 2010, p. 302). Because this study was focused on assessing patient's readiness for attendance at CR after discharge and minimizing patient burden, only the Patient Needs and Treatment Planning subscales were utilized for a total of 11 questions (validity $\alpha = 0.81$ and $\alpha = 0.76$ respectively) (Arnetz et al., 2010) (Table 1). Subscale questions were made more specific to CR and MI with author permission (Figure 8).

Eligible patients who were observed during their stay were approached to complete questionnaire on the day before or day of discharge. Patients received written IRB-approved scripted consent (Figure 9) and provided documentation of consent by completing the questionnaire. Patients were given 30 minutes to self-administer the PIQ as well as a supplemental four questions in five-point Likert Scale design developed for this study to assess helpfulness of QPS and perception of strength of physician endorsement to CR (based on previous study) (Tsui, Shanmugasegaram, Jamnik, Wu, & Grace, 2012). Intention to attend cardiac rehab was collected via yes/no response. The researcher and observers were available if patients had questions or needed assistance in filling out the questionnaire. Indication of any patient utilizing research staff to facilitate completion of the questionnaire was recorded.

Physician perception of QPS intervention and education was obtained through self-administered questionnaire. The questionnaire was developed for this study based on evidenced-based literature (Ghisi, Polyzotis, Oh, Pakosh, & Grace, 2013) and cardiologist input. The five-point Likert scale questions assessed perception of helpfulness of education and patient QPS, self-evaluation of current practices in endorsement, referral to CR, and barriers to endorsement of CR in the inpatient setting (7 questions) with one open-ended question for feedback. Any physician on the acute cardiology service was invited to fill out a questionnaire once during their rotation at the weekly educational session. Physicians received IRB-approved scripted consent with opportunity to participate in post-procedure questionnaire (Figure 10). Drop-off location provided in work room to account for demands of physician schedule and provide flexibility in filling out questionnaire.

Demographics.

Demographics of patients were collected via chart review of electronic medical record and self-reported questionnaire. Chart review included age, gender, length-of-stay, and diagnosis of MI of both included and excluded patients. Other demographics were only collected on patients who completed self-reported pre-discharge questionnaire including race, level of education, county, history of MI, PCI or CABG, tobacco use, marital status, and employment status. Presence of CR nurse providing education to patients was also obtained via chart review on patients included in the study. Physician demographics were obtained through a self-reported questionnaire including age, gender, role (intern vs attending), and years of experience.

Data analysis

Data was organized and analyzed with SPSS® v.24 statistical software (Unicom). All data was non-parametric except for age of included patients. Descriptive statistics were calculated for demographic data and reported as medians and interquartile ranges for continuous variables and frequency and percentages for categorical variables. Question-asking behavior was calculated as median and interquartile ranges of total number of questions asked during length of stay. Questions were further categorized by topics of question and reported as percentages and frequencies. PIQ subscales of Treatment Plan and Patients Needs were computed as median and interquartile range individually. Similar to Arnetz et al. (2010), the average of the scales was converted to a score and reported on scale from 0 to 100 with higher scores indicating higher perception of engagement. Rates of physician endorsement of CR and QPS, and patient self-reported intention to attend CR were reported as frequencies and percentages. For patients and physician self-reported surveys, median and interquartile range were calculated for Likert scale questions and barriers to patient engagement on physician survey were reported as frequency and percent.

For inferential analysis, a Mann Whitney *U* was computed to determine the difference in question-asking behavior of those who expressed intention to attend CR versus those who did not. This same analysis strategy was used for Treatment Plan and Patient Needs subscales scores and intention to attend CR. An exact Chi-Square test was computed to determine the relationship between intention to attend CR and observed physician endorsement of CR. Differences between groups were calculated with appropriate statistics (Independent *t*-test, exact Mann Whitney *U,* and exact Chi-square.) All patient and physician data were deidentified for analysis. Significance defined as $p < 0.05$.

Results

From October to December, 42 eligible patients were identified to participate in study. Of the 42 patients who received a QPS, 10 patients who were initially included became ineligible prior to observation, resulting in 32 patients for final analysis (Figure 11). Sixteen patients participated in post-intervention questionnaire prior to discharge and four physicians completed provider questionnaire.

Nonparticipants vs Participants

The 25 patients excluded from the study were similar in age compared to those that were included (median age of 68 years old versus and 68.5 years old) but tended to have longer length of stay (median 5 days versus 3 days) and more severe MI diagnosis with sixteen percent (*n*=25) of those excluded diagnosed with STEMI. The remaining 21 patients were classified as NSTEMI, 9 of which were designated as NSTEMI type 2. The 10 patients who became ineligible prior to observations tended to be younger than the 32 who were observed (median 67.5 years old versus 68.5 years old) and more likely to be male (80% vs. 50%) (Table 2). There were no statistically significant differences in demographics between those who were not observed compared to those who were included, except for MI diagnosis, as 4 patients in the not observed group had non-MI diagnoses.

Demographics

The mean age of patients included in the study (*n*=32) was 66.4 years of age and female and male genders were equally represented (Table 2). All of the patients observed were classified as NSTEMI diagnosis with predominant number of cases designated as type 1 (*n*=21). Median length of stay was 3 days. Of the patients who opted to take the questionnaire (*n*=16), the age was slightly younger than those who opted out, but this was not statistically significant (Table 2). There were no statistically significant differences in demographics for the 16 patients that took the questionnaire compared to the 16 patients who did not. The questionnaire sample was predominantly white (75.0%), married (50.0%), and retired (62.5%), with the majority of patients reporting at least a high school education (75.0%) (Table 3). Of the four physicians who completed surveys, two were interns, one was a second-year resident, and one was a third-year resident, with no representation from fellow or attending physicians. Median age was 29.5 years; one was female, three were male. Physicians reported a median of 1.6 years of experience.

Question-Asking Behavior

The median of the total number of questions asked by patients (*n*=32) on interprofessional rounds during their hospital stay was one (IQR 2). Twelve patients did not ask any questions during their hospital stay. The frequency of questions asked was determined for each hospital day. For the 20 patients who asked questions, nine patients (45%) asked at least one question on hospital day two, followed by 7 patients (35%) on hospital day three, and 5 patients (10%) on hospital day 1. Although patients were the most common individual to ask questions, both the patient and the family asked questions 20% of the time. A total of 52 questions were asked during the study period with 47% of questions focused on treatment and procedures (Figure 12). Only two questions asked about CR. Number of questions asked was not statistically different for patients intending to attend CR versus those who did not (Exact Mann-Whitney U=16, p=.410).

Patient Involvement Questionnaire

Median and interquartile ranges of PIQ scores are reported in Table 4 by subscale. Overall, patients reported higher perceived engagement in the Patient Needs subscale compared to Treatment Planning subscale. The subscale scores of patients who intended to attend CR were not statistically different from those who did not, however, the scores of those who intended to attend CR were higher in both subscales.

Cardiac Rehab

Endorsement.

During interprofessional rounds physicians endorsed CR to five patients (15.6%) and the QPS was endorsed to one patient (3.1%). Three of the four physicians reported referring MI patients to CR *Often* (*n*=2) or *Always* (*n*=1), but also said they endorsed CR to their patients either *Rarely* (*n*=3) or *Sometimes* (*n*=1) (Table 5). Of the 14 patients who answered the question about endorsement on the pre-discharge questionnaire, nine (64%) reported at least some level of physician endorsement of CR (Table 7). Four of the 14 patients (28%) reported *Much* endorsement and 2 patients (14%) reported a *Great Deal* of endorsement. Of the 16 patients responding to the questionnaire, thirteen (81%) report either a nurse or physician discussed CR with them during their hospitalization with seven patients reporting both. Two other patients (13%) reported that a case manager or other individual discussed CR with them. One patient (6%) did not report anyone discussing CR with them. Physicians (*n*=4) identified multiple barriers to CR endorsement with time constraint reported by all physicians, followed by half of the physicians reporting lack of knowledge, perceived patient lack of motivation, and provider workload as additional barriers.

Intention to attend cardiac rehab.

Thirteen patients answered the question about intent to go to CR and 11 (85%) reported positive intention to attend after discharge. All of the patients (*n*=5) with observed physician endorsement expressed positive intention to attend CR, however, this was not statistically significant comparing those who ep (X^2 [1, *N*=13] =1.477, Exact 2-sided *p* =.487). This trend was also noted for patients who reported an RN discussed CR with them during their hospital stay. All the patients (*n*=8) who reported a positive intention to attend CR reported an RN discussed CR with them during their stay (X^2 [1, N=13] =3.782, Exact 2-sided, p= .128). Sixty-three percent (n=32) of patients had documented education from CR nurse as part of Phase 1 CR (Table 2). Of the 11 patients who expressed positive intent to go to CR and were seen by the CR nurse, 9 (82%) of these patients received education from the CR nurse during hospitalization. This finding demonstrated some relationship between CR nurse and intention to attend CR approaching statistical significance (X^2 [1, N=13] =5.318), Exact 2-sided, p= .077).

Patient and Physician Acceptance

The four physicians reported that the education session regarding CR and patient engagement was helpful, and that the QPS sometimes helped patients and families ask questions (Table 5). Two of the physicians reported that QPS increased time with patients, however responses ranged from never to always with only three physicians responding to this question. Patient questionnaire responses reported a median of 4 on a scale from 1 to 5. Patients agreed that the QPS helped them ask questions about CR and helped them think about other questions they wanted to ask about their care (Table 6).

Discussion

To this authors knowledge, this is the first study to look at the use of a QPS to promote patient engagement in an inpatient cardiac population. Patients report helpfulness of the QPS in facilitating question asking about CR and other aspects of MI care, however few questions were observed. Despite lack of statistical significance regarding patient engagement, endorsement, and intention to attend CR, positive trends highlight the potential clinical significance and role of the physician, CR nurse and clinical nurse in patient engagement and CR endorsement in AMI population.

Feasibility of Question Prompt Sheet

In evaluating the feasibility of the QPS, patients endorsed that the QPS helped them ask questions about CR and helped them think of other questions important to their care, even though few questions were observed. These positive findings associated with patient perceptions of the QPS are consistent with previous QPS literature in both cardiac (Bolman et al., 2005; Martinali et al., 2001) and non-cardiac populations (Brandes et al., 2014; Dimoska et al., 2012; Shirai et al.,2012; Yeh et al., 2014). These results suggest that providing patients tailored information and list of questions relevant to their care accompanied by verbal information from clinicians, can help patients feel engaged.

Two physicians reported that the QPS helped patients ask questions, however, 50% (*n*=4) perceived this was associated with an increase in duration of bedside rounds. The literature on during of consultation when a QPS was used has reported the majority of studies saw none to some increase in consult duration using a QPS (Dimoska et al., 2008; Henselmans et al., 2013; Kinnersley et al., 2007; Sansoni et al.,2015). However, this study did not directly measure duration of rounds and perception of length of consult is highly subject to recall bias. Another important consideration is none of the previous studies have evaluated duration of consult with QPS during inpatient rounds. Due to the small sample size and the variability in perceived impact of the QPS on duration of bedside rounds in this study, further research is needed to explore the feasibility of a QPS for inpatient encounters.

Patient Engagement

This study also found that although inpatients diagnosed with AMI who receive a QPS report relatively high levels of engagement, these scores were similar to an outpatient population who did not receive any intervention to promote patient engagement (Arnetz et al., 2010). In spite of similar scores on the subscales, the population in Arnetz et al.'s (2010) study identified an inverse relationship between the Patient Needs subscale scores and attendance CR. The contrast findings in this area may be due to the difference between inpatient and outpatient settings as Arnetz et al. (2010) did not administer the PIQ until 6 to 10 weeks post-discharge. The small sample size of this study may also have been a factor, but, the trend of higher scores in those who intended to go to CR indicates the potential role of patient engagement to facilitate participation at CR. The irresolution of this difference is a reminder for the continued need to research the association between patient engagement and CR with experimental study designs and larger sample sizes.

Question-Asking Behavior

Despite high PIQ scores, patients only asked a median of one question during hospitalization. This is a significantly lower number than other studies where patients received a QPS, who reported an average of 5 to 18 questions per encounter (Clayton et al., 2007; Eggly et al., 2016; Galliher et al., 2010; Smets et al., 2012; van Weert et al., 2011), with the exception of one study who reported similar results (Shirai et al.,2012). Many of the potential reasons for this disparity can be conceived along the difference between inpatient and outpatient settings.

First, the brief observation window during rounds in the inpatient setting may limit the potential for patients to be observed asking questions in contrast to scheduled outpatient appointments. Although van Weert et al. (2011) evaluated the use of a QPS in the inpatient setting, the study looked at nurse/patient communication during a scheduled encounter, which is more similar to the outpatient setting. A second possibility that arises from the inpatient setting is patients have multiple providers available at different times to which they may ask questions instead of going through one clinician in the outpatient setting. And finally, as referenced in the literature on MI education, patients' information seeking tends to peak post-discharge, which further privileges the outpatient setting for increased question asking. On the contrary, one possibility that does not arise out of the differences of inpatient and outpatient settings is the lack of physician endorsement of the QPS, where physician endorsement has been shown to increase question asking behavior in other studies (Clayton et al., 2007). Observational data from this study identified only one patient encounter where the MD endorsed the QPS during rounds. Although this may be unique to this patient's inherent level of engagement it is notable that the patient who received endorsement regarding the QPS also asked a question regarding CR and endorsed intention to attend CR. Because of the logistical challenges to observing patients' question-asking behavior in the acute care setting, measurement of patient engagement through alternative means, including validated instruments such as the Patient Involvement Questionnaire or the Patient Activation Measure, warrant further exploration and validation in the inpatient setting.

Unlike the number of questions asked, this study was consistent with previous literature (Brandes, et al., 2014; Dimoska et al., 2008; Sansoni et al., 2015; Scott & Thompson, 2003; van Weert et al., 2011) in the patient's desire to seek information about specific topic areas such as treatments and procedures. The QPS was created specific to CR but patients were more focused on the work-up of diagnosis and treatment during this acute phase of care. In order to optimize promotion of all aspects of post-MI care, including CR, a broader QPS may address a wider scope of patient information needs and further promote patient engagement.

In addition to looking at the quantity and types of questions asked, this study is the first to evaluate the timing of question-asking behavior for the inpatient MI population. Although patients will have individual preferences about how and when they want to receive information

(Astin et al., 2008), this finding is consistent with information needs increasing towards discharge and may help nurses to tailor timing of patient education and provision of QPS.

Endorsement

The presence of physician and clinical nurse endorsement of CR, although not statistically significant, notably demonstrated trends in increased intention to attend CR. This trend approached significance for patients who received education from CR nurse suggesting that each of these providers has potential to influence patient engagement and intention to attend CR. The role of physician endorsement has been studied and confirmed in the literature as one of the most significant factors that can positively affect patient enrollment in CR (Ghisi et al., 2013).

Even though only five patients were observed receiving CR endorsement, 64% (*n*=14) of those who answered question about level of physician endorsement on questionnaire reported at least some level of endorsement, suggesting endorsement may be occurring outside of rounds. The low frequency of observed endorsement may also be related to the rotating nature of physicians on the acute cardiology service or perceived time constraints. Only a small sample of physicians provided feedback on endorsement practices, and feedback was limited by lack of input from physicians who specialize in cardiovascular populations, such as a fellow or attending cardiologist.

An unexpected finding of this study was the potential role of the CR nurse in encouraging CR participation, with association to intend to go to CR approaching statistical significance. A previous study reported that patients with eligible cardiac diagnoses were 3 times more likely to attend CR when advised by the CR nurse (OR 3.40 CI 95% [1.74, 6.64]) after controlling for physician endorsement and other potential confounding variables (Johnson, Inder, Nagle, and Wiggers, 2010). Although not commonly cited in the literature, this trend supports the continued role of the CR nurse to encourage CR participation. Further evaluation of the association between CR nurse endorsement and CR participation should be undertaken.

Despite some evidence of a relationship between CR nurse and intention to attend CR, 37% of patients in this study were not seen by the CR nurse, therefore highlighting the continued importance of the clinical nurse and physician to promote patient engagement and endorse cardiac rehab. Clinical nurses have an extended opportunity to provide patient education and endorse CR in absence of or in addition to CR nurse education (Arena et al., 2012). One research study suggested that patients may perceive a lower level of CR endorsement from nurses compared to physicians, however the type of provider was not related to CR enrollment (Tsui et al., 2012). This suggests that nurses can play a role in encouraging CR participation and even lower levels of perceived endorsement may influence CR attendance.

Limitations

The results of this study should be interpreted in light of several limitations. First, the lack of control group limits the evaluation of the effectiveness of this intervention. The small sample size and low response rate to questionnaire limit external validity. Secondly, the limited time frame of observation during rounds may not be representative of the patient's question-asking behavior and engagement overall. This method was chosen to avoid recall bias with self-reported data, but the low median of questions asked suggests otherwise. Other studies have previously used video or audio recordings to accurately capture this data (Dimoska et al., 2007; Sansoni et al., 2015; van Weert et al., 2011), but the feasibility of this type of intervention is limited in the hospital setting due to semi-private rooms and frequent patient movement for diagnostics and procedures.

A third limitation of this study includes the lack of complete responses on the Patient Involvement Questionnaire subscales with only 13 patients and 14 patients who answered all questions for Treatment Planning and Patient Needs subscales respectively. This prevented valuable reliability and validity testing. Although the subscales were administered prior to discharge to more accurately reflect the patient's perception of their engagement, the incomplete responses suggest this may not be the best time. The demands and stress of an acute hospitalization may have influenced these incomplete responses. Further research is needed to best determine time to assess patient engagement during hospitalization.

A fourth limitation of this study is the method of measuring CR participation. The academic medical center where this study was conducted provides care to patients throughout the region, as well as neighboring states. Because of this widespread population, patients that seek care at this hospital have the option to attend a number of CRs across the state. Intention to attend CR was measured to preliminary assess association of engagement with intention, with future research needed to assess if intention to attend CR results in subsequent attendance. Patient's face a number of barriers to attending CR (Neubeck et al., 2011) and level of patient engagement may be one of many factors affecting an individual's decision to participate. A fifth limitation of the study design is inherent in observation of subjects. Although physician and patients were not informed of observation protocol, the possibility of the Hawthorne effect must be considered (McCambridge, Witton, & Elbourne, 2014). A final limitation of this study was the potential confounding variables on intention to attend CR. Phase 1 CR was introduced just prior to implementation of study in which a CR nurse provided education and endorsement of CR to patient prior to discharge. The presence of an additional healthcare worker providing education may have reduced the patient's likelihood to ask questions regarding CR or MI follow-up during interprofessional rounds. But their role may have significant implications for influencing a patient's decision to intend to go to CR. Although data was collected on patient demographics to control for confounding variables based on CR literature (Ruano-Ravina et al., 2016), the small sample size of those who participated in the questionnaire prevented meaningful analysis.

Nursing Practice Implications

Higher levels of patient engagement have demonstrated ability to decrease healthcare utilization and cost, improve adherence to treatment recommendations and improve the patient experience. Findings of this study suggest three distinct factors related to patient engagement and intention to attend CR. These three factors can be productively related to the three factors of the SCT with which this study was grounded. The environmental factor of physician endorsement has been noted in this study and confirmed in the literature. However, for specific nursing practice implications, the other two personal and behavioral factors figure prominently. Clinical nurses can enhance a patient's self-efficacy related to the personal factor by encouraging question-asking behavior through the use of a QPS. The CR nurse has the greatest potential to influence the patient's knowledge and skills related to cardiac rehab and may impact patient outcomes by influencing CR participation. As the presence of a CR nurse cannot be assumed, efforts should be made to systematically ensure patients receive education through standardized education by clinical nursing staff. Through the use of a CR-specific QPS, an opportunity exists to indirectly improve patient outcomes not only through promotion of patient engagement, but also through increased participation in CR post discharge, both of which have demonstrated decreased healthcare utilization in the literature.

Future Research

In light of the findings and limitations of this study, further research is needed to explore the relationship between patient engagement and participation in post-MI care, particularly CR participation, and the role of nurses in patient engagement and CR endorsement. Although it appears that higher levels of engagement may be seen in patients who intend to go to CR, future research is needed to determine if patients who report intention actually attend. Further research is also needed to explore the role of the clinical nurse and CR nurse in promoting patient engagement and endorsement of CR. Future research should focus on evaluating nurse-driven initiatives to promote patient engagement, such as a QPS, as well as the impact of nurse endorsement of CR on intention and actual CR participation. This study suggests a QPS is helpful to AMI patients who are hospitalized, but more robust study designs and larger sample sizes are needed to evaluate the effectiveness of this intervention in promoting engagement and tailoring questions to meet patient information needs.

Products of Scholarly Project

As a result of this study, products of this work will include publications, presentations, and potential practice changes, such as: the completion of Doctorate of Nursing Practice Scholarly Project, submission for publication in both Libra and *Patient Education and Counseling Journal*, and abstract submissions for poster presentations will be submitted to Doctors of Nursing Practice National Conference for and Cardiovascular Nursing Symposium calendar year 2019. This project will also be presented to the MI quality improvement committee and staff of the units that participated with recommendations for future practice changes including development of standardized QPS to be utilized in MI care.

Conclusion

In conclusion, a CR-specific QPS can help AMI patients ask questions and feel engaged in their care. The higher levels of patient engagement in patients who intended to participate in CR suggest that patient engagement may play a role in CR participation, but the relationship between level of engagement and CR participation requires further study. Promoting patient engagement is key part of patient-centered care with potential to improve patient outcomes. Further research should evaluate the effectiveness of a QPS in patient engagement and the role of physicians and nurses in encouraging patient engagement and CR participation.

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Tables

Table 1

Adapted Patient Involvement Questionnaire

Scale items and questions	Response options
Treatment planning (4 questions) *To what degree do you agree that the following aspects are important:* Did you take part in discussing your examinations including cardiac catheterization, stress test or cardiac medications? Did you discuss the goals of your treatment after a heart attack with your doctor? Have doctors/nurses motivated you to take responsibility for your future health? Did you take part in planning your follow-up care, including MI clinic and cardiac rehab? (e.g. what would happen after you leave the hospital?)	Yes, to a great degree (4) Yes, somewhat (3) No, not especially (2) No, not at all (1)
Patient Needs (7 questions) *To what degree do you agree that the following aspects are important:* Did you have the opportunity to ask questions about your heart attack and cardiac rehab? Did you understand the information you received about your heart attack and cardiac rehab? Were doctors and nurses sensitive to your needs/requests; were you treated with respect? Did you receive the information you wanted about results of examinations or treatments such as cardiac catheterization, stress test, EKG, or lab results? Did you receive the information you wanted about your medications? Did you have the opportunity to ask questions about cardiac rehab when preparing for discharge?	Yes, to a great degree (4) Yes, somewhat (3) No, not especially (2) No, not at all (1)

Note. Adapted from “Is Patient Involvement During Hospitalization for Acute Myocardial Infarction Associated with Post-Discharge Treatment Outcomes?” by J.E. Arnetz, U. Winblad, A.T Höglund, B. Lindahl, K. Spangberg, L. Wallentin… and B.B. Arnetz, 2010, *Health Expectations: Journal of Public Participation in Health Care and Health Policy, 13* (3) p. 301. Sections underlined were added to the original question with permission from author.

Table 2

Characteristics of Patients Observed (N=32)

	Questionnaire Group (*n*=16)		No Questionnaire Group (*n*=16)		All Patients (*n*=32)		
Characteristic	No. of Patients	%	No. of Patients	%	No. of Patients	%	*p*
Age, yrs							.939[a]
Mdn (IQR)	67.5 (18.3)		69.5 (11.0)		68.5 (12.0)		
M (SD)					66.4 (9.0)		
LOS, days							.623[b]
Mdn (IQR)	3.0 (1.8)		3.0 (3.8)		3.0 (2.0)		
Gender							1.00[c]
Male	8.0	50.0	8.0	50.0	16.0	50.0	
Female	8.0	50.0	8.0	50.0	16.0	50.0	
MI Diagnosis							.252[c]
NSTEMI 1	12.0	75.0	9.0	56.3	21.0	65.6	
NSTEMI 2	3.0	18.8	7.0	43.7	10.0	31.3	
NSTEMI Unspecified	1.0	6.2	0.0	0.0	1.0	3.1	
Phase 1 CR							1.00[c]
Yes	10.0	62.5	10.0	62.5	28.0	62.5	
No	6.0	37.5	6.0	37.5	4.0	37.5	

Note: IQR= Interquartile range; LOS=Length of Stay; MI=Myocardial Infarction; NSTEMI=Non-ST elevated MI; 1 and 2 designated type of NSTEMI. CR: Cardiac Rehab. Phase 1 CR refers to CR RN coming to providing education and endorsement for CR to eligible patients in hospital prior to discharge. [a]Independent *t*-test performed. [b]Mann-Whitney *U* test performed. [c]Exact Chi-square test performed.

Table 3

Baseline Characteristics of Survey Patients (n=16)

Characteristic	No. of Patients	%
Race		
Black/AA	4	25.0
White	12	75.0
Marital Status		
Divorced	2	12.5
Married	8	50.0
Widowed	3	18.8
Unmarried/Single	3	18.8
Employment		
Employed	5	31.3
Retired	10	62.5
Unable to work	1	6.3
Education		
Grade 1-8	1	6.3
Grade 9-11	3	18.8
High School	5	31.3
Some College	4	25.0
Associate's	1	6.3
Bachelor's	1	6.3
Graduate	1	6.3
Tobacco Use		
Current	2	12.5
Former	9	56.3
Never	5	31.3
History of MI		
Yes	7	43.8
No	8	50.0
Missing	1	6.3
History of CABG		
Yes	3	18.8
No	13	81.3
History of PCI		
Yes	4	25.0
No	12	75.0

Note: AA= African American; MI= Myocardial Infarction; NSTEMI=Non-ST elevated MI; 1 and 2 designated type of NSTEMI. CABG=Coronary Artery Bypass Graft; PCI= Percutaneous Coronary Intervention.

Table 4

Patient Involvement Questionnaire

				Intent to go to CR					
	All Patients			Yes (*n*=11)		No (*n*=2)			
Scale	*Mdn*	IQR	Range	*Mdn*	IQR	*Mdn*	IQR*	Mann-Whitney *U*	*P*
Treatment Planning **	66.7	29.0	42.0-100.0	75	38.0	62.5		6.0	.582
Patient Needs**	90.5	20.0	67.0-100.0	90.5	15.0	83.3		8.5	.758

Note 1: Each scale is from 0-100. Patients with higher scores for a subscale have increased perceived level of involvement in that factor. Patients were required to complete each subscale in its entirety in order to be included in final analysis. There were 13 valid scores for the Treatment planning subscale and 14 valid scores for the Patient Needs subscale

Note 2: Of the 13 patients who answered question about intent to go to CR, 2 responded that they did not intend to go, 11 responded that they did intend to go. Exact Mann-Whitney *U* tests were used to compare the two subscale scores over those two groups. Eleven patients were included in test for Treatment Planning score and 12 patients were included in Mann-Whitney U analysis for Patient Needs score. * IQR not meaningful for only *n*=2. ** Exact Mann-Whitney U test. Statistical significance determined by p <0.05.

Table 5

Physician Questionnaire Responses (n=4)

Questions	*Mdn*	Range of Responses
How often do you refer patients diagnosed with AMI to cardiac rehab before discharge?	4	1-5
How often do you personally endorse cardiac rehab to AMI patients prior to discharge?	2	2-3
How often do you provide care to patient's status post AMI?	3	1-4
The patient handout and list of questions pertaining to cardiac rehab helped patients/families ask more questions.[a]	3	1-5
The provider education session and handout adequately prepared me to endorse cardiac rehab to patients diagnosed with AMI and encourage their participation in rounds.	4	4-5
The patient's list of questions increased the length of time spent with patient during interprofessional rounds.[a]	4	1-5

Note: Answers on a Likert scale from 1 to 5: 1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5= Always. AMI: Acute Myocardial Infarction; [a]*n*=3.

Table 6

Patient Perception of QPS and Physician Endorsement (n=15)

Question	Median	Interquartile range
The list of questions about cardiac rehab helped me to ask questions about cardiac rehab.[a*]	4	1
The list of questions helped me think of other questions or concerns I wanted to ask.[a*]	4	2
Did your physician say you should go to cardiac rehab? [b**]	3	3

Note: QPS= Question Prompt Sheet.
[a]Responses based on Likert scale from 1 to 5: 1= strongly disagree, 2=disagree, 3=undecided, 4=agree and 5=strongly agree. [b] Responses based on Likert scale: 1=Never, 2=Little, 3=Some, 4=Much, 5= Great Deal. * missing one response, *n*=15. ** missing two responses, *n*=14.

Figures

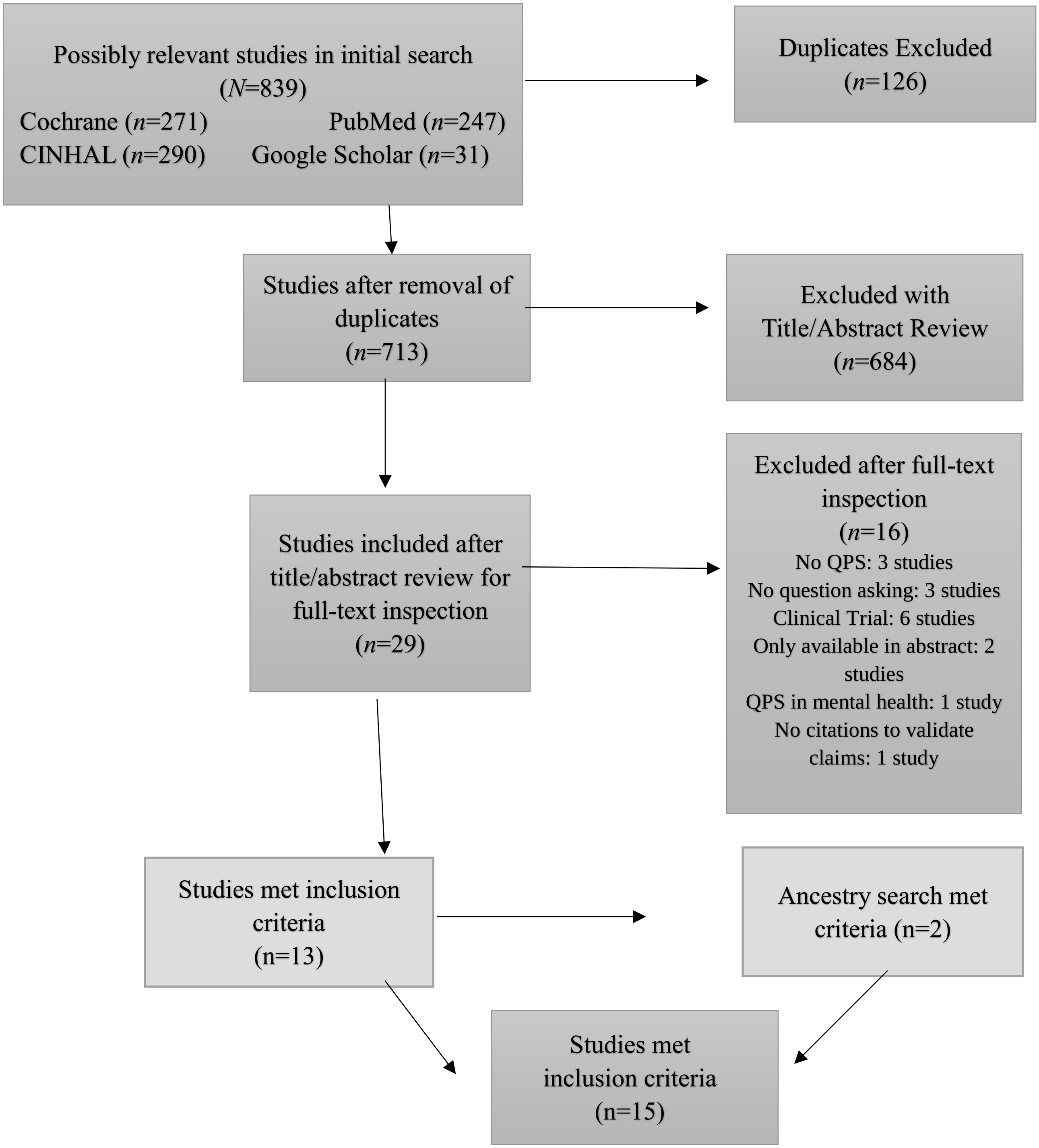


Figure 1. Flow Chart for study selection of QPS. n=Number of articles; RCT: Randomized Control Trial.

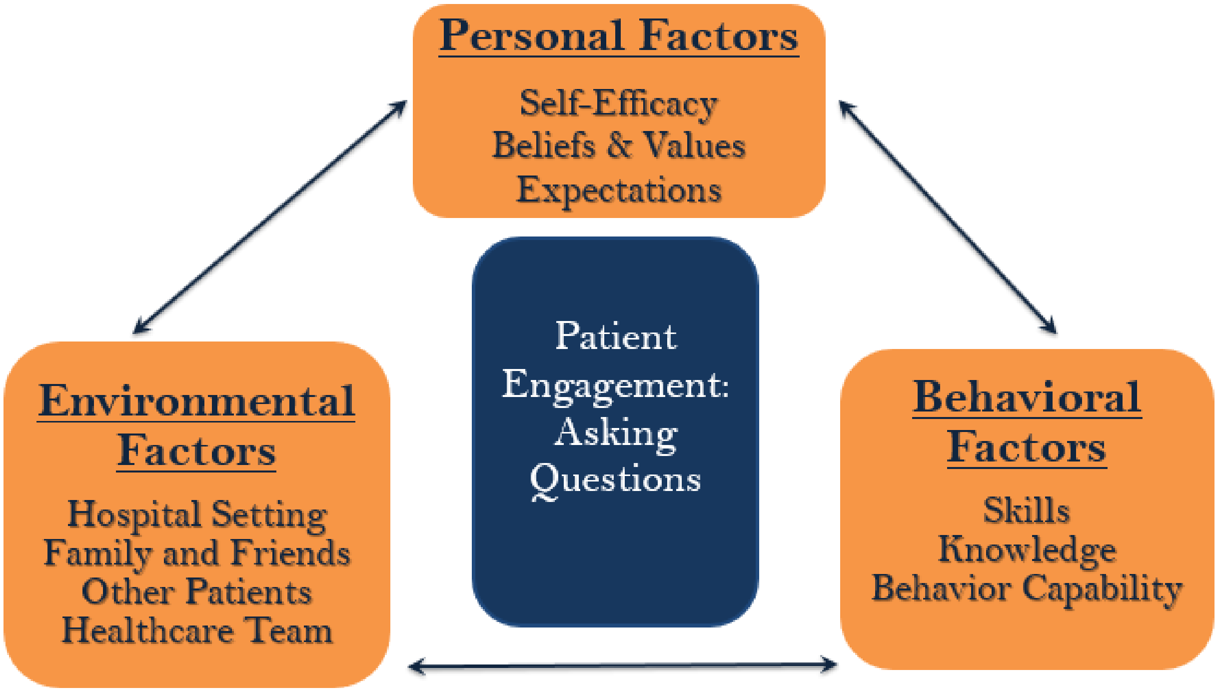
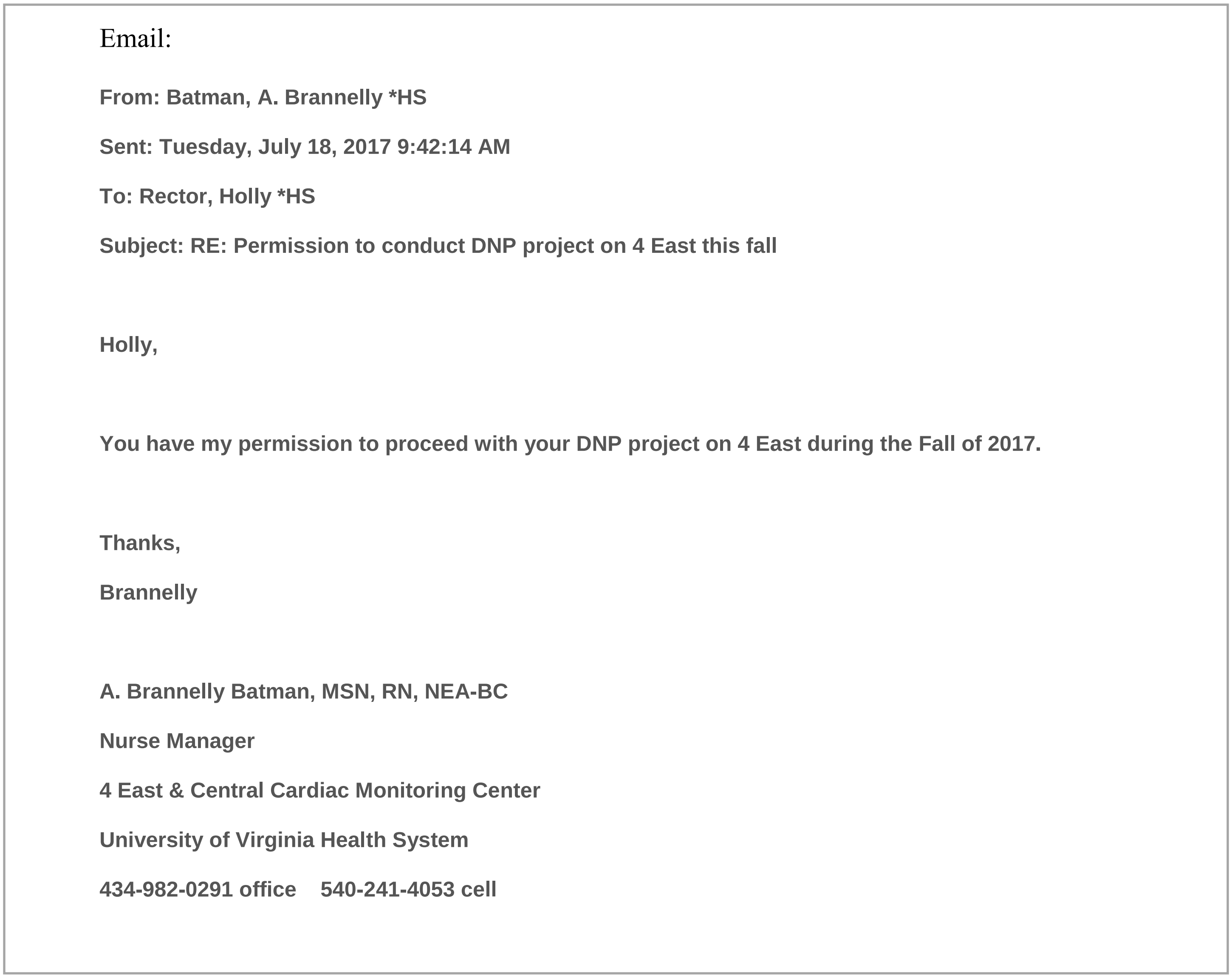


Figure 2. Social Cognitive Theory framework adapted from “Social Foundations of Thought and Action: A Social Cognitive Theory, by A. Bandura, 1986.



Email:

From: Batman, A. Brannelly *HS

Sent: Tuesday, July 18, 2017 9:42:14 AM

To: Rector, Holly *HS

Subject: RE: Permission to conduct DNP project on 4 East this fall

Holly,

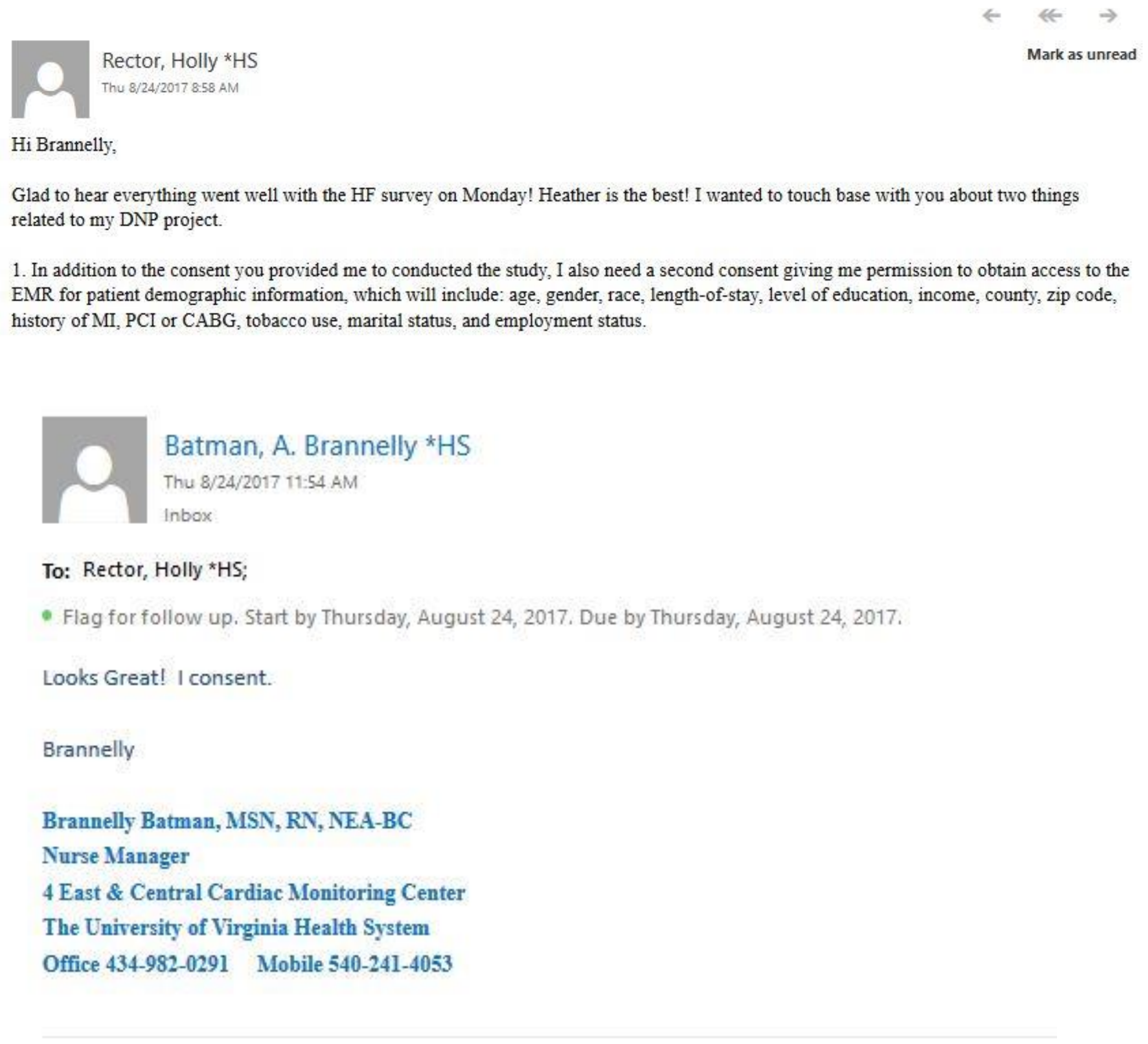
You have my permission to proceed with your DNP project on 4 East during the Fall of 2017.

Thanks,

Brannelly

A. Brannelly Batman, MSN, RN, NEA-BC
Nurse Manager
4 East & Central Cardiac Monitoring Center
University of Virginia Health System
434-982-0291 office 540-241-4053 cell

Figure 3. Approval to conduct Doctorate of Nursing Practice (DNP) project.



Rector, Holly *HS
Thu 8/24/2017 8:58 AM

Hi Brannelly,

Glad to hear everything went well with the HF survey on Monday! Heather is the best! I wanted to touch base with you about two things related to my DNP project.

1. In addition to the consent you provided me to conducted the study, I also need a second consent giving me permission to obtain access to the EMR for patient demographic information, which will include: age, gender, race, length-of-stay, level of education, income, county, zip code, history of MI, PCI or CABG, tobacco use, marital status, and employment status.

Batman, A. Brannelly *HS
Thu 8/24/2017 11:54 AM
Inbox

To: Rector, Holly *HS;

• Flag for follow up. Start by Thursday, August 24, 2017. Due by Thursday, August 24, 2017.

Looks Great! I consent.

Brannelly

Brannelly Batman, MSN, RN, NEA-BC
Nurse Manager
4 East & Central Cardiac Monitoring Center
The University of Virginia Health System
Office 434-982-0291 Mobile 540-241-4053

Figure 4. Institutional consent for chart review.

UVA IRB OnLine
file:///U|/IRB/IRB-HSR/PREREVIEWS/EXPEDITED/12000s/12130%2009.15.17%20mwb/12130%20approval%2010.30.17.htm[10/30/2017 11:16:13 AM]

University of Virginia
Institutional Review Board for Health Sciences Research
HIPAA Privacy Board
IRB - HSR # 20202

Event:
Approval New Protocol - Expedited
Type:
Protocol
Sponsor(s):
Sponsor Protocol #:
Principal Investigator: Regina DeGennaro, RN-C, MSN, AOCN, CNL
Title: Promoting Patient Engagement during Hospitalization for Acute Myocardial Infarction
Assurance: Federal Wide Assurance (FWA)#: 00006183 **IRB#00000447**

Certification of IRB Review: The IRB-HSR/HIPAA Privacy Board abides by 21CFR50, 21CFR56, 45CFR46, 45CFR160, 45CFR164, 32CFR219 and ICH guidelines as compatible with FDA and DHHS regulations. This activity has been reviewed in accordance with these regulations.

Event Date: 10/30/17
Protocol Expiration Date: 10/29/18
Number of Subjects: 84
HSR Protocol Version Date: 10/18/17
IRB Application Date: 10/26/17
Data Security Plan Date: 10/26/17
Current Status: Open to enrollment
Consent Version Dates:
Committee Members (did not vote):
Comments: The IRB determined the protocol met the criteria for approval per the federal regulations and was approved.
It is open to enrollment.
The purpose of this study is to assess the feasibility of utilizing a cardiac rehab question prompt sheet to promote patient engagement in interprofessional bedside rounds for inpatients diagnosed with acute myocardial infarction.
The study will involve observation of patients and physicians during bedside rounds, and patient and physician surveys.
There is no outside sponsor for this study.
N= 84 subjects
Ages: greater than or equal to 18 years
The following documents were submitted with this protocol: surveys for patient and physician, checklist for observations.
Approved with this protocol are the following recruitment materials: verbal consent script for patients and letter to physicians.
UVA IRB OnLine
file:///U|/IRB/IRB-HSR/PREREVIEWS/EXPEDITED/12000s/12130%2009.15.17%20mwb/12130%20approval%2010.30.17.htm[10/30/2017 11:16:13 AM]
-This study has been reviewed and approved by the Graduate Medical Education Committee.
No compensation.

Figure 5. IRB approval. Full approval available upon request.

Cardiac Rehabilitation for Patients Who Have Had a Heart Attack

After a heart attack (Myocardial Infarction), going to a Cardiac Rehabilitation (rehab) program is as important as taking your medicines every day.

What is cardiac rehab?

- A doctor-supervised outpatient program
- Recommended by the American College of Cardiology Foundation and American Heart Association
- Includes exercise, medicine, diet, and lifestyle education and counseling, stress management and support
- Your <u>health care team</u>, includes a physician, nurse, exercise physiologist, registered dietitian, respiratory therapist, pharmacist, and physical therapist
- *Cardiac rehab is NOT the same as home health or home physical therapy

Why should I consider going to cardiac rehab?

Research has shown patients who attend cardiac rehab have:

- Less risk of future heart attacks and death
- Less risk for future health problems
- Fewer visits to the hospital
- Better quality of life

What are the next steps?

1. Your doctor places a referral order to cardiac rehab before discharge.
2. You receive a phone call from the cardiac rehabilitation program at University of Virginia within 7 to 10 days after discharge. If you do not hear from them, call: **(434) 243-4600.** Their address is 2955 Ivy Road, Charlottesville, VA 22908.

Many patients have questions about cardiac rehab. Below are some questions you may have. Ask your healthcare team your questions during daily rounds:

1. When can I start a cardiac rehab program? If I decide not to go right away, can I go later?
2. What happens at my first appointment?
3. When are cardiac rehab sessions offered? How many sessions do I need to go to?
4. I have too much to do at work and home to bother with cardiac rehab. How can I do it all?*
5. Does my insurance cover a cardiac rehab program?
6. What if there are no cardiac rehab programs near where I live or the closest one is too far away? Can I do an exercise program at home?
7. I don't live in Charlottesville. Is there a cardiac rehab center I can go to near my home?
8. Is exercising safe after a heart attack?
9. Do I exercise by myself or will it be in a group format?
10. Can my family come with me?
11. Can a cardiac rehab program help me quit smoking?
12. At my age I don't see how cardiac rehab could help. Isn't it too late for me?*
13. Other:____

Figure 6. Question Prompt Script specific to cardiac rehab provided to patients and families. *From "How do I address my concerns about cardiac rehab?" by The American Heart Association, 2016 (http://www.heart.org/HEARTORG/Conditions/More/CardiacRehab/How-Do-I-Address-My-Concerns-About-Cardiac-Rehab_UCM_487776_Article.jsp#.WaEcrumQzIU http://URL). Copyright [2016] by the American Heart Association. Reprinted with permission.

Patient Alternate Identifying Number:
Room number:
Date:
Hospital day:

Was referral to Cardiac Rehab discussed during rounds? Yes____ No__

Who initiated referral discussion? (please write in role e.g. nurse, physician) ___________

# of questions asked about cardiac rehab_________ (note which questions below) (**Tally marks**)

Who asked the questions? Patient (**# of questions Tally marks**):____________Family member:_

1. When can I start a cardiac rehab program? If I decide not to go right away, can I go later?
2. What happens at my first appointment?
3. When are cardiac rehab sessions offered? How many sessions do I need to go to?
4. I don't live in Charlottesville. Is there a cardiac rehab center I can go to near my home?
5. What if there are no cardiac rehab programs near where I live or the closest one is too far away? Can I do an exercise program at home?
6. I have too much to do at work and home to bother with cardiac rehab. How can I do it all?
7. Can my family come with me to cardiac rehab?
8. Is exercising safe after a heart attack?
9. Do I exercise by myself or will it be in a group format?
10. Can a cardiac rehab program help me quit smoking?
11. At my age I don't see how cardiac rehab could help. Isn't it too late for me?
12. Other:____

# of questions asked about Post MI care_________ including (note which categories below; circle all that apply and how many questions about each; **TALLY MARKS**)

1. Medications
2. Follow-up with Physicians
3. MI clinic
4. Activity/mobility
5. Anatomy/physiology
6. Treatments/Procedures (cardiac cath)
7. Prognosis (eg. what will happen to me in the future; future MI's?).
8. Diet
9. Cholesterol
10. Sexual function

Physician endorsement of QPS: (check mark)

Absent_________

Basic (physician acknowledged QPS, and asked if they had any questions):___

Extended (referenced specific questions on the QPS to engage the patient):____________

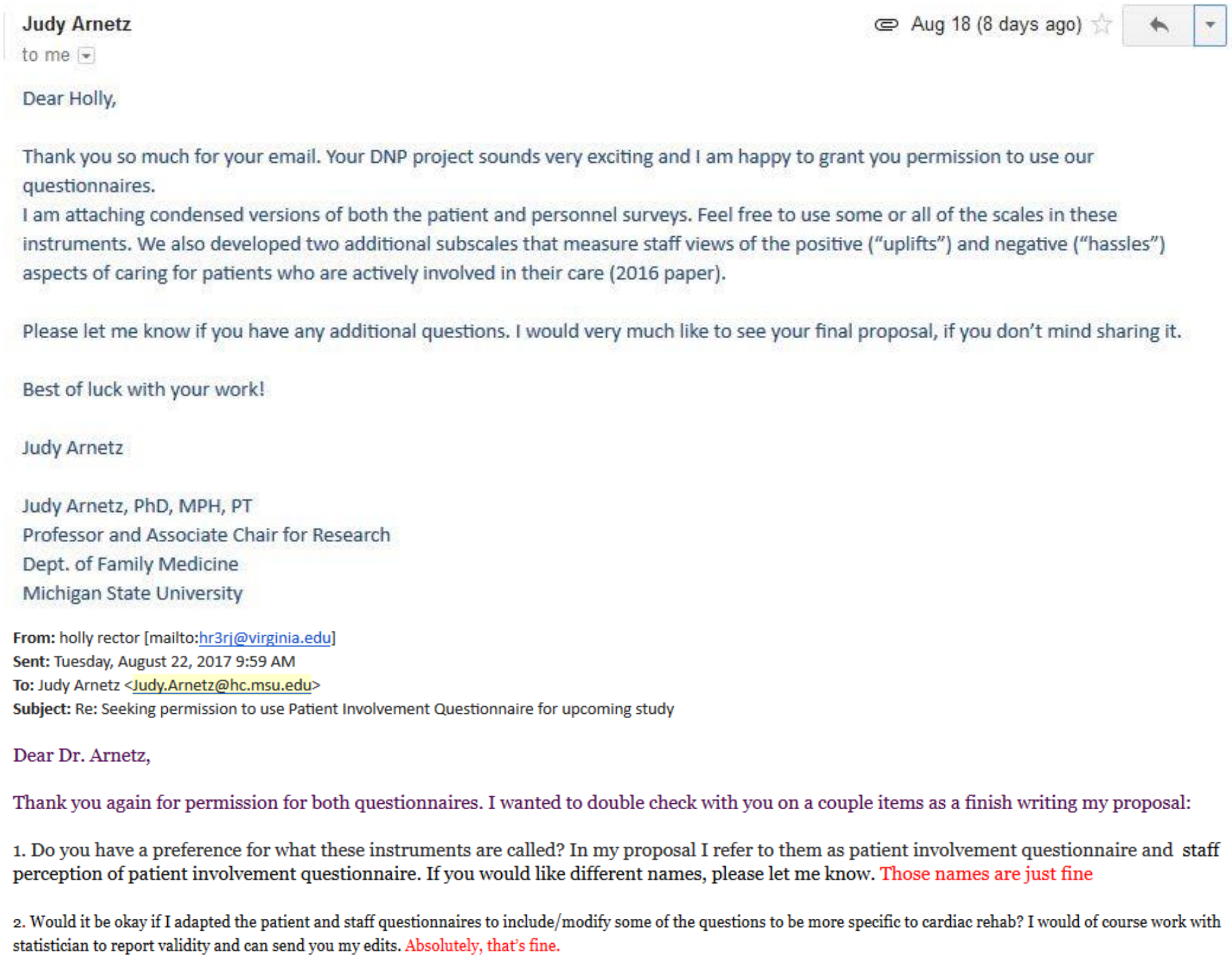
Physician endorsement of Cardiac Rehab (check mark)

Absent:

Present:

Anticipated Discharge Date:

Figure 7. Standardized Observation Checklist.



Judy Arnetz
to me

Aug 18 (8 days ago)

Dear Holly,

Thank you so much for your email. Your DNP project sounds very exciting and I am happy to grant you permission to use our questionnaires.
I am attaching condensed versions of both the patient and personnel surveys. Feel free to use some or all of the scales in these instruments. We also developed two additional subscales that measure staff views of the positive ("uplifts") and negative ("hassles") aspects of caring for patients who are actively involved in their care (2016 paper).

Please let me know if you have any additional questions. I would very much like to see your final proposal, if you don't mind sharing it.

Best of luck with your work!

Judy Arnetz

Judy Arnetz, PhD, MPH, PT
Professor and Associate Chair for Research
Dept. of Family Medicine
Michigan State University

From: holly rector [mailto:hr3rj@virginia.edu]
Sent: Tuesday, August 22, 2017 9:59 AM
To: Judy Arnetz <Judy.Arnetz@hc.msu.edu>
Subject: Re: Seeking permission to use Patient Involvement Questionnaire for upcoming study

Dear Dr. Arnetz,

Thank you again for permission for both questionnaires. I wanted to double check with you on a couple items as a finish writing my proposal:

1. Do you have a preference for what these instruments are called? In my proposal I refer to them as patient involvement questionnaire and staff perception of patient involvement questionnaire. If you would like different names, please let me know. Those names are just fine

2. Would it be okay if I adapted the patient and staff questionnaires to include/modify some of the questions to be more specific to cardiac rehab? I would of course work with statistician to report validity and can send you my edits. Absolutely, that's fine.

Figure 8. Permission to use and adapt Patient Involvement Questionnaire

Hello,
Am is speaking to (*potential subject or parent's name)*?
If YES, then continue:

My name is ____________**.** I am a Nurse and graduate student at the University of Virginia. The School of Nursing is doing a study about helping patients to become more engaged in their care after a heart attack. I am contacting you because you are being seen in our department because of having a heart attack. It is a goal in our department to keep our patients informed of research in which they may be interested while carefully protecting your confidentiality. To do both we follow federal regulation called HIPAA.

May I have your permission to talk to you about this new study?

- *If no, say Thank you for your time.*
- *If yes, continue as below.*

The purpose of this study is to learn more about how helpful the use of the question sheet is to patients in helping patients plan their life after having a heart attack, including learning about cardiac rehab. If you agree to participate in this study, we will ask you to take a short survey to give us feedback on the information you received during your stay regarding cardiac rehab, and how you felt about your involvement with your healthcare team during this admission. Members of our team will be happy to help you read any survey questions to you if you need assistance. The survey will take about ten minutes of your time.

Some patients may find answering questions uncomfortable which may increase anxiety. If you do not wish to answer a question, you may skip it and go to the next question.

There is no direct benefit to you as a result of taking the survey; however, information we learn about our patient education may help others in the future.

You will not be paid for participating in this study.

The only risk in taking the survey is that someone might see your answers. Your name will not be recorded on the survey.

You do not have to be in this study if you do not want to participate. Your decision to be in any study is totally voluntary. Your care at UVa will not be altered by your decision about being in this study. Your relationship with your doctor will not be affected by your decision to participate or not.

Do you have any questions?

Well let's see how good of a teacher I was – I am going to ask you a few questions about the study:

- What is the purpose of the study?
- What do you have to do to be in the study?
- What are the risks?
- What are the benefits?

Correct any answers that are not correct.

- *If the potential subject is not able to answer questions accurately and if there is any question regarding subject ability to understand say: "*It looks like you will not be eligible for this study. Thank you so much for your time and I hope you have a nice rest of your day.
- *If the potential subject is able to answer the questions say:* OK very good, here is the survey.

Figure 9. Patient consent script for documentation of consent

Dear Physician:

I am writing to you to tell you about a research study that is being done through the University of Virginia. The purpose of the study is to assess the feasibility of utilizing a cardiac rehab specific question prompt sheet (list of questions) to promote patient engagement in interprofessional bedside rounds for inpatients diagnosed with acute myocardial infarction (AMI).

You are receiving this letter because you are practicing on the Adult Cardiology Service and have not previously completed the survey for this study.

If you agree to participate, this study will involve completing the attached survey, which will take about 10 minutes of your time. The survey asks your opinion and practices regarding patient engagement with and participation in cardiac rehab. If you do not wish to answer a question, simply skip it and go to the next question.

There is only a minimal risk that someone might see your responses. To keep your survey responses confidential, do not write your name or other identifying information on the survey.

You do not have to be in this study if you do not want to participate. Your decision to be in any study is totally voluntary.

Your job will not be affected if you decide not to participate in this study.

You will not be paid for participating in this study.

If you feel you understand the study and would like to participate, please complete the attached survey and return to box labeled "surveys" in the physician work room on 4 East. Your return of the survey will indicate your consent to be in this study.

If you have questions you would like answered prior to participating, please contact:

- Holly Rector, MSN, RN-BC
  Telephone: (614) 949-8135
  hr3rj@virginia.edu

Your survey responses will not be shared outside of this study team except to those groups inside and outside of UVa who are responsible for making sure studies are conducted correctly and ethically. If you decide to participate in this study now, but decide later to stop, you need to know that the survey responses will continue to be used.

Sincerely,

Regina Degennaro, DNP, CNS, RN, AOCN, CNL
Principal Investigator
IRB/HSR # 20202

Figure 10. Documentation of consent accompanied physician questionnaire.

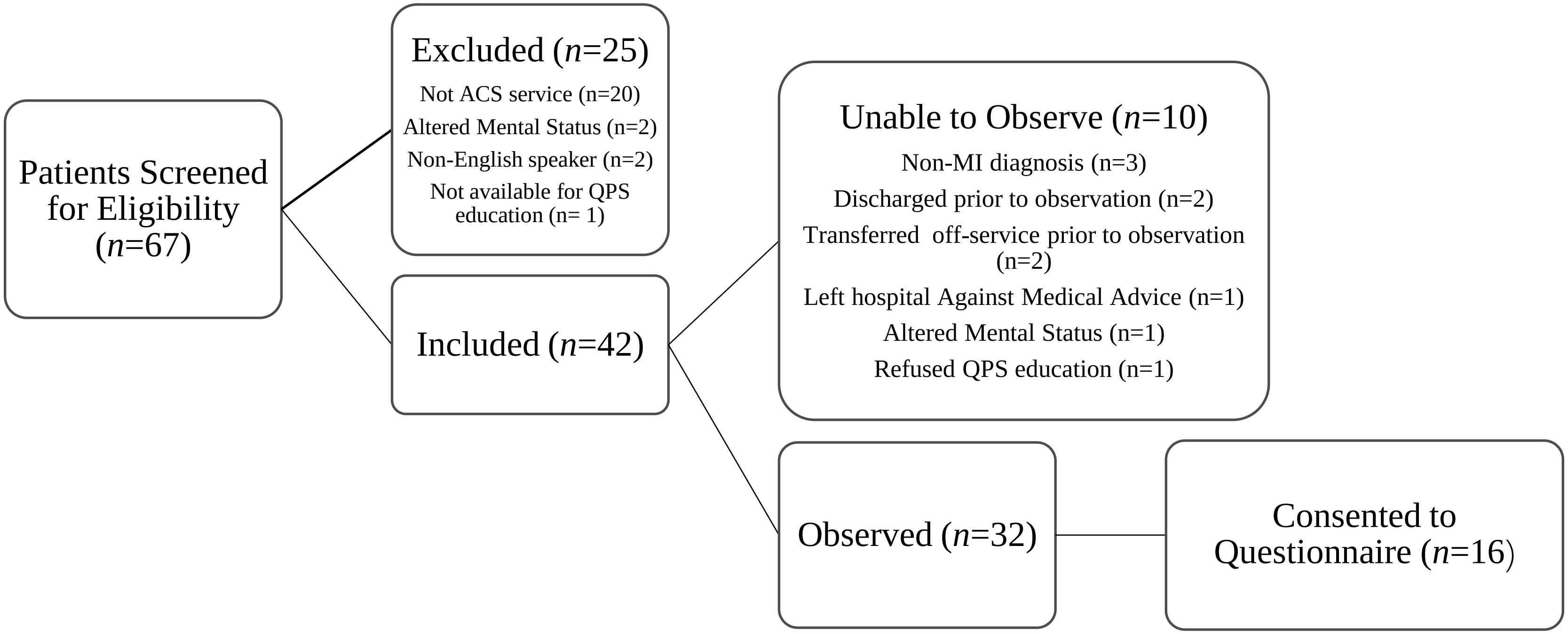


Figure 11. Participant flow chart and enrollment in study. QPS= Question Prompt Sheet; MI= Myocardial Infarction.

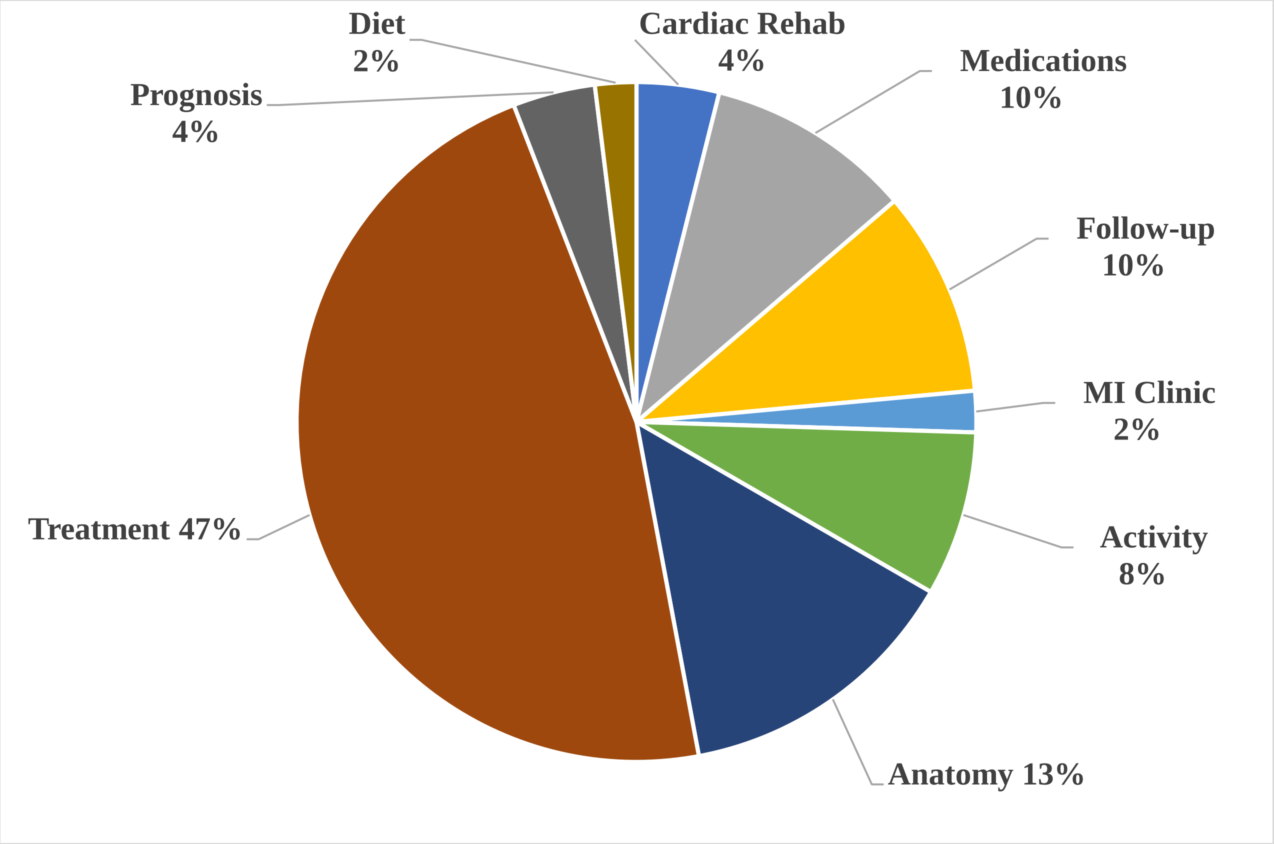


Figure 12. Topic areas of questions asked during hospitalization reported as percentages. A total of 52 questions were asked by 32 patients in in 9 out of 11 different topic areas during the study period. No questions were asked regarding sexual activity or cholesterol management therefore they are not depicted above.

Appendix

Manuscript Draft for Patient Education and Counseling Journal

Promoting Patient Engagement during Hospitalization for Acute Myocardial Infarction

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Abstract

Objective: The purpose of this study was to examine the relationship between patient engagement and intention to attend CR by utilizing a CR-specific question prompt sheet (QPS) to promote patient engagement in patients hospitalized with acute myocardial infarction (AMI).

Methods: A descriptive correlation study was conducted over eight weeks on two cardiovascular units at an academic medical center. A convenience sample of 32 (*N*) inpatient adults received QPS with education, supplemented by staff education. Primary outcome of patient engagement was measured by question-asking behavior and Patient Involvement Questionnaire (PIQ).

Results: Sixty-two percent of patients (*N*=32) asked questions during rounds with a median of one question. Question asking-behavior and PIQ scores were not significantly related to intention to attend CR, however PIQ scores suggest higher levels of patient engagement in patients with positive intention.

Conclusion: Although a CR-specific QPS may be helpful and trends suggest potential to promote patient engagement, further research is needed to determine the feasibility and role of a QPS in promoting patient engagement in the AMI population.

Practice Implications: A CR-specific QPS may indirectly improve patient outcomes through promotion of patient engagement and CR participation. Nurses and physicians should encourage patient engagement in acute cardiology populations.

Keywords: patient engagement, myocardial infarction, question prompt sheet, cardiac rehab

1. Introduction

Patient engagement is a fundamental part of patient-centered care and quality improvement[1,2]. However, research is limited on effective interventions to promote patient engagement in the inpatient setting[3], particularly for patients diagnosed with acute myocardial infarction (AMI) [4]. The implications of a poorly engaged patient population may be devastating, with increasing evidence that patients with lower levels of engagement are at higher risk for increased healthcare utilization and costs compared to those who are more engaged [5–9]. In contrast, patients with higher levels of engagement are recognized to have increased adherence to treatment regimens and health-related behaviors [10–13].

For the AMI population in particular, patient engagement may play a crucial role in encouraging adoption of secondary and tertiary prevention strategies, such as cardiac rehabilitation (CR) [14,15]. Despite CR's numerous benefits, including decreased mortality, morbidity, hospitalization, and improved health-related quality of life, [16,17] CR continues to be underutilized with current national participation rates ranging from 23% to 52% [17,18]. Promotion of patient engagement during hospitalization may play a role in improving patient outcomes in this population through increasing CR participation.

One way to promote patient engagement is to encourage patients to ask questions. Recognized as a behavior of engaged patients [3], question asking is endorsed by the Agency for Healthcare Research and Quality(AHRQ) [19,20]. In the outpatient setting, and in predominantly oncology populations, providing patients with a list of questions ("question prompt sheet," henceforth "QPS"), demonstrates some success in increasing patient question asking behavior [21–24], however this has not been studied in the inpatient setting or with acute cardiac populations. The use of a QPS in promoting patient engagement and CR participation in patients hospitalized with AMI should be further explored.

1.1 Purpose and Research Question

The purpose of this study was to examine the relationship between patient engagement and intention to attend CR by utilizing a CR-specific question prompt sheet (QPS) to promote patient engagement in patients hospitalized with acute myocardial infarction (AMI). This study aimed to answer the following questions:

- Does a CR-specific QPS help patients diagnosed with acute myocardial infarction ask questions?
- Is patient engagement related to intention to attend CR?

2. Methods

2.1 Theoretical Framework

In considering how to promote patient engagement, Bandura's social cognitive theory offers assistance [25]. This theory suggests that a behavior, such as asking questions, is affected by the dynamic relationships between personal, environmental, and behavioral factors (Figure 1). If a patient perceives they are capable of asking questions, known as self-efficacy, and have the knowledge and skills to enact that behavior, patients may be more inclined to ask questions. As this model highlights, the patient's decision to participate in a behavior does not occur in isolation, but rather is influenced by responses of the healthcare team, family, and friends. Responses to the patient's questions can either negatively or positive reinforce question-asking behavior.

2.2 Research Design and Setting

A prospective descriptive correlational study was implemented on two acute care cardiology units (58 bed) at a rural academic medical center in the southeast United States. The study was conducted prospectively over eight weeks beginning with physician education at the end of October. The acute cardiology service on these two units historically provides care to approximately 15 AMI patients per month with high month-to-month variability.

2.2.1 The Interprofessional Team

The interprofessional team that conducts daily structured bedside rounds on these two units includes an attending, fellow, and resident physicians, clinical nurse, social worker, case manager, and pharmacist. Interprofessional rounds are conducted Monday through Friday from 9:00am to 11:00am with exception of holidays and weekends. The acute cardiology service is divided into four different teams with two attendings; one heart failure and one acute cardiology. All the physicians rotate off service approximately every one to three weeks.

2.2.2 Interprofessional Rounds.

Bedside interprofessional rounds last approximately six to ten minutes per patient and are primarily focused on discussing the plan of care and discharge needs. After the interprofessional team collaborates outside the room, the team enters the patient's room and introduces themselves to the patient. The resident or intern then presents the plan of care and asks if the patient has any questions. If a patient is unavailable at the time of rounds, the team does not conduct the bedside portion of rounds.

2.3 Sample

A convenience sample included adult patients (age ≥ 19 years old) hospitalized with primary or secondary diagnosis of AMI, admitted to the acute cardiology service (ACS) between October to December. Patients were determined eligible if they met the following criteria: (1) adults hospitalized with primary or secondary diagnoses of AMI, (2) admitted to the acute cardiology service from October to December, (3) English-speaking, and (4) able to read questions on QPS back to observer. Patients were excluded if they were: (1) non-English speakers, (2) altered mental status (e.g. diagnoses of dementia per chart review or positive screening for delirium with score ≥ 2 on Nursing Delirium Screening-delirium screening tool within past 48 hours [26]) or (3) were not on the ACS service. A convenience sample of physicians was also recruited to participate in study. Physicians had to be English-speaking and providing patient care on the acute cardiology service. Any physician not meeting those two criteria was excluded.

2.4 Ethical considerations

Internal Review Board (IRB) approval was obtained. During observations, patients and healthcare team were observed under IRB approved waiver of consent to prevent alteration of behavior and ensure data validity. Both patients and physicians received IRB-approved scripted consent with opportunity to participate in post-procedure questionnaire. Subjects provided documentation of consent by completing the questionnaire.

2.5 Procedures

2.5.1 Question prompt sheet

A twelve-question QPS was developed at the sixth-grade reading level based on expert opinion and review of evidence -based literature (Figure 3). Two questions from the American Heart Association patient resources on CR [27] were included with copyright permission obtained. Participants for the study were identified with assistance from charge nurses prior to morning rounds and eligibility confirmed by research team. The charge nurses received training on study protocol and patient eligibility prior to implementation. Prior to morning rounds, the researcher provided patients with the QPS and brief introduction to CR with encouragement to ask questions. The QPS was provided the first day the patient was rounded on during hospitalization.

2.5.2 Staff education

In addition to the QPS, the physicians and nurses received education regarding CR, patient engagement, and the QPS. Physician education occurred weekly for seven out of the eight weeks of the study period with a five-minute verbal presentation and handouts. Staff were encouraged to discuss CR during rounds and endorse CR to their patients. They were also encouraged to endorse the QPS and encourage patients to ask questions.

Clinical nurses also received a five-minute verbal presentation and handout. Due to the workflow on each unit, this education was provided during morning huddle or in one-on-one teaching sessions prior to and during the first two weeks of study. Nurses who were unable to attend these sessions received an emailed version of the presentation. Nurses were encouraged to identify eligible patients, discuss CR and the QPS with their patients, and encourage question asking.

2.6 Measures

Patient engagement was measured by: (1) observed number and type of questions asked by patient or family during rounds and (2) Patient Involvement Questionnaire [28]. Secondary outcomes included physician endorsement of QPS to the patient, patient and physician demographics, patient and physician perceptions of the QPS, and patient intention of attending CR. The methods of measurement included direct observation, chart review, and physician and patient self-administered questionnaires.

2.7 Data collection

2.7.1 Observations

Patient question-asking behavior and physician endorsement of QPS were measured with direct observation during interprofessional rounds. In addition to the primary researcher, three observers received training on the study protocol prior to implementation, but only one conducted observations. No simultaneous observations were conducted during study period with only one individual present to conduct observations on a given day.

To control for variability in observation practices, observations were done using a standardized checklist and paired practice observations were conducted prior to the start of the study to assess feasibility and resolve any incongruencies. Patients were observed every day during the rounding process for the entire length of stay. Physician endorsement of QPS was coded as absent, basic, or extensive, mirroring methodology incorporated into a previous study [29].

2.7.2 Questionnaires

Two subscales of the Patient Involvement Questionnaire (PIQ) were used to measure patient engagement [4,28]. This 53-question instrument was designed to assess patient perceptions of involvement during hospitalization for adults hospitalized with AMI and has previously demonstrated good validity and internal reliability in all six subscales.

Because this study focused on assessing intention to attend CR after discharge while minimizing patient burden, only the Patient Needs and Treatment Planning subscales were utilized for a total of 11 questions (reliability [Cronbach's alpha] $\alpha = 0.81$ and $\alpha = 0.76$ respectively) [4] (Table 1). The Patient Needs subscale refers to the degree to which patients' needs were fulfilled related to questions asked, understanding information, respect, and opportunity to discuss treatments and medications [28]. The Treatment Planning subscale refers to the "patient's role in discussing examinations and treatment options, treatment goals, and participating in planning post-discharge care" [30, p. 302]. Because of the specific nature of the QPS, the subscale questions were made more specific to CR and MI care with permission from primary author.

In addition to the PIQ, patient questionnaires included a dichotomous question regarding intent to attend CR and four five-point Likert scale questions (1=Strongly disagree, 5=Strongly agree) to assess helpfulness of the QPS. These questions were developed for this study based on evidenced based literature and expert opinion [27,30–34]. Questionnaires were administered day before or day of discharge to patients who were observed. The research team was available if patients needed assistance in filling out the questionnaire. Indication of any patient utilizing the research team to facilitate completion of the questionnaire was recorded.

Physician perception of the QPS intervention and weekly education session was obtained through self-administered questionnaire. The questionnaire was developed for this study based on evidence -based literature [35] and cardiologist input. Two five-point Likert scale questions (1=Never, 5=Always) assessed perception of helpfulness of education and patient QPS with one open-ended question for feedback. Any physician on ACS was invited to complete the questionnaire at the weekly educational session once during their rotation.

Demographics of patients were collected via chart review of electronic medical records and self-reported questionnaires. Chart review included age, gender, length-of-stay, and diagnosis of MI. Demographics of race, level of education, county, history of MI, PCI or CABG, tobacco use, marital status, and employment status were collected on patients who completed questionnaire prior to discharge. Physician demographics were obtained through a self-reported questionnaire including age, gender, role, and years of experience.

2.8 Data Analysis

Data were organized and analyzed with SPSS® v.24 statistical software (Unicom). Descriptive statistics were calculated for demographic data and reported as medians and interquartile ranges for continuous variables and frequencies and percentages for categorical variables. Question-asking behavior was calculated as median and interquartile ranges of total number of questions asked during length of stay. Questions asked were further categorized by topic and reported as percentages and frequencies. The PIQ subscales of Treatment Planning and Patients Needs were computed as median and interquartile range individually. Similar to Arnetz et al. [4] the average of each subscale was converted to a score and reported on scale from 0 to 100, with higher scores indicating higher perception of engagement. Patients were required to answer all questions in each subscale in order to be included in final analysis. Rates of physician endorsement of QPS and patient intention to attend CR were reported as frequencies and percentages. Differences between groups were calculated with appropriate statistics (independent t-test, exact Mann Whitney *U,* and exact Chi-square). For inferential analysis, an exact Mann Whitney *U* was computed to determine the difference in question-asking behavior of those who expressed intention to attend CR versus those who did not. This same analysis strategy was used for Treatment Planning and Patient Needs subscales scores and intention to attend CR. For patient and physician self-reported surveys, median and interquartile range were calculated for Likert scale questions. All patient and physician data were de-identified for analysis. Statistical significance was defined as $p < 0.05$.

3. Results

Forty-two eligible patients were identified to participate in the study (Figure 1). Of the 42 patients who received a QPS, 10 patients became ineligible prior to observation, resulting in 32 patients for final analysis. Sixteen patients participated in post-QPS questionnaire prior to discharge and four physicians completed the provider questionnaire.

3.1 Nonparticipants vs Participants

Except for classification of MI diagnosis, no significant differences in demographics were noted between those who participated in the study and the 10 patients who became ineligible. The significance of this difference is largely due to four of the 10 patients having a non-MI diagnosis. The 25 patients excluded from the study were similar in age compared to those that were included (median age of 68 years old versus and 68.5 years old) but tended to have longer length of stay (median 5 days versus 3 days) and more severe MI diagnosis with four of the 25 (16%) excluded diagnosed with STEMI.

3.2 Demographics

Demographics of patients in the study are displayed in Table 2 and Table 3. There were no statistically significant differences in demographics for the 16 patients who took the questionnaire compared to the 16 patients who did not. Of the four physicians who completed surveys, two were interns, one was a second-year resident, and one was a third-year resident with a median of 1.6 years of experience. Median age was 29.5 years; one was female and three were male.

3.3 Question-Asking Behavior

The median of the total number of questions asked by the patients (*N*=32) during their hospital stay was one (*IQR*= 2). Twelve patients did not ask any questions during rounds.

Frequency of questions asked was determined for each hospital day and for the 20 patients who asked questions, nine patients (45%) asked at least one question on hospital day two, followed by 7 patients (35%) on hospital day three. A total of 52 questions were asked during the study period with 47% of questions focused on treatment and procedures (Figure 4). Only two questions were asked about CR. Thirteen of the 16 patients who participated in the questionnaire answered the question about intent to go to CR and 11 (85%) reported positive intention to attend CR. The number of questions asked was not statistically different for patients expressing intent to attend CR versus those who said No to intent (Exact Mann-Whitney U=16, p=.410). Only one of the 32 observed patients were observed receiving endorsement of QPS by the physician.

3.4 Patient Involvement Questionnaire

Median and interquartile ranges of Patient Involvement Questionnaire scores are reported in Table 4 by subscale. Overall, patients reported higher perceived engagement in the Patient Needs subscale compared to Treatment Planning subscale. The subscale scores of patients who intended to attend CR tended to be higher in both subscales compared to those who did not, however this was not statistically significant.

3.5 Helpfulness of QPS

The four physicians agreed that the education session regarding CR adequately prepared them to engage their patients (Median of 4, range 4-5) and three physicians reported QPS sometimes helped patients and families ask questions (Median of 3, range 1-5). Three physicians responded to question about impact of QPS on time spent with patient. Physicians agreed (Median 4, range 1-5) that the QPS increased time with patient, but responses varied highly from never to always. Patient questionnaire responses on the helpfulness of the QPS reported a median score of 4 (4=Agree) on a scale from 1 to 5 suggesting that patients agreed the QPS helped them ask questions about CR and MI care.

4. Discussion and Conclusion

4.1 Discussion

To this author's knowledge, this is the first study to look at use of a QPS to promote patient engagement in an inpatient cardiac population. Patients reported the helpfulness of the QPS in facilitating question asking about CR and other aspects of MI care; however, few questions were observed. Despite lack of statistical significance regarding patient engagement and intention to attend CR, positive trends and perceived helpfulness of the intervention highlight the potential clinical significance of this study.

In evaluating the feasibility of the QPS, patients endorsed that the QPS helped them ask questions related to CR and MI care. These positive findings are consistent with previous QPS literature [36–41] and suggest that providing patients with a list of questions relevant to their care can help patients feel more engaged. Although two physicians reported that the QPS helped patients ask questions, the variable answers regarding the QPS's impact on length of rounds warrants further research. The majority of previous QPS studies that report on duration of consult cite no difference or an increase in duration with a QPS; however none of these studies evaluated the effect of a QPS on inpatient rounds [21–24].

Despite the helpfulness of the QPS, very few questions were observed as patients only asked a median of one question during hospitalization. This is a significantly lower number than other studies where patients received a QPS, who reported an average of 5 to 18 questions per encounter [29,42–45], with the exception of one study who reported similar results [40].

Potential reasons for this disparity can be considered along with the difference between inpatient and outpatient settings.

First, the brief observation window during rounds in the inpatient setting may limit potential for patients to be observed asking questions in contrast to scheduled outpatient appointments. A second possibility relating to the inpatient setting includes multiple providers available at different times to whom patients may ask questions instead of asking one clinician in the outpatient setting. And finally, some MI literature suggests that patients' information seeking tends to peak post-discharge [46,47], which further privileges the outpatient setting for increased question asking.

On the contrary, one possibility that does not arise out of the differences of inpatient and outpatient settings is the lack of physician endorsement of the QPS, where physician endorsement has been shown to increase question asking behavior in other studies [23,24,29]. Because of the logistical challenges to observing patients' questions in the acute care setting, measurement of patient engagement through alternative means, including validated instruments such as the Patient Involvement Questionnaire or the Patient Activation Measure [48], warrant further exploration and validation in the inpatient setting.

Unlike the number of questions asked, this study was consistent with previous literature in the patient's desire to seek information about specific topic areas such as treatments and procedures[21,23,36,45,49]. In order to optimize promotion of all aspects of post MI care, including CR, a broader QPS may address a wider scope of patient information needs and further promote patient engagement. Future development of a QPS should include patient focus groups to ensure patient information needs are being addressed. In addition to evaluating quantity and types of questions asked, to this author's knowledge, this is the first to assess when inpatients diagnosed with AMI express information needs. Although patients will have individual preferences about how and when they want to receive information [46], this study suggests that patients are more likely to ask a question on the second or third day of their hospital stay. This information can help nurses to tailor patient education and provision of QPS.

Although not statistically significant, patients in this study who expressed intention to go to CR tended to have higher PIQ subscale scores compared to those who did not. However, these scores were similar to an outpatient population who did not received an intervention to promote engagement in Arnetz et al. [4]. In spite of similar scores, the population in Arnetz et al.'s study [4] found an inverse relationship between the Patient Needs subscale scores and attendance at CR. With only 12 patients included in the statistical analysis the small sample of this study may be one reason for this unexpected relationship. The difference between inpatient and outpatient may also be a significant factor as Arnetz et al. did not administer the PIQ until 6 to 10 weeks post-discharge. The relationship between CR and patient engagement needs further research with

The results of this study should be interpreted in light of several limitations. First, the descriptive correlational design, combined with the small sample size and low response rate limits external validity. Questionnaires were administered prior to discharge to more accurately reflect the patient's perception of their engagement, but the incomplete responses suggest this may not be the best time. The demands and stress of an acute hospitalization may have influenced these incomplete responses. Further research is needed to determine the best time to assess patient engagement during hospitalization. This low response rate also prevented valuable validity and reliability testing of the Patient Involvement Questionnaire, which is particularly needed since some aspects of the questionnaire were altered.

Secondly, the limited time frame of observation during rounds may not be representative of the patient's question-asking behavior and engagement overall. Direct observation was chosen to avoid recall bias with self-reported data and because video or audio recordings common in the QPS literature [21,23,45] were not appropriate for the inpatient setting. Future research should continue to validate instruments, such as the PIQ, in the inpatient setting to assess patient engagement.

A third limitation of this study is the method of measuring CR participation as intent is not equivalent with participation. Patient's face a number of barriers to attending CR [33] and level of patient engagement may be only one of many factors affecting an individual's decision to participate. A final inherent limitation is the potential for Hawthorne Effect on patient and physician behavior [50].

4.2 Conclusion

In conclusion, a CR-specific QPS may help AMI patients ask questions and feel engaged in their care. The higher levels of patient engagement in patients who intended to participate in CR suggest that patient engagement may play a role in CR participation, but the relationship between level of engagement and CR participation requires further study. Promoting patient engagement is a key part of patient-centered care with the potential to improve patient outcomes. Further research should evaluate the effectiveness of a QPS during hospitalization to promote patient engagement and the role of nurses and physicians in encouraging patient engagement.

4.3 Practice Implications

Through the use of a CR-specific QPS, an opportunity exists to indirectly improve patient outcomes not only through promotion of patient engagement, but also through increased participation in CR post discharge, both of which have demonstrated decreased healthcare utilization in the literature. Findings of this study also suggest that environmental factors cited in the social cognitive theory including nurses and physicians, can play a critical role in encouraging patients to ask questions. Clinical nurses in particular can enhance a patient’s self-efficacy related to the personal factor by encouraging question-asking behavior through the use of a QPS. By influencing a patient’s knowledge and skills related to CR, the healthcare team may impact patient outcomes by influencing CR participation.

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Tables

Table 1

Adapted Patient Involvement Questionnaire

Scale items and questions	Response options
Treatment planning (4 questions) *To what degree do you agree that the following aspects are important:* Did you take part in discussing your examinations/treatments including cardiac catheterization, stress test or cardiac medications? Did you discuss the goals of your treatment after a heart attack with your doctor? Have doctors/nurses motivated you to take responsibility for your future health? Did you take part in planning your follow-up care, including MI clinic and cardiac rehab, i.e. what would happen after you leave the hospital?	Yes, to a great degree (4) Yes, somewhat (3) No, not especially (2) No, not at all (1)
Patient Needs (7 questions) *To what degree do you agree that the following aspects are important:* Did you have the opportunity to ask questions about your ~~condition/illness~~ heart attack and cardiac rehab? Did you understand the information you received about your heart attack and cardiac rehab? Were doctors and nurses sensitive to your needs/requests? Were you treated with respect? Did you receive the information you wanted about results of examinations or treatments such as cardiac catheterization, stress test, EKG, or lab results? Did you receive the information you wanted about your medications? Did you have the opportunity to ask questions about cardiac rehab ~~when you were being discharged~~ when preparing for discharge?	Yes, to a great degree (4) Yes, somewhat (3) No, not especially (2) No, not at all (1)

Note. Response options organized into a 4-point Likert scale with 1= No, not at all to 4= Yes, to a great degree. Adapted from "Is Patient Involvement During Hospitalization for Acute Myocardial Infarction Associated with Post-Discharge Treatment Outcomes?" by J.E. Arnetz, U. Winblad, A.T Höglund, B. Lindahl, K. Spangberg, L. Wallentin… and B.B. Arnetz, 2010, *Health Expectations: Journal of Public Participation in Health Care and Health Policy, 13* (3) p. 301. Sections underlined were added to the original question and sections crossed out were removed. Alterations were done with author permission.

Table 2

Characteristics of Patients Observed (N=32)

	Questionnaire Group (*n*=16)		No Questionnaire Group (*n*=16)		All Patients (*n*=32)		
Characteristic	No. of Patients	%	No. of Patients	%	No. of Patients	%	*p*
Age, yrs							.939[a]
Mdn (IQR)	67.5 (18.3)		69.5 (11.0)		68.5 (12.0)		
M (SD)					66.4 (9.0)		
LOS, days							.623[b]
Mdn (IQR)	3.0 (1.8)		3.0 (3.8)		3.0 (2.0)		
Gender							1.00[c]
Male	8.0	50.0	8.0	50.0	16.0	50.0	
Female	8.0	50.0	8.0	50.0	16.0	50.0	
MI Diagnosis							.252[c]
NSTEMI 1	12.0	75.0	9.0	56.3	21.0	65.6	
NSTEMI 2	3.0	18.8	7.0	43.7	10.0	31.3	
NSTEMI							
	1.0	6.2	0.0	0.0	1.0	3.1	
Unspecified							1.00[c]
Phase 1 CR	10.0	62.5	10.0	62.5	28.0	62.5	
Yes	6.0	37.5	6.0	37.5	4.0	37.5	
No							

Note: IQR= Interquartile range; LOS=Length of Stay; MI=Myocardial Infarction; NSTEMI=Non-ST elevated MI; 1 and 2 designated type of NSTEMI. CR: Cardiac Rehab. Phase 1 CR refers to CR RN coming to providing education and endorsement for CR to eligible patients in hospital prior to discharge. [a]Independent *t*-test performed. [b]Mann-Whitney *U* test performed. [c]Exact Chi-square test performed.

Table 3

Baseline Characteristics of Survey Patients (n=16)

Characteristic	No. of Patients	%
Race		
Black/AA	4	25.0
White	12	75.0
Marital Status		
Divorced	2	12.5
Married	8	50.0
Widowed	3	18.8
Unmarried/Single	3	18.8
Employment		
Employed	5	31.3
Retired	10	62.5
Unable to work	1	6.3
Education		
Grade 1-8	1	6.3
Grade 9-11	3	18.8
High School	5	31.3
Some College	4	25.0
Associate’s	1	6.3
Bachelor’s	1	6.3
Graduate	1	6.3
Tobacco Use		
Current	2	12.5
Former	9	56.3
Never	5	31.3
History of MI		
Yes	7	43.8
No	8	50.0
Missing	1	6.3
History of CABG		
Yes	3	18.8
No	13	81.3
History of PCI		
Yes	4	25.0
No	12	75.0

Note: AA= African American; MI= Myocardial Infarction; NSTEMI=Non-ST elevated MI; 1 and 2 designated type of NSTEMI. CABG=Coronary Artery Bypass Graft; PCI= Percutaneous Coronary Intervention.

Table 4

Patient Involvement Questionnaire

				Intent to go to CR					
	All Patients			Yes (n=11)		No (n=2)			
Scale	*Mdn*	IQR	Range	*Mdn*	IQR	*Mdn*	IQR*	Mann-Whitney *U*	*P*
Treatment Planning **	66.7	29.0	42.0-100.0	75	38.0	62.5		6.0	.582
Patient Needs**	90.5	20.0	67.0-100.0	90.5	15.0	83.3		8.5	.758

Note 1: Each scale is from 0-100. Patients with higher scores for a subscale have increased perceived level of involvement in that factor. Patients were required to complete each subscale in its entirety in order to have a valid subscale score. There were 13 valid scores for the Treatment planning subscale and 14 valid scores for the Patient Needs subscale

Note 2: Of the 13 patients who answered question about intent to go to CR, 2 responded that they did not intend to go, 11 responded that they did intend to go. Exact Mann-Whitney *U* tests were used to compare the two subscale scores over those two groups. Twelve patients were included in test for Treatment Planning score and 12 patients were included in Mann-Whitney U analysis for Patient Needs score. * IQR not meaningful for only n=3. ** Exact Mann-Whitney U test. Statistical significance determined by p <0.05.

Figures

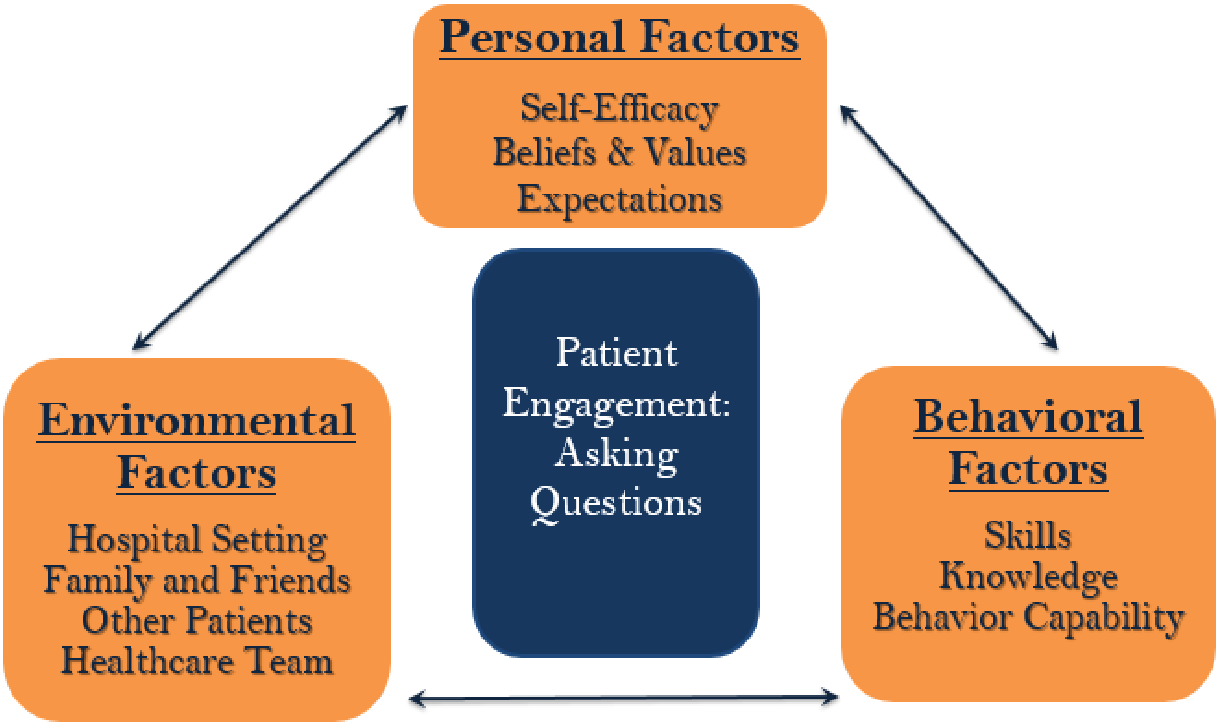

Figure 1. Social Cognitive Theory framework adapted from "Social Foundations of Thought and Action: A Social Cognitive Theory, by A. Bandura, 1986.

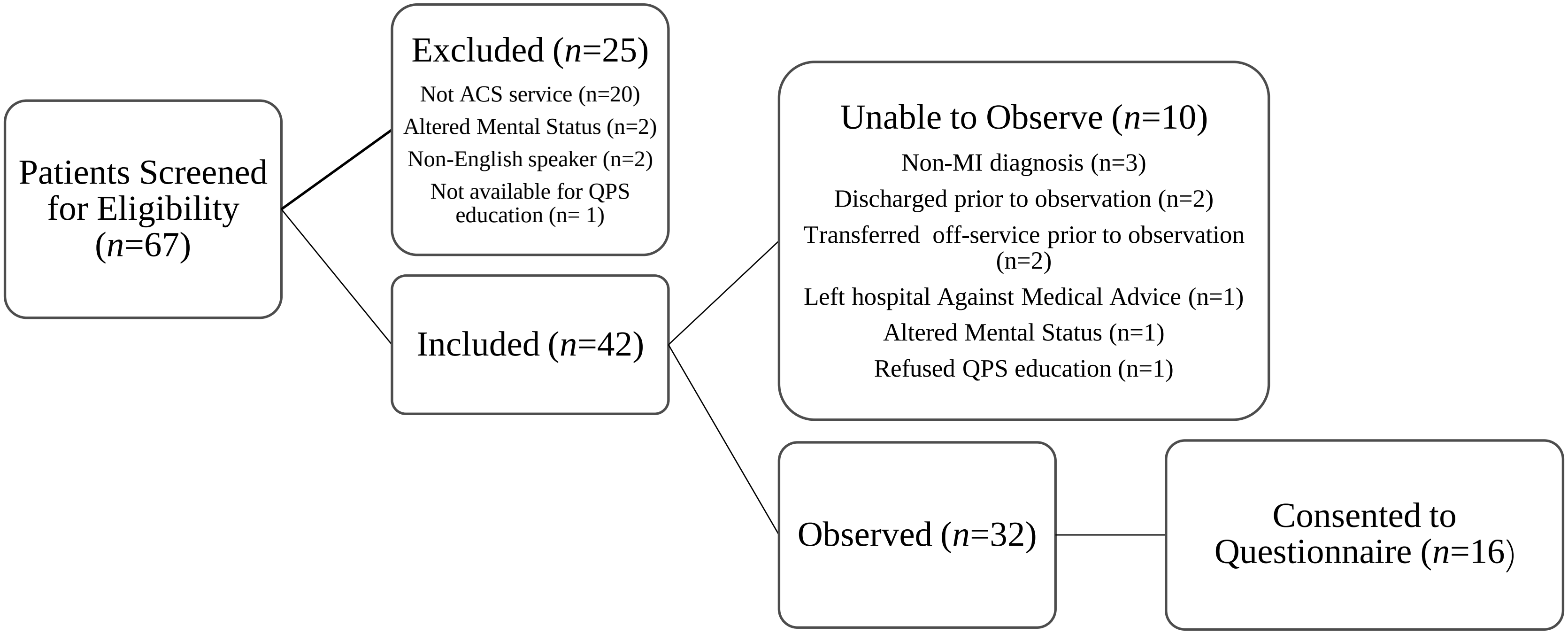

Figure 2. Participant flow chart and enrollment in study. QPS= Question Prompt Sheet; MI= Myocardial Infarction.

1. When can I start a cardiac rehab program? If I decide not to go right away, can I go later?
2. What happens at my first appointment?
3. When are cardiac rehab sessions offered? How many sessions do I need to go to?
4. I have too much to do at work and home to bother with cardiac rehab. How can I do it all?*
5. Does my insurance cover a cardiac rehab program?
6. What if there are no cardiac rehab programs near where I live or the closest one is too far away? Can I do an exercise program at home?
7. I don't live in Charlottesville. Is there a cardiac rehab center I can go to near my home?
8. Is exercising safe after a heart attack?
9. Do I exercise by myself or will it be in a group format?
10. Can my family come with me?
11. Can a cardiac rehab program help me quit smoking?
12. At my age I don't see how cardiac rehab could help. Isn't it too late for me?*
13. Other:____

Figure 3. Figure 6. Question Prompt Script specific to cardiac rehab provided to patients and families. *From "How do I address my concerns about cardiac rehab?" by The American Heart Association, 2016 (http://www.heart.org/HEARTORG/Conditions/More/CardiacRehab/How-Do-I-Address-My-Concerns-About-Cardiac-Rehab_UCM_487776_Article.jsp#.WaEcrumQzIU http://URL). Copyright [2016] by the American Heart Association. Reprinted with permission.

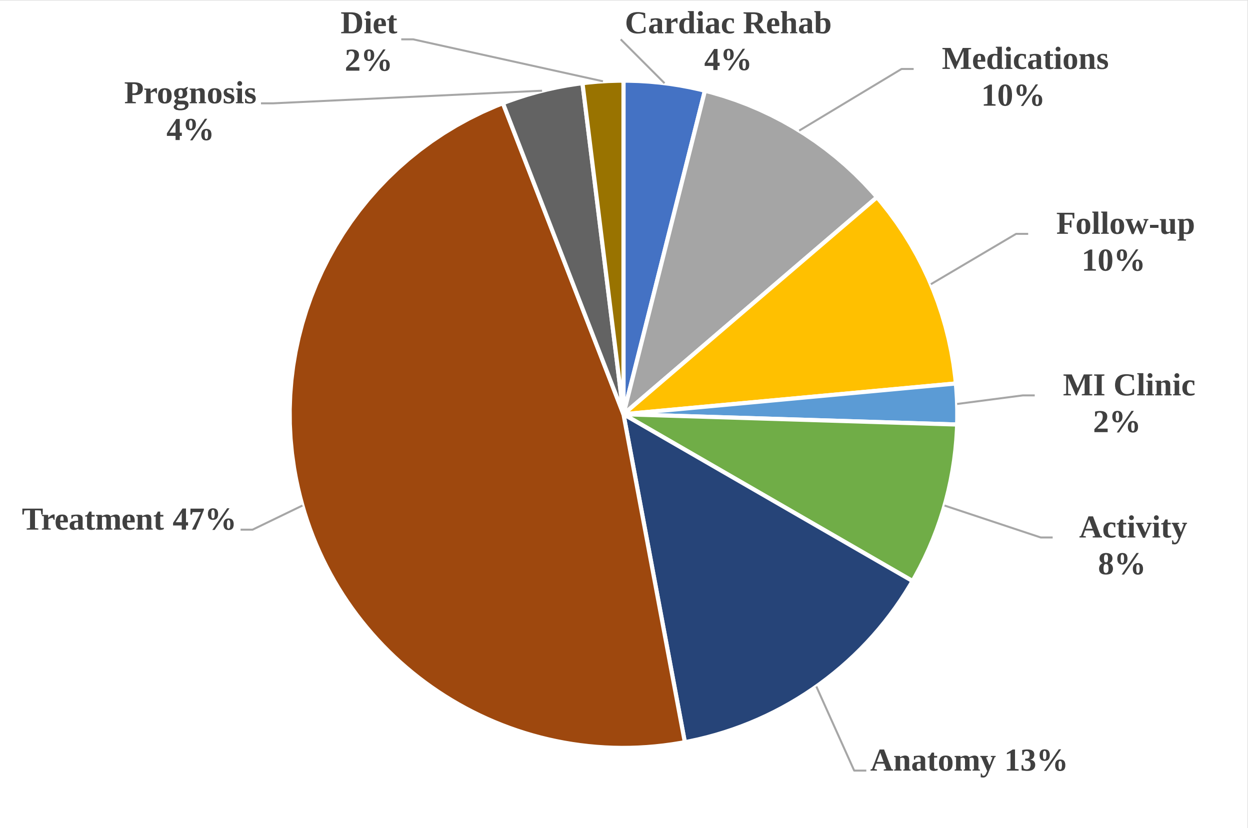

Figure 4. Topic areas of questions asked during hospitalization reported as percentages. A total of 52 questions were asked by 32 patients in 9 out of 11 different topic areas during the study period. No questions were asked regarding sexual activity or cholesterol management therefore they are not depicted above.