Psychometric Development of the Patient Engagement in Prenatal Care Scale

Phyllis M. Dyess-Nugent

University of Texas at Tyler

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PSYCHOMETRIC DEVELOPMENT OF THE
PATIENT ENGAGEMENT IN PRENATAL CARE SCALE

by

PHYLLIS M. DYESS-NUGENT

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctorate of Philosophy in Nursing
Department of Nursing

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College of Nursing & Health Sciences

The University of Texas at Tyler
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Tyler, Texas

This is to certify that the Doctoral Dissertation of PHYLLIS DYESS-NUGENT

has been approved for the dissertation requirement on April 3, 2019
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Dedication

I dedicate this work to my father, William “Bill” Dyess, who would have been 101 years old this year, and to my six grandchildren, in order of appearance – Keeley, Wyatt, Eloise, Cole, Tallulah, and Oliver. My father taught me to be curious about the world around us and seek knowledge. May his love of learning carry on through the generations and make this world a better place.
Acknowledgements

To all the prenatal care experts who reviewed my instrument items multiple times, thank you for your time and thoughtful consideration. Your dedication to maternal health care is inspiring, and your insight and feedback were essential to my study.

To the many research assistants who helped gather data during both studies – Annette Bacon, Janice Lankford, Shieta March, Joyce Miller, Tina Wolfson, and Polly Cordova. I am so grateful for your time and hard work.

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To my husband, Phillip, my personal barista. Thank you.
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Abstract

PSYCHOMETRIC DEVELOPMENT OF THE PATIENT ENGAGEMENT IN PRENATAL CARE SCALE

Phyllis M. Dyess-Nugent

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The University of Texas at Tyler
March 2019

The value of prenatal care in improving maternal and neonatal outcomes has been evident in research for many years, and yet in the U.S. where prenatal care is widely accessible to women, maternal and neonatal morbidity and mortality remain higher than many developing countries (CDC, 2019). Attributes of prenatal care have been studied, such as the number of visits and timing of entry into care. Additional aspects of prenatal care deserve exploration in order to make improvements in this established, valuable intervention. A woman’s engagement in her care during pregnancy has not been previously measured. The focus of this dissertation research was to develop a sound instrument to measure Patient Engagement in Prenatal Care (PEPC).

The first manuscript, Nurses’ Unique Opportunity to Promote Patient Engagement in Prenatal Care, provides an analysis of the concept of PEPC. The second manuscript, Instrument Development and Initial Testing of the Patient Engagement in Prenatal Care Scale, reports the development of the PEPC scale items, the first administration of the survey to a sample of 202 pregnant women, and data analysis including initial psychometric testing. Content validity index (CVI), internal consistency reliability, and exploratory factor analysis (EFA) were assessed for the Phase 1 study.
The CVI of the 18-item scale was satisfactory (S-CVI = .92), and the reliability was acceptable (Cronbach’s $\alpha = .86$). Three items were removed through EFA and resulted in a three factors structure. The alpha coefficients for the final 15-items and three subscales were all acceptable (Cronbach’s $\alpha = .73$-. .89).

The third manuscript, *Psychometric Development of the Patient Engagement in Prenatal Care Scale*, reports a subsequent Phase 2 research study in which the 15-item PEPC scale was administered to a second sample of 205 pregnant women, with psychometric testing and instrument revision. The coefficient alpha and confirmatory factor analysis (CFA) were used to assess the internal reliability and construct validity, respectively. The alpha coefficient of the 15-item scale showed good reliability (Cronbach’s $\alpha = .81$). The CFA supported 3-factor loading model with acceptable model indices values in the final 12-item PEPC. The final 12-item scale demonstrated acceptable reliability in this sample ($\alpha = .77$).

This dissertation portfolio begins with laying the theoretical foundation of PEPC as a concept and advances to the creation of a sound instrument with initial psychometric testing. The resulting PEPC-12 scale was a brief instrument that will be easy to administer and useful in future clinical studies.
Chapter 1
Overview of Research Portfolio

The purpose of this dissertation portfolio of research is to develop a psychometrically sound instrument to measure Patient Engagement in Prenatal Care (PEPC) in pregnant women. Each manuscript herein contributes to the development of the instrument and reports the initial psychometric testing of the instrument.

Introduction of Manuscripts

The manuscript in chapter two, *Nurses’ Unique Opportunity to Promote Patient Engagement in Prenatal Care*, provides an in-depth analysis of the concept of PEPC. The manuscript was submitted for publication to *Nursing Forum*, a peer-reviewed quarterly nursing journal that reports on innovative trends that advance the profession of nursing. The manuscript was accepted, appeared first on-line (2017), and was published in the January-March 2018 print issue.

The early development of the PEPC scale and the Phase I study in this portfolio is reported in the manuscript, *Instrument Development and Initial Testing of the Patient Engagement in Prenatal Care Scale*, found in chapter three. After expert panel review the instrument was revised from its original pool of 30 items to an 18-item scale. After administration and subsequent data analysis, the scale was refined to 15 items.

The Phase II study is found in chapter four, *Psychometric Development of the Patient Engagement in Prenatal Care Scale*. This manuscript reports the administration
of the 15-item version of the PEPC scale, data analysis, validity assessment, and further revisions to a final 12-item PEPC scale.
Chapter 2
Nurses’ Unique Opportunity to Promote Patient Engagement in Prenatal Care

Abstract

Aim. To report an analysis of the concept of Patient Engagement in Prenatal Care

Background. Engagement in health care has been widely discussed, but vaguely defined. Patients benefit more from their health care when they are fully engaged in their care. Patient engagement in prenatal care is an important element of prenatal care utilization that has not been analyzed, standardized as a concept, or measured.

Design. Concept analysis.

Data Sources. CINAHL, MEDLINE, PsycINFO databases and the internet were searched for literature published in English with a focus on peer-reviewed journals from disciplines of business, allied health sciences, health administration, psychology, and nursing; focusing on the period of 2010 – 2015.


Results. This concept analysis provides four defining attributes of patient engagement in prenatal care and a table of related empirical referents of engagement. These elements offer a foundation for further nursing scholarship toward measurement and evaluation of patient engagement in prenatal care.

Conclusion. Patient engagement in prenatal care represents a human response to a health condition. Efforts to increase patient engagement in health care are best addressed by the nursing profession through continued research and intervention development.
Nurses’ Unique Opportunity to Promote Patient Engagement in Prenatal Care

In recent years, patient engagement has come to represent the underpinning of a revolution in health care, bringing improved patient health outcomes and reduction of health care costs (Barello, Graffigna, Vegni, & Bosio, 2014). Patient engagement in health care has been generally understood as a patient behavior, and patients’ perceptions have been recognized to affect their health care decision-making. The purpose of this paper was to explore patient engagement in health care, with a focus on prenatal care (PNC), in order to provide an approach for future research into improving maternal outcomes. A hybrid version of the Walker and Avant (2011) concept analysis method is used as a framework for this discussion. Identification of the defining attributes, antecedents, consequences, and empirical referents is followed by discussion of purposeful application of this concept to nursing practice.

**Background and Significance to Nursing**

Exploring and clarifying the concept of patient engagement is important because the phrase *patient engagement* has been widely used when addressing different patient populations and health issues during recent years without a standard definition in the health care community (Gallivan, Kovacs Burns, Bellow, & Eigenseher, 2012). Stakeholders in public health policy and health care professions acknowledge the value of patient engagement in their care; however, they have not shared a mutual definition of patient engagement (Barello et al., 2014) nor is there an established method to ensure that engagement actually takes place.

The perceptions of individuals affect their thoughts and behaviors. In the health care setting, the study of individuals’ perceptions has helped clinicians to understand and
guide interventions in education and health promotion (Golden & Earp, 2012). Various theories have described how an individual’s perceptions affect engagement in desired health behaviors (Simons-Morton, McLeroy, & Wendel, 2012). Understanding patients’ perceptions of health care relevance could be useful as a precursor to designing interventions aimed at improving the decision to engage in a health-related activity such as prenatal care.

Prenatal care holds an exclusive place in health care, combining health promotion, health protection, and disease prevention for two joined individuals. Health care of the pregnant mother affects both maternal and infant health outcomes. As a unique group among the caring professions, nurses are in a position to develop concepts for application in all areas of patient care instead of relying on other disciplines to define the work. Prenatal care is a perfect example of an area where nurses can and should use their expertise in health literacy and social support to engage pregnant women as early as possible in their care.

**Data Sources**

CINAHL, MEDLINE, PsycINFO databases and the internet were searched for literature published in English with a focus on peer-reviewed journals from disciplines of business, allied health sciences, health administration, psychology, and nursing. Inclusion dates were initially broad to search for appearance of the concept in articles from 2000—2015 then narrowed to focus on articles from 2010 – 2015. The keywords used were engagement, patient, and concept. Early in the literature review a recurrent theme of patients’ perception of the value of care was noted, and the keywords relevance and perceived relevance were introduced.
Results

Patient Engagement: Concept Description

Engagement has been used in business research, applied to both consumers and employees. The term *engagement* has been used since 2005 in marketing research (Brodie, Ilic, Juric, & Hollegeek, 2013). The working definition of consumer engagement refers to the level of the customers’ presence in the relationship with an organization providing a service (Brodie et al., 2013). Gray (2012) noted engagement to be a term used in the work context to describe a person’s emotional attachment to a company based on the individual’s perception of how the organization values the employee.

Nursing has used the term *engagement* in research and discussion of the profession. Bargagliotti (2012) defined work engagement in nursing as a “positive, fulfilling state of mind about work” (p.1414). Gray (2012) analyzed the concept of nurse manager engagement and identified three components of work engagement definitions: rational, behavioral, and emotional.

Patient engagement appeared in health care literature with increasing frequency over the past ten years, and although the meaning seems to have evolved, it is still inconsistent (Barello et al., 2014). In 2010, Gruman et al. posited that patient education alone was no longer enough to achieve desired health outcomes and identified patient behaviors necessary for patient engagement in health care. Docherty, Bugge, and Watterson (2012) defined patient engagement using the constructs of language and personalization of care, power and relationships, and health literacy. In 2012, Ross used engagement to indicate patient adherence with prenatal care advice. Drenkard (2014)
noted that patient engagement can be described in terms of the actions that individuals take to derive benefit from their health care, positioning patients as full partners in their health care experience.

Focusing on patients with chronic illness, Simmons, Wolever, Bechard, and Snyderman (2014) defined patient engagement as a broad concept with three components:

1. Recognizing and understanding the importance of taking an active role in one’s health and health care;
2. Having the knowledge, skills, and confidence to manage health;
3. Using knowledge, skills, and confidence to engage in health-promoting behaviors to obtain the greatest benefit. (pp. 3-4)

While the definition offered by Simmons et al. (2014) addressed attitudes and health behaviors shared by many patient populations, the focus of their research was patients with chronic illness.

A systematic literature search revealed a paucity of nursing articles that focused on patient engagement during pregnancy care. Romano (2010) described the potential benefits of fostering an environment that allows for engaged patients to make a positive impact on the field of maternity care. Docherty et al. (2012) studied antenatal care engagement among socioeconomically deprived women by using semi-structured interviews and identifying themes of engagement. Ross (2012) studied the influence of maternal-fetal attachment on patient engagement with healthy practices, specifically understanding and adherence to antenatal health advice. The term engagement has been used in the literature as a general and undefined reference to patient access and use of prenatal care (Hamilton & Campbell, 2013).
The fundamental traits associated with an individual engaged in health care included presence in a relationship with a health care professional, understanding the importance of care, and demonstration of behaviors promoting health. Considering these traits in the context of pregnancy helped to refine the list of PNC engagement attributes.

**Patient Engagement: Defining Attributes**

A key focus of the Walker and Avant (2011) method is to determine the defining attributes of the concept which must be present in order for an instance of the concept to occur. The following attributes of the patient and the health care environment were determined to be necessary for patient engagement in care. These characteristics were interwoven, and each one may be influenced by another during the course of a pregnancy. Patient engagement in care was understood to be affected by both patient behaviors and health care personnel behaviors and attitudes. In part, the process of patient engagement in PNC demonstrated a relationship between the patient and the health care provider.

The four defining attributes of patient engagement in PNC are:

1. Perceived relevance of care to successful outcomes
2. Sustained commitment to involvement in care
3. Adherence to professional health recommendations
4. Taking an active partnership role in interacting with provider

**Perceived relevance of care to successful outcomes.** A definitive characteristic of perceived relevance was its subjective quality. Perceived relevance was based on the individual’s perceptions and opinions. The assessment of relevance was assigned by the individual. Perceived relevance was what the individual believed it to be.
The term *perceived relevance* was used in the literature to describe significance, importance, or germaneness of a topic to the matter at hand. Perceived relevance provided a meaningful connection for the individual to the principal subject. Perceived relevance was always discussed in relation to another topic. Without the context of an object, perceived relevance lacks meaning. For example, an educational module may be perceived by a student to be relevant to the student’s mastery of a skill, but the assessment of relevance without the specified context of skill mastery leaves the question of perceived relevance incomplete. Meyer, Lees, Humphris, and Connell (2007) discussed perceived relevance of a training intervention to the nurse’s job role. Skirton, O’Connor, and Humphreys (2012) described the literature findings of the perceived relevance of genetics to the nursing role. Hagen, Awosoga, Kellett, and Damgaard, (2013) studied the perceived relevance of statistics to nursing practice. At first glance perceived relevance may seem to have meaning by itself, but without a framework it would be aimless.

**Sustained commitment to involvement in care.** Patient engagement in PNC requires participation in ongoing activities, such as return appointments, follow up laboratory tests, and imaging studies. Pregnancy care is viewed as a dynamic process over the course of several months. Patient engagement in PNC results from an active participation, not simply a series of passive transactions from health care provider to patient.

Initiation of PNC begins with the woman’s first visit with a health care provider, ideally prior to conception or prior to the completion of the first trimester. Although various schedules for return visits have been proposed, guidelines used across the globe
call for multiple health care interactions spaced throughout the pregnancy for optimal health promotion and timely intervention if pregnancy complications arise (American College of Obstetricians and Gynecologists & American Academy of Pediatrics, 2012; Health Canada, 2000; National Institute for Clinical Excellence, 2008). Many factors affect entry into pregnancy care, such as geographical and financial access to care, culture, and maternal nativity (Boerleider, Wiegers, Manniën, Francke, & Devillé, 2013; Chiavarini, Lanari, Minelli, & Salmasi, 2014); however, the patient’s decision to initiate and continue PNC remains essential.

The patient’s commitment to attending PNC appointments directly impacts utilization of care and affects birth outcomes. Utilization of health care during pregnancy has been operationalized and studied to evaluate the relationship of PNC to outcomes. Kotelchuck’s Adequacy of Prenatal Care Utilization Index (APNCU) was developed to measure PNC utilization and classify levels of care (Kotelchuck, 1994). The APNCU Index has been used widely to evaluate the association of multiple variables with utilization of care. Weir et al. (2011) used the APNCU Index in their research of PNC utilization among insured, yet vulnerable, pregnant women. Krans, Davis, and Palladino (2013) studied the relationship of medical and psychosocial risk levels with adequacy of PNC using the APNCU. Kotelchuck’s index has been used to identify significant relationships of PNC utilization with birth outcomes and health care disparities (Anum, Retchin, Garland, & Strauss, 2010; Coley & Aronson, 2013).

**Adherence to professional health recommendations.** Engagement in care entails the patient giving serious consideration to the advice given by a qualified health care provider and following that advice thoughtfully. One of the main goals of PNC is to
alter maternal behavior in ways that promote the health of the mother and baby. Adherence to appropriate health behaviors such as nutritious diet, adequate exercise, and avoidance of potentially harmful substances is essential to full engagement in PNC. If a pregnant woman does not adapt her health decision making to focus on behaviors that reduce risks during her pregnancy, keeping appointments for PNC hold limited value other than preparing health care providers for the challenges that lie ahead.

**Taking an active partnership role in interacting with provider.** Engagement in care requires the patient to become an active participant in care as opposed to a passive bystander. Open communication within the patient/health care provider relationship is an attribute of engagement. High quality pregnancy care is only possible when the patient fully discloses her health history and provides continuing honest responses to questions during visits for care. One would think that with the intrusive nature of pregnancy on a woman’s body, passivity would be impossible, but the fact that many women forego prenatal care altogether suggests that an active provider dialogue is not always a priority.

As the other partner in the health care relationship, the provider also plays an essential role. Effective communication and shared decision making occur only with the active participation of both the health care professional and the pregnant patient.

**Patient Engagement: Antecedents and Consequences**

An antecedent is a situation that must occur in advance of the concept occurring (Walker & Avant, 2011). The primary antecedent of patient engagement in PNC is pregnancy. Access to care is another antecedent of patient engagement in PNC, and includes geographic access, physical access, and financial access to PNC. Caring and
interested providers who initiate and maintain communication are also noted to be an antecedent of patient engagement in PNC.

A consequence occurs as a result of the concept. Early and adequate PNC has been shown to decrease morbidity and mortality of mothers and their infants (Beeckman, Louckx, & Putman, 2011). Patient engagement in PNC improves maternal/fetal health outcomes. Knowledgeable, engaged patients can help overcome the barriers to effective PNC (Romano, 2010).

**Patient Engagement: Empirical Referents**

Empirical referents relate to the attributes of a concept and provide the means by which characteristics of the concept can be measured (Walker & Avant, 2011). The number and timing of PNC visits attended have been used widely for many years in measures of adequacy of health care during pregnancy (Colón-Burgos, Colón-Jordan, Reyes-Ortiz, Marin-Centeno, & Rios-Mota, 2014; Kotelchuck, 1994). While the importance of this fundamental dimension of care has been evident, engagement in care cannot be measured solely by initiation of PNC and clinic attendance. Empirical referents of patient engagement in PNC should measure the various attributes unique to the patient’s involvement in PNC including their perceptions, enthusiasm, confidence, adherence to advice, and intent to continue care. The literature does not provide an existing instrument designed for the measurement of patient engagement in PNC; however, instruments have been developed to measure engagement in other patient populations (see Table 1). Comparison of these existing measures of engagement could inform the development of an instrument designed to measure patient engagement in PNC.
Discussion

Professional nurses address the human response to health problems, rather than addressing the health problem or disease process itself as the medical profession often does. Our professional diagnoses reflect this distinct difference. Nurses diagnose a problem response or vulnerability to a problem instead of identifying the actual disease. The engagement of women in health care during pregnancy is a concept that embodies a woman’s reaction to a health condition. Engagement in PNC represents a human response that is often lacking, and a health care need that is best addressed by nurses.

If one accepts the four defining attributes of patient engagement in PNC, a clear pathway to improvement begins to unfold. For many years, nurses have focused on disengagement from PNC, evidenced by not attending appointments, non-compliance with recommendations, and indifference to risks, as a knowledge-deficit issue. Nurses believed that if pregnant women just had more knowledge about the good outcomes and possible risks, they would engage in the care. This analysis shows that PNC engagement is much more complex than simply a knowledge issue and might benefit from other priorities. *Perceived relevance* is an important aspect for nurses who interact with pregnant women. Until the woman sees some relationship between clinic visits and her pregnancy outcomes, she may have little incentive to engage. We tend to downplay risks and potential problems when the news of a pregnancy is delivered; however, focusing on how prenatal care can affect the outcomes should be a priority on the first visit. Perceived relevance should be discussed in relation to having a healthy baby, the desired goal for all involved. *Sustained commitment to involvement in PNC* can be supported by positive feedback and encouragement. Young Millennial mothers-to-be are from a
generation where praise and encouragement are an expectation in every aspect of life (Howe & Strauss, 2000). Honing in on the need to be acknowledged for even the minor activities, such as showing up for appointments and taking prescribed vitamins, can help to encourage sustained commitment to PNC. Adherence to professional health recommendations can be promoted by using young mothers’ own strengths. The “wired” generations of technology-savvy women of child-bearing age make it vital to connect health recommendations to some type of digital reinforcement. Having a list of free apps that show how to select food choices, identify potentially harmful substances, exercise safely during pregnancy, and follow normal fetal development put the conversation into a context familiar to the younger generations. Use of digital media is second-nature, so engagement with health practitioners who negate the importance of technology in their lives is a disincentive for young women to engage in PNC. Finally, engagement is seen when pregnant women take an active partnership role in interaction with the provider.

Consideration of the common traits of child-bearing age women can help facilitate this active partnership. Women from the younger generation have spent their entire lives learning and playing in a team environment (Howe & Strauss, 2000). They have a great deal of comfort and confidence in a team situation. Focusing the prenatal experience as a team effort between patient, partner, family, provider team, and delivery site can encourage their active partnership in their interactions with the provider team. One of the benefits of a concept analysis of patient engagement is knowing where to focus on interactions with the pregnant woman to optimize her engagement in positive outcome from her pregnancy experience. Attention to the defining attributes provides a pathway to successful engagement.
Nursing is poised to make a meaningful and lasting impact on maternal/fetal health in an era of changing health care systems and metrics. Understanding patient engagement in PNC is the first step in moving forward toward designing programs that augment maternal strengths, such as the desire for a healthy newborn. Of all the members of the health care system, nurses are best equipped to speak to this human response, pursue the scholarly work necessary to understand it, and deliver the care that will affect it.

**Conclusions**

Understanding how pregnant women access and use health care informs development of programs to improve PNC utilization and birth outcomes (Krans et al., 2013). Despite the implementation of interventions aimed at reducing barriers to prenatal care, more work is necessary to improve utilization of PNC. The use of PNC can be increased by focusing on enhancing positive attributes of health care such as patient engagement. In other disciplines, such as psychology, the general focus of clinical activities has moved to optimal functioning and positive behaviors as opposed to disease and illness (Schaufeli & Baker, 2003). Optimizing a positive behavior in pregnant women, like patient engagement in health care, should be a primary focus of nursing interventions, and should be empirical in nature. Measurement of engagement in care early in pregnancy would give the nurse an opportunity for effective intervention leading to improved pregnancy outcomes and better nurse/patient relationships.
References


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https://doi.org/10.1515/ijnes-2012-0044


### Appendix A: Measures

#### Table 1

*Selections of engagement measurement and potential for application to Patient Engagement in Prenatal Care (PEPC).*

<table>
<thead>
<tr>
<th>Engagement measures</th>
<th>Population</th>
<th>Potential application of measures to PEPC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>duration of time involved</td>
</tr>
<tr>
<td>Hank &amp; Stuck (2008)</td>
<td>Productive activities measure</td>
<td>older adults</td>
</tr>
<tr>
<td></td>
<td></td>
<td>voluntary involvement, frequency of engagement</td>
</tr>
<tr>
<td>Indiana University School of Education (2015)</td>
<td>National Study of Student Engagement (NSSE)</td>
<td>college students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>reflective &amp; integrative learning, quality of interactions</td>
</tr>
<tr>
<td>Schaufeli &amp; Bakker (2003)</td>
<td>Utrecht Work Engagement Scale (UWES)</td>
<td>workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dedication, absorption</td>
</tr>
<tr>
<td>Skolasky, Mackenzie, Wegener, &amp; Riley (2008)</td>
<td>Hopkins Rehabilitation Engagement Rating Scale</td>
<td>physical therapy participants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HC provider rated degree of engagement (attitude, participation, understanding)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>satisfaction, belief in the work, commitment</td>
</tr>
</tbody>
</table>
Chapter 3
Instrument Development and Initial Testing of the Patient Engagement in Prenatal Care Scale

Abstract

Background/Problem: The occurrence of severe maternal morbidity and mortality in the U.S. higher than in other developed countries. Prenatal care improves maternal and infant outcomes and should be explored further for opportunities to increase its impact. Patient engagement in prenatal care (PEPC) is an important characteristic of health care utilization that has not been previously measured as a single construct.

Purpose: This was a Phase I study to develop an instrument to measure PEPC, and aimed to answer the research questions: (1) What is the evidence of internal consistency indicating that the PEPC instrument is a reliable instrument? (2) What is the evidence that the items on the PEPC instrument provide a quantifiable measure of the construct of PEPC?

Methods: The Social Ecological Model provided a framework to guide the study design, and Item Response Theory guided psychometric testing of the scale. A convenience sample of pregnant women (N=202) was recruited and participated in this quantitative psychometric instrument development study. Content validity index (CVI), internal consistency reliability, and exploratory factor analysis (EFA) were used.

Results: The CVI of the 18-item scale was satisfactory (S-CVI = .92), and the reliability was acceptable (Cronbach’s $\alpha = .86$). Three items were removed through EFA and
resulted in an optimal three factors structure, which accounted for 54.5% of the variance for PEPC. The alpha coefficients for the final 15-items and three subscales were all acceptable (Cronbach’s $\alpha = .73-.89$). Split-half reliability was evident (Spearman-Brown coefficient = .92).

**Conclusion:** The 15-item scale is a reliable measure of PEPC with acceptable content validity. Confirmatory factory analysis is needed for further construct validity testing.

Keywords: patient engagement, prenatal care, pregnancy, instrument, scale, EFA, psychometric testing
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Despite global advances in perinatal health outcomes, the rates of maternal mortality and severe maternal morbidity in the U.S. have increased in recent years (Center for Disease Control and Prevention, 2016; World Health Organization, 2014). The benefits of prenatal care for mothers and infants have long been established more than three decades ago (Institute of Medicine, 1985). Many aspects of prenatal care have been studied, such as components of care, quality of care, frequency of visits, facilitators and barriers to care, and different models of care have been topics of research (Ickovics et al., 2016; Kitsantas, Gaffney, & Cheema, 2012; Sunil, Spears, Hook, Castillo, & Torres, 2010; Sword et al., 2012; Thielen, 2012). Efforts to improve utilization and effectiveness of prenatal care have been widespread, yet the positive effects of those efforts have not been fully realized. Understanding how pregnant women engage in their care may reveal gaps in care that can be addressed to ensure full use and benefit of prenatal care. Measurement of engagement in prenatal care will reveal divergences in care that are amenable to improvement through nursing interventions.

In recent years, patient engagement has represented a foundation of a health care revolution: improved patient health outcomes with a reduction in health care costs (Barello, Graffigna, Vegni, & Bosio, 2014). Patient engagement in health care is generally understood as a set of patient behaviors related to their participation in health care, and patients’ perceptions of their health have been recognized to affect their health care decision-making (Pomey, Ghadiri, Karazivan, Fernandez, & Clavel, 2015).
Prenatal care contributes to prevention of complications and optimization of pregnancy outcomes for mothers and infants. The effectiveness of prenatal care depends on the degree of patient engagement in care throughout pregnancy. Factors affecting the use and effectiveness of prenatal care have been evaluated (Boerleider, Wiegers, Manniën, Francke, & Devillé, 2013; Chiavarini, Lanari, Minelli, & Salmasi, 2014; Heaman et al., 2014); however, the engagement of pregnant women in their care during pregnancy has not been measured as a single construct.

The purpose of this Phase I study was to establish theory-related validity, face and content validity, and initial reliability assessment of a psychometrically sound instrument to measure the affective domain of Patient Engagement in Prenatal Care (PEPC) in pregnant women. The affective domain was chosen in order to measure the attitudes, interests, and values that pregnant women experience regarding prenatal care. A quantitative measure of PEPC will be useful in future nursing research of prenatal care utilization and its impact on maternal and infant outcomes.

The following research questions were addressed by this Phase I study:

1. What is the evidence of internal consistency indicating that the PEPC instrument is a reliable instrument?
2. What is the evidence that the items on the PEPC instrument provide a quantifiable measure of the construct of PEPC?

Clarifying and measuring the construct of PEPC is important because the phrase *patient engagement* has been widely used in recent years without a standard definition in the health care community (Gallivan, Kovacs Burns, Bellows, & Eigenseher, 2012). Stakeholders in public health policy and health care professions acknowledge the value of
patient engagement in their care; however, they have not shared a mutual definition of patient engagement (Barello et al., 2014), nor is there an established method to ensure that engagement actually takes place. The ability to measure PEPC quantitatively will provide an approach for future research of maternal utilization of health care during pregnancy aimed at improving birth outcomes, such as gestational age and birth weight (Dyess-Nugent, 2017).

**Theoretical Framework**

Prenatal care utilization is a health behavior with consequences that involve not only individuals, but also multiple societal levels within a population. Therefore, a social ecological theory was chosen to provide the philosophical foundation for this study of individual health behavior that affects and is affected by multiple societal levels. A contemporary conception of the Social Ecological Model (Simons-Morton, McLeroy, & Wendel, 2012) was used to guide the study. This contemporary model evolved from the original Social Ecological Model (SEM) described by Bronfenbrenner (1974). Item Response Theory (IRT) was also used in the design and analysis of the PEPC items and scale.

**The Social Ecological Model (SEM)**

Bronfenbrenner (1974) originally described the application of social ecology to human health and development within multiple system layers. Bronfenbrenner’s original model included the microsystem, mesosystem, exosystem, and macrosystem levels of analysis. The microsystem level addressed individuals and their beliefs, knowledge, and values. The mesosystem level included two or more interacting microsystems, and organizational influences. The exosystem level included external environments and
community influences. The macrosystem level referred to broader cultural systems that affected an individual’s beliefs and behaviors. Social ecological concepts and frameworks have been further developed to address health behaviors (Simons-Morton et al., 2012). McLeroy, Bibeau, Steckler, and Glanz (1988) described five social levels of a Social Ecological Model (SEM) for health promotion, which were used as the framework for this study and include: (1) intrapersonal, (2) interpersonal, (3) organizational, (4) community, and (5) public policy. Individuals are embedded within layers of larger social systems, and these layers of influence are interactive and reinforcing (Golden & Earp, 2012). Factors within each level of an ecological model affect health behaviors (Glanz, Rimer, & Viswanath, 2015).

The SEM was an appropriate theoretical model with which to frame the development of an instrument measuring PEPC because factors at all societal levels influence utilization of prenatal care. McCormack, Thomas, Lewis, and Rudd (2017) proposed using the SEM to increase health literacy and patient engagement. The SEM has been useful in studies of racial disparities in birth outcomes (Alio, Richman, Clayton, Jeffers, Wathington, & Salihu, 2010), sexual behaviors in adolescents (DiClemente, Salazar, & Crosby, 2007), and adolescent pregnancy (Araújo Pedrosa, Pires, Carvalho, Canavarro, & Dattilio, 2011; Buzi, Wiemann, Smith, Kozinetz, & Peskin, 2014; Raneri & Wiemann, 2007; Shahabuddin et al., 2017).

**Intrapersonal.** Individual characteristics, such as knowledge, attitudes, values, and beliefs, may influence health behaviors (Simons-Morton et al., 2012). Several intrapersonal factors influence prenatal care engagement (Dyess-Nugent, 2015a). In studies of African, Asian, and Hispanic women in industrialized western countries, low
educational levels have negatively impacted immigrant women’s participation in health care (Boerleider et al., 2013; Bromley, Nunes, & Phipps, 2012). Maternal education of less than five years has been associated with inadequate prenatal care (Heaman et al., 2013). Lack of perceived importance of care, and the lack of knowledge about the available health care services during pregnancy, can influence access to care (Boerleider et al., 2013). Lack of proficiency in the common language of a society has also been associated with decreased utilization of prenatal care (Boerleider et al., 2013; Bromley et al., 2012; Heaman et al., 2013).

**Interpersonal.** The second level of the SEM focuses on the influence that friends, family members, co-workers, and neighbors have on an individual’s behaviors. Supportive family members can positively impact prenatal care appointment attendance (Boerleider et al., 2013), through such means as providing transportation to attend appointments. Other factors influencing prenatal care at this level include challenging family situations, childcare support, and financial support.

Culture may influence how an individual or group perceives health problems and accesses health care. The culture of a person affects health habits through a system of shared beliefs, values, and norms (Simons-Morton et al., 2012). For example, women experiencing pregnancy and birth while living in a country that is non-native to them could face cultural differences and challenges. In a systematic review, Heaman et al. (2013) found that migrant women were more likely to receive inadequate prenatal care. Migrant women’s experiences of pregnancy are influenced by cultural values and can be supported by culturally sensitive prenatal care support structures (Benza & Liamputtong, 2014).
**Organizational.** The third level of the SEM addresses the organizations where people gather for school, work, entertainment, or health services (Simons-Morton et al., 2012). Influencing factors include features and capacity of health care organizations providing prenatal care services.

**Community.** The fourth level of the SEM includes the characteristics of the community in which the pregnant woman and her family live. The features of the neighborhood, faith-based organizations, and social groups within the area influence health behaviors (Simons-Morton et al., 2012).

The physical environment may alter health and health behaviors and can significantly impact access to prenatal care. Geographic inaccessibility of a clinic and lack of available public transportation systems have been identified as barriers to prenatal care (Boerleider et al., 2013). Individuals’ perceptions of their environment can have an indirect impact on health behaviors (Simons-Morton et al., 2012). For example, individuals may avoid walking for exercise if they perceive a safety threat in their neighborhood.

**Public policy.** Interpretation and enforcement of local, state, and federal laws affect public health and health promotion. Public policies can change social environment, affecting the health behaviors of large numbers of the population over long periods of time (Simons-Morton et al., 2012). For example, Kitsantas et al. (2012) found that two frequently cited barriers to the initiation of prenatal care were inability to pay for a visit and not having a Medicaid card.
Measurement: Item Response Theory (IRT)

Item Response Theory (IRT) guided psychometric testing of the PEPC instrument. The IRT model describes the relationship between a person’s response to a scale item and the level of the latent variable being measured by the scale (Di lorio, 2005; Reeve & Fayers, 2005). More traditional measurement theory approaches are based on averages or summation of multiple items, whereas IRT models are based on the probability of making a particular response according to the individual’s level of the latent variable. IRT focuses on items versus the scale as a whole and evaluates the performance of each item within the scale, allowing for an evaluation of an item’s contribution for construct measurement (DeVellis, 2017; Reeve & Fayers, 2005). A polytomous item response model was used, and the item responses in the PEPC scale were collected using a Likert-type response format. The item response model utilized was multidimensional to provide an accurate representation of the latent trait, because PEPC was conceptualized to be composed of multiple defining attributes.

Review of Literature

The central construct in this study evolved from popular use of the term patient engagement, application to the unique health care opportunities of pregnancy, and through an analysis of the concept of PEPC (Dyess-Nugent, 2015b). A review of the literature pertaining to patient engagement in health care in general and specifically during pregnancy is presented in this paper because PEPC has not yet been defined or used consistently in the literature. The SEM (McLeroy et al., 1988) was used to filter the relevant evidence from the literature.
Engagement in Care and Health Outcomes

Patient engagement has appeared in health care literature with increasing frequency over the past ten years, and although the meaning seems to have evolved, it is still inconsistent (Barello et al., 2014; Fumagalli, Radaelli, Lettieri, Bertele’, & Masella, 2015; Higgins, Larson, & Schnall, 2016). The evolution of the term, patient engagement, follows the growing realization in health care that optimal patient outcomes result from patients becoming fully involved in the management of their care, not simply complying with the health care providers’ orders.

Full involvement in care during pregnancy has been recognized as a factor contributing to optimal birth outcomes. In a study of teen mothers, Coley and Aronson (2013) applied a social-ecological lens to focus on the interactions of intrapersonal determinants of health with organizational-level factors, and their effects on infant outcomes. They found a protective association between adequate prenatal care and birth outcomes. Multiple regression analysis revealed inadequate prenatal care was negatively related to higher birth weights compared to adequate prenatal care ($\beta = -0.07; p < .001$) in the overall teen study population. However, prenatal care utilization did not decrease the racial association with infant outcomes for the African-American teen mothers. In fact, in comparison of racial status with prenatal care adequacy, racial status as Non-Hispanic African American ($\beta = -0.18; p < .001$) had a greater contribution to low birth weight than inadequate prenatal care access (Coley & Aronson, 2013). Low birth weight is defined as infant birth weight of less than 2500 grams (World Health Organization, 2015), and preterm birth is defined as the birth of a live infant prior to the completion of 37 weeks of pregnancy (World Health Organization, 2016). In a study of 995 adolescent
mothers Nimi, Fraga, Costa, Campos, and Barros (2016) found a significant association between too few prenatal care visits and low birth weight (OR 2.00; 95% CI, 1.15 – 3.50) and preterm delivery (OR 2.74; 95% CI, 1.69 – 4.44). Nimi et al. (2016) also found that late entry into prenatal care was associated with low birth weight (OR 1.62; 95% CI, 0.94 – 2.81) and preterm delivery (OR 1.58; 95% CI, 1.01 – 2.48).

**Intrapersonal Attributes of Engagement in Care**

Within the dimensions of the SEM, Shahabuddin et al. (2017) identified several factors that influence maternal health-seeking behaviors. At the intrapersonal level, education, knowledge, and decision-making autonomy were noted to be determinants of prenatal care. In 2010, Gruman et al. posited that patient education alone was no longer enough to achieve desired health outcomes and identified changing patient behaviors as necessary for patient engagement in health care and improving outcomes. Health literacy was also described as necessary for patient engagement, and included the patient’s perception of value in educational information in addition to the ability to seek out and understand health information (Docherty, Bugge, & Watterson, 2012).

Engagement in care has been described in terms of the actions that individuals take that are aimed at improving their health, and also as patients sharing management of their care, positioning themselves as full partners in their health care experience (Drenkard, 2014; Fumagalli et al., 2015). Focusing on patients with chronic illness, Simmons, Wolever, Bechar, and Snyderman (2014, pp. 3-4) defined engagement as a broad concept with three components: (1) recognizing and understanding the importance of taking an active role in one’s health and health care; (2) having the knowledge, skills,
and confidence to manage health; and (3) using knowledge, skills, and confidence to engage in health-promoting behaviors to obtain the greatest benefit.

While the definition offered by Simmons et al. (2014) addressed attitudes and health behaviors shared by many patient populations, the focus of their research was patients with chronic illness. Researchers in the field of psychology also focused on chronic illness and developed the Patient Health Engagement (PHE) scale to measure stages of patients’ engagement with the management of their chronic disease (Graffigna, Barello, Bonanomi, & Lozza, 2015). The dimensions of the PHE address patient engagement as a “process-like and multi-dimensional experience” (Graffigna et al., 2015, p. 2) that results from thoughts, emotional feelings, and actions of individuals regarding their chronic disease management.

A pregnant woman’s thoughts, feelings, and actions towards health care affect commitment to involvement in prenatal care, as well as factors associated with appointment attendance. Barriers and facilitators linked to commitment to prenatal care fall within several levels of the SEM. At the intrapersonal level, desire for the baby’s well-being and anxiety surrounding missed appointments can be facilitators for prenatal care, while fear, maternal ambivalence, and insufficient understanding of Medicaid criteria can serve as barriers to care (Tucker Edmonds, Mogul, & Shea, 2015).

Cultural influences are present at the individual level. The level of acculturation has been associated with decreased access to and utilization of health care among Hispanics (Bromley et al., 2012). Acculturation has been described as the changes an individual undergoes in response to persistent intercultural contact (Dyess-Nugent, 2015a; Consedine, Chentsova-Dutton, & Krivoshekova, 2014). Acculturation influences
psychosocial functioning, and most evidence suggests that the demands of adapting to a new culture have been associated with poorer mental and physical health (Consedine et al., 2014).

**Interpersonal Attributes of Engagement in Care**

At the interpersonal level, family support and tradition may influence behaviors. Culture affects relationships within families and decisions made regarding health care. Immigrant women often rely on rides from family members and friends to attend prenatal appointments for care (Rhodes et al., 2015). Lack of childcare services can present a barrier to prenatal care utilization (Boerleider et al., 2013). Needing time to handle family problems prevent women from participation in prenatal care visits (Sword, 1999), and complex family situations can consume a mother’s time and energy.

Foreign-born women who are without domestic partners utilized prenatal care less than immigrant women who lived with their baby’s father (Heaman et al., 2013). Additionally, women who do not attend prenatal care appointments may be less likely to receive social support from friends, family, and professionals (Sword, 1999).

Financial resources of the woman and her family affect access to health care (Boerleider et al., 2013). Low income has been associated with inadequate prenatal care, and inability to pay for care has been a frequently noted barrier to prenatal care (Dyess-Nugent, 2015a; Kitsantas, Gaffney, & Cheema, 2012).

**Organizational Attributes of Engagement in Care**

Factors within the organizational level of the SEM influence the pregnant woman’s interactions with her health care providers. The behavior of health care providers was identified as a determinant of maternal health behaviors (Shahabuddin et
Patient engagement has been described as effective communication with patients and personalization of care through what patients perceived as efforts of conversation individualized to them (Blanton, 2015; Burns, 2012; Docherty et al., 2012). Engagement in care was aligned with patient-centered care, and seen as empowering patients through enhanced communication with their health care teams (Blanton, 2015; Pelletier & Stichler, 2014; Prey et al., 2014; Washington, 2014). Patient engagement has been viewed as a range of two-way interactions that patients and their family members have with health care providers (McCormack et al., 2017). Health care worker behaviors that demonstrate differential treatment of pregnant women based on income and race have been identified by patients as having a negative effect on their utilization of prenatal care (Salm Ward, Mazul, Ngui, Bridgewater, & Harley, 2013).

The understanding of patient engagement in care has been broadened beyond the constructs of language and personalization of care to include power, relationships, and health literacy (Docherty et al., 2012). A leveling of the power differential between care provider and patient through strategies such as empathy, social conversation, and physical touch was seen as necessary for a professional relationship that fostered engagement.

Other determinants of commitment to prenatal care fall in the organizational level of the SEM. In addition to lack of respect or caring from providers and lack of personal connection with providers, health care clinic parking costs and transportation problems were identified as barriers to attending prenatal care (Tucker Edmonds et al., 2015).
Cultural influences are woven throughout all levels of the SEM. At the organizational level, the attitude and cultural competency of care providers impact the prenatal care experiences of immigrant women. Caregivers sensitive to cultural needs and preferences improve prenatal care engagement (Boerleider et al., 2013).

Community and Public Policy Attributes of Engagement in Care

At the community level, poverty, neighborhood influence, and availability of services, were identified as factors affecting maternal health behaviors (Shahabuddin et al., 2017). Factors arising within both the community and public policy levels of the SEM have been associated with negative maternal health behaviors. Economics within a community can influence maternal health behaviors. In a study of 7,074 pregnancies, Margerison-Zilko (2014) examined the associations of economic contraction and maternal behaviors, and found extreme unexpected economic hardship to be associated with increased alcohol use in Black—non-Hispanic women. Public policy factors impact health care behavior. Avoidance of health care seeking was described by immigrant families who feared enforcement of immigration policies if they presented at a clinic without proper documentation (Rhodes et al., 2015).

Summary of Attributes: Engagement in Prenatal Care

A systematic literature search revealed a paucity of nursing articles that focused on patient engagement during pregnancy care (Dyess-Nugent, 2017). Romano (2010) described the potential benefits of fostering an environment that allows for engaged patients to make a positive impact on the field of maternity care. Docherty et al. (2012) studied antenatal care engagement among socioeconomically deprived women by using semi-structured interviews and identifying themes of engagement:
language/communication, relationships with health care providers, and health literacy. Ross (2012) studied the influence of maternal-fetal attachment on patient engagement with healthy practices, specifically understanding and adherence to antenatal health advice. The term *engagement* has also been used in the literature as a general and undefined reference to patient access and use of prenatal care (Hamilton & Campbell, 2013).

In a limited view, prenatal care has been seen as only medical care; however, prenatal care also incorporates other services that provide support and promote connections to health and social networks (Beeckman, Louckx, & Putman, 2011). In the broadest view, prenatal care encompasses health promotion, health protection, and disease prevention. Application of the SEM to health care behavior addresses the complex influences on prenatal care utilization.

Drawing on the health literature, the fundamental themes associated with an individual engaged in health care centered on understanding the importance of care, demonstration of behaviors promoting health, and presence in a relationship with a health care professional. Considering these traits within the framework of the SEM in the context of pregnancy helped to refine the essential attributes of prenatal care engagement (Dyess-Nugent, 2015b), and define the concept of PEPC for use in instrument development.

**Methods**

A two-stage process was used in the Phase I study to developing and evaluating the PEPC scale. The research study design was an instrument development with initial psychometric testing.
Stage I: Scale Development

There are six major steps involved in a scale development (DeVellis, 2017; Waltz, Strickland, & Lenz, 2017). In the first step, we identified the theoretical definition and the attributes of patient engagement from a concept analysis (Dyess-Nugent, 2015b). The following attributes of the patient and the health care environment were determined to be necessary for PEPC (Dyess-Nugent, 2017), and served as the conceptual definition of PEPC: (1) Perceived Relevance of Prenatal Care to Successful Pregnancy Outcomes, (2) Sustained Commitment to Involvement in Prenatal Care, (3) Adherence to Health Behaviors Recommended During Pregnancy, (4) Interacting with Health Care Provider During Pregnancy. These characteristics were interwoven, and each one may be influenced by another during the course of a pregnancy.

Content validity. Assessment of content validity begins early in the development of an instrument with identification of the domain, item generation, and instrument formation (Lynn, 1986). To demonstrate content validity, the scale should include all the relevant topics and exclude irrelevant matters (Bannigan & Watson, 2009).

Items and scaling. The operational definition of PEPC was the level of endorsement of PEPC indicated by the total score of the PEPC scale. The total score was the mathematical sum of the scores of all individual items for each participant. The scale does not include any negatively scored items. Affective statements were developed as instrument items and comprised the operational definitions of PEPC and its dimensions. The dimensions were based on the attributes of PEPC. The Likert summated rating technique is the most widely used scaling technique for affective scales and was used for
this instrument development (DeVellis, 2017; McCoach, Gable, & Madura, 2013; Waltz et al., 2017). Recommended principles for item writing were incorporated into the item writing process (DeVellis, 2017; Dilorio, 2005). Scale items were written to be unambiguous, using brevity and clarity of wording. Multiple negatives were not used in items. Likert scaling was used with five response options, 1 = Disagree Strongly, to 5 = Agree Strongly. Respondents were able to choose the level with which they agree with the particular statements about PEPC. The Flesch-Kindaid grade reading level was six, as recommended for health materials (DeVellis, 2017). The instrument items were generated de novo to align with the affective domain of Krathwohl, Bloom, and Masia’s taxonomy (Waltz et al., 2017). Objectives were written for all levels of the taxonomy, Affective domain: Receiving, Responding, Valuing, Organization, and Characterization by Value (Waltz et al., 2017). These objectives were then be used in the blueprint matrix to write items for all subscales. Consideration of the overall length of a survey was imperative for the successful use of the instrument (Dilorio, 2005; McCoach et al., 2013). A blueprint matrix was drafted and used to guide item writing for each of the five levels of the affective domain. The initial item pool contained 35 items; it was expected that some items would be deleted during the instrument’s later development process.

**Expert panel review.** Following initial development of the scale items, an expert panel review was conducted through electronic mail to assess the degree to which interpretations within the scale items about PEPC were reasonable and supported. A panel of fourteen experts in a variety of roles were invited to review the scale items. Eleven experts agreed to serve on the panel for the first round: 2 maternal-fetal medicine physician specialists, 2 registered nurses with expertise in maternal nursing, 4 women’s
health nurse practitioners with expertise in prenatal care, 1 certified nurse midwife, and 2 nurse scholars specializing in research and maternal health. To evaluate content validity, the content experts judged the specific scale items in terms of their relevance, adequacy, and clarity in representing the defining attributes of the concept PEPC (McCoach et al., 2013; Waltz et al., 2017). Both qualitative and quantitative feedback were solicited from the panel experts. The experts were asked to evaluate each item and rank the items on a 4-point scale as follows: 1= not relevant, 2= somewhat relevant, 3= quite relevant, or 4= highly relevant. The item content validity index (I-CVI) was calculated as the number of experts who gave a rating of either 3 or 4, divided by the number of experts on the panel (Lynn, 1986; Polit & Beck, 2017; Polit, Beck, & Owen, 2007). An I-CVI of 1.00 indicated complete agreement whereas an I-CVI of 0.00 would indicate lack of agreement among the subject matter experts. A second panel review was then conducted with 10 experts from the original panel to evaluate the relevance of the revised items and further revise the scale. One response from the original panel of experts was not used for calculation of I-CVI as it contained more than one answer choice for each item. The qualitative comments from all experts were considered.

Instructions that explain the process for responding to the scale items were carefully written, taking into consideration clarity, completeness, and readability level. The final version of the pilot instrument was clear, pleasing to the eye, and easy to read. Demographic questions that were helpful to describe the pilot sample were included.

**Face validity.** An instrument must be understandable, reasonable, and seem relevant to the subjects for whom it is intended. Assessment of face validity was important in determining that the scale was functional (Bannigan & Watson, 2009).
The survey was administered to a representative sample of five women at a prenatal care clinic site. Following the scale administration, their reactions and opinions of the form was solicited and discussed to further inform the instrument development. Participants were asked to identify items that were confusing or unclear. Pilot testing confirmed feasibility and ease of use. No scale items were revised based on the information gathered from the participants.

**Stage II: Psychometric testing**

The study protocol was approved by the University of Texas at Tyler Institutional Review Board (IRB) and Parkland Health and Hospital System Office of Research Administration.

**Content validity.** Results of the expert panel reviews were used to modify scale items. Items with an I-CVI less than .82 were revised or deleted. Qualitative comments from the first review panel were used to aid in revision of items. In response to feedback and discussion with several panel members, the item terms “nurse” and “doctor” were revised to “health care provider”. The scale was reduced to 21 items, with a scale content validity index (S-CVI) of .90. After the second expert panel round, the instrument was reduced to 18 items with an S-CVI of .92 (see Table 1). The goal for the S-CVI was .90 with a minimum acceptable level of .80 (Polit & Beck, 2017; Polit et al., 2007).

**Sample and Setting**

A convenience sample of pregnant women attending outpatient women’s health centers in Dallas County, Texas was recruited. Recruitment of participants was carried out without coercion. After prescreening for exclusion criteria, potential participants were kindly asked by a trained research assistant in a private manner and setting if they
would like to participate in the study. Potential participants were assured that whether or not they choose to participate, their care would not be affected. Participation was voluntary and confidential, and the participants understood they could withdraw from the study at any time.

Inclusion criteria were: (a) able to read, write, and speak English; (b) seeking prenatal care; (c) 12 weeks or greater gestational age; (d) age 18 or older. This study focused on women experiencing the second and third trimesters of pregnancy with the intent of recruiting a homogenous sample. Women who have completed the first trimester are assumed to have taken in the news of being pregnant and navigated successfully through early pregnancy psychosocial developmental tasks.

Women with the following conditions were excluded: (a) had a current diagnosis of mental health disorder; (b) were known to be carrying an anomalous fetus; (c) had achieved the current pregnancy with the aid of advanced reproductive technology (i.e., in vitro fertilization); or (d) were currently hospitalized. The challenges faced by a participant with a mental health disorder could have affected her perception of engagement in prenatal care and negatively impacted the internal validity of this study. Women who knew that their fetus had an anomaly might have engaged in care more often or completely disengaged in care when coping with the additional stress of a birth defect. The use of advanced reproductive technology to achieve pregnancy represented considerable engagement in health care even prior to conception. Hospitalization during pregnancy for any reason could have introduced factors that influenced engagement in care and therefore had the potential to alter internal validity of this study.
Data Collection

Recruitment of participants occurred at three outpatient women’s health centers where low-risk pregnancy care is provided and at the Parkland Maternal Fetal Medicine (MFM) clinic for high-risk pregnancy care. After the study was explained and consent obtained, the participant was asked to complete the survey on a paper-and-pencil format. Data collection occurred from May 14, 2018 to July 23, 2018. Six advanced practice nurses were trained by the primary investigator to assist with data collection.

Data Analysis

Descriptive statistics for the study sample included demographic characteristics, clinic site, and gestational age at time of participation. Mean scores for the sample and individual item statistics were evaluated. The possible range of scores on this 18-item scale was 18 to 90.

An analysis of Cronbach’s alpha coefficients was used to estimate internal consistency, both before and after the exploratory factor analysis (EFA). The desired alpha coefficient for the final iteration of the instrument was .80 or greater; however, reliability estimates as low as .70 for data resulting from affective measures have been tolerated when used for research purposes and not for individual decisions (McCoach et al., 2013).

Exploratory factor analysis was conducted to explore the underlying factor structure by deciding which factors to retain, what those factors represent, and which items load onto those factors. IBM SPSS © Version 25 was used to assess descriptive statistics, items, reliability, and EFA.
Results

The participants were reflective of the urban Dallas population served at this public hospital, predominantly Hispanic White women and African American women. (see Table 2). The distribution of participants was across three low-risk clinics and one high-risk pregnancy clinic. The subjects ranged in age from 18 to 43 years (M = 26, SD = 5.6), and the mean gestational age of participants was 28 weeks. The average total score on the PEPC scale was 80 (SD = 7.1), and the scores ranged from 63 to 90 (see Table 2). Item statistics are found in Table 3.

Item Analysis and Reliability

Of the 202 total cases, 195 contained responses for all items and were processed. The item response means were all relatively high (see Table 3) as expected given the likelihood of social acceptability bias intrinsic within a scale inquiring about a mother’s engagement in prenatal care. The standard deviations (SD) of the response means showed a pattern of lower SD with higher means and higher SD with the lower mean responses. The Cronbach’s alpha coefficient of the 18-item scale provided evidence of acceptable internal consistency reliability (α = .86) in this sample. Split-half assessment also demonstrated internal reliability, with a Spearman-Brown coefficient of .91.

Assessment of Factor Structure

Prior to EFA, prerequisite conditions were assessed and met. The Kaiser-Meyer-Olkin (KMO) index was .87, which indicated sample adequacy. The Bartlett’s test was significant ($X^2 = 1505.54$, $df=153$, $p < .001$), which indicated correlation between the items and a correlation matrix amenable to factor analysis.
The EFA was conducted using principal axis factoring extraction without rotation first. The pattern matrix of factor loadings (see Table 4) and the scree plot indicated a three-factor solution (see Figure 1). Factor rotation was then used to help improve the interpretation. In viewing PEPC through the lens of the SEM, PEPC was posited to be a multidimensional construct with several interrelated contributing factors. Therefore, an oblique rotation, direct oblimin, was the chosen method of factor rotation. The decision to retain three factors was based on Kaiser’s criterion of retaining factors with eigenvalues greater than one, along with examination of the concurring scree plot. Three factors accounted for a cumulative 54.5% of the variance for prenatal care engagement. This value may be inflated due to the correlation among the extracted factors.

The piloted 18-item scale was revised, and three items were eliminated because they did not contribute to a simple factor structure. Item 5 and item 10 were deleted due to factor loadings < .40, and item 8 was deleted because of cross-loadings > .30. Item 11, “need to answer honestly”, had a factor loading of .78, which was the highest loading item on Factor 1. Eight retained items loaded on to factor 1, and all item loadings were above .50, with most around .70. Item 12, “health care provider will help me”, had a primary factor loading of .83 and was the highest loading factor on Factor 3. Five items loaded on to Factor 3, with loadings ranging from .42 to .83. Item 7 and item 14, “information can affect my health” and “answering questions can affect my health”, both had strong loadings on Factor 2. These two items were the only items that had primary loadings on Factor 2. Although Factor 2 had only two variables, the loading levels of the two items were high (.85 and .84), and Factor 2 was determined to be non-trivial and retained (Gorsuch, p. 156, 1974).
The scale items that loaded on to the three retained factors were examined for subscale themes and labeled. Two of the high loading items in Factor 1 were from the proposed *Sustained Commitment to Involvement in Care* domain and were named COMMITMENT. Both items in Factor 2 were from the proposed *Perceived Relevance of Care to Successful Outcome* domain; therefore, Factor 2 was named RELEVANCE. All five items in Factor 3 were from the two proposed domains *Adherence to Professional Recommendations* and *Interacting with Health Care*. Based on the pattern of factor loadings, the two proposed domains were collapsed to one subscale and named RELATIONSHIP (see Table 5). The correlation between Factor 1 and Factor 3 was highest, whereas the correlations between Factor 2 and the other two factors were lower (see Table 6).

The alpha coefficient for the final 15-item scale indicated good reliability in this sample (α = .83), and the three subscales also demonstrated evidence of internal consistency (COMMITMENT, α = .87; RELEVANCE, α = .89; RELATIONSHIP, α = .73). Participant scores of PEPC-15 scale and subscales are described in Table 7.

**Discussion**

Reduction of the number of variables was achieved with EFA, and the resulting solution was a parsimonious structure of three subscales. The originally identified four domains of PEPC were understood to be related to one another, and the EFA elucidated these connections. COMMITMENT was a combination of items from all four domains, four of the five items on the RELATIONSHIP factor came from the *Interacting with Health Care Provider* domain, and both items on the RELEVANCE factor came from the *Perceived Relevance of Care to Successful Outcome* domain.
Some of the scale items did not match between the proposed domains and the EFA factor structure. For example, item 18, “I will come to the clinic for check-ups as my health care provider tells me”, was theorized to be associated with *Adherence to Professional Recommendations*; however, the EFA showed highest loadings of this item on COMMITMENT. On review of the item, in theory one can see the connection between appointment attendance and commitment to prenatal care. In another example, item 11, “I need to answer honestly when my health care provider asks questions about my health”, was originally seen by the experts to be most closely associated with *Interacting with Health Care Provider*. However, the EFA results show item 11 loading to be related to COMMITMENT instead. On examination of the item wording, perhaps the honesty component was viewed as an important element of commitment to prenatal care from pregnant women.

**Strengths and Limitations**

The main strength of this study is the theoretical foundation for the PEPC instrument. The PEPC scale is an instrument based on theory derived from a review of evidence in the literature and a concept analysis. The psychometric testing conducted during this pilot study also contributed to the strength of the instrument development.

Two subscales, COMMITMENT and RELATIONSHIP were not as easily distinguished from one another in the factor loading pattern matrix and in review of the items’ content. Additional research using confirmatory factor analysis (CFA) may help elucidate whether these two subscales are in fact separate and distinct subscales, or if a more parsimonious model joining the two together, or removing weaker performing items altogether, would lead to an improved model solution.
The Phase I study had limitations and threats to validity. Responses of clinic patients were subject to social acceptability bias, in which participants may have provided answers that they perceived as more socially acceptable. Development of this instrument with a sample from a population of pregnant women attending a clinic associated with a large urban safety net hospital may limit its generalizability to other groups of pregnant women, specifically those who are not disadvantaged from a socioeconomic standpoint. Also, this study sample lacked variance in terms of prenatal care utilization. All of the participants were seeking prenatal care, and the sample did not include any women who had not sought or received prenatal care.

**Recommendations**

Administration of the revised 15-item scale to another sample of pregnant women would lead to continued development of this instrument. While EFA is an important statistical strategy, CFA would provide a robust analysis of the PEPC-15 performance, allowing for additional assessment of construct validity.

**Conclusion**

Prenatal care effectively contributes to optimal pregnancy outcomes for mothers and infants. The positive impact of prenatal care for the mother and her infant depends on the degree of patient engagement in care throughout pregnancy. An instrument to measure PEPC will serve in research of interventions to improve care utilization and to optimize the health outcomes for both mothers and infants. Psychometric testing of the instrument, including face validity, content validity, internal consistency reliability, and initial testing of construct validity, indicates the instrument has evidence for its reliability and validity and provides a sound foundation for future psychometric testing. The
revised scale, the 15-item PEPC scale, should undergo further testing to assess reliability in other samples and populations, and to further evaluate evidence of the scale’s validity.

The PEPC scale will be useful in clinical settings for identifying women at risk for poor engagement in prenatal care early in their pregnancy, when interventions to encourage engagement are still possible. The PEPC scale may also be useful in the future to assess the effect of nursing interventions designed to increase PEPC in at-risk populations.
References


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Appendix A: Tables

Table 1

*Relevance Ratings of Items by Expert Panel*

<table>
<thead>
<tr>
<th>Item #</th>
<th>I-CVI</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00</td>
<td>Telling my health care provider about my health problems is important.</td>
</tr>
<tr>
<td>2</td>
<td>1.00</td>
<td>It is important for my health care provider to teach me about my pregnancy.</td>
</tr>
<tr>
<td>3</td>
<td>0.80</td>
<td>It is important for me to understand how my blood tests affect my health.</td>
</tr>
<tr>
<td>4</td>
<td>1.00</td>
<td>I feel at ease asking my health care provider questions.</td>
</tr>
<tr>
<td>5</td>
<td>0.90</td>
<td>It is important that I ask for help at the clinic if I cannot afford my medication.</td>
</tr>
<tr>
<td>6</td>
<td>1.00</td>
<td>I will come to the clinic for check-ups like my health care provider tells me.</td>
</tr>
<tr>
<td>7</td>
<td>0.90</td>
<td>The information that my health care provider gives me can affect my health.</td>
</tr>
<tr>
<td>8</td>
<td>0.90</td>
<td>I feel comfortable talking to my health care provider.</td>
</tr>
<tr>
<td>9</td>
<td>0.90</td>
<td>I work with my health care provider to plan my appointments.</td>
</tr>
<tr>
<td>10</td>
<td>0.90</td>
<td>I need to see my health care provider to learn about my baby's health.</td>
</tr>
<tr>
<td>11</td>
<td>1.00</td>
<td>I need to answer honestly when my health care provider asks questions about my health.</td>
</tr>
<tr>
<td>12</td>
<td>0.80</td>
<td>My health care provider will help me figure out solutions if I have problems taking care of myself.</td>
</tr>
<tr>
<td>13</td>
<td>0.90</td>
<td>I make a list of questions that I want to ask my health care provider at my next visit.</td>
</tr>
<tr>
<td>14</td>
<td>0.90</td>
<td>Answering the questions my health care provider asks can affect my health.</td>
</tr>
<tr>
<td>15</td>
<td>1.00</td>
<td>Keeping appointments for care will help keep my baby healthy.</td>
</tr>
<tr>
<td>16</td>
<td>0.90</td>
<td>I ask questions if I do not understand how to take my medications.</td>
</tr>
<tr>
<td>17</td>
<td>1.00</td>
<td>Telling my health care providers if I have problems with my medications can help them take care of me.</td>
</tr>
<tr>
<td>18</td>
<td>0.80</td>
<td>I like getting information about my pregnancy from my health care provider.</td>
</tr>
</tbody>
</table>

*S-CVI* 0.92
Table 2

*Participant Characteristics and Location of Care*

<table>
<thead>
<tr>
<th></th>
<th>Participants (N = 202)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Black or African American</td>
<td>59</td>
<td>29.2</td>
<td></td>
</tr>
<tr>
<td>Native Hawaiian or Other Pacific Islander</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Other Race</td>
<td>11</td>
<td>5.4</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>130</td>
<td>64.4</td>
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</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>135</td>
<td>66.8</td>
<td></td>
</tr>
<tr>
<td>Not Hispanic or Latino</td>
<td>67</td>
<td>33.2</td>
<td></td>
</tr>
<tr>
<td><strong>Clinic</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neighborhood Low-Risk Clinic 1</td>
<td>49</td>
<td>24.3</td>
<td></td>
</tr>
<tr>
<td>Neighborhood Low-Risk Clinic 2</td>
<td>30</td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td>Neighborhood Low-Risk Clinic 4</td>
<td>49</td>
<td>24.3</td>
<td></td>
</tr>
<tr>
<td>MFM High Risk Clinic</td>
<td>74</td>
<td>36.6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>26 (5.6)</td>
<td>18 – 43</td>
</tr>
<tr>
<td>GA (Weeks)</td>
<td>28 (7.8)</td>
<td>12 – 41</td>
</tr>
<tr>
<td>Total Score</td>
<td>80.6 (7.1)</td>
<td>63 – 90</td>
</tr>
</tbody>
</table>
Table 3

*Item Response Statistics*

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>M</th>
<th>SD</th>
<th>Var</th>
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<tbody>
<tr>
<td>Q1</td>
<td>201</td>
<td>3</td>
<td>5</td>
<td>4.82</td>
<td>.401</td>
<td>.161</td>
</tr>
<tr>
<td>Q2</td>
<td>201</td>
<td>3</td>
<td>5</td>
<td>4.74</td>
<td>.450</td>
<td>.203</td>
</tr>
<tr>
<td>Q3</td>
<td>201</td>
<td>3</td>
<td>5</td>
<td>4.77</td>
<td>.447</td>
<td>.200</td>
</tr>
<tr>
<td>Q4</td>
<td>202</td>
<td>1</td>
<td>5</td>
<td>4.44</td>
<td>.840</td>
<td>.705</td>
</tr>
<tr>
<td>Q5</td>
<td>201</td>
<td>1</td>
<td>5</td>
<td>4.49</td>
<td>.664</td>
<td>.441</td>
</tr>
<tr>
<td>Q6</td>
<td>202</td>
<td>3</td>
<td>5</td>
<td>4.76</td>
<td>.452</td>
<td>.205</td>
</tr>
<tr>
<td>Q7</td>
<td>199</td>
<td>1</td>
<td>5</td>
<td>3.73</td>
<td>1.241</td>
<td>1.540</td>
</tr>
<tr>
<td>Q8</td>
<td>202</td>
<td>1</td>
<td>5</td>
<td>4.62</td>
<td>.674</td>
<td>.455</td>
</tr>
<tr>
<td>Q9</td>
<td>201</td>
<td>1</td>
<td>5</td>
<td>4.16</td>
<td>.951</td>
<td>.905</td>
</tr>
<tr>
<td>Q10</td>
<td>202</td>
<td>3</td>
<td>5</td>
<td>4.54</td>
<td>.662</td>
<td>.439</td>
</tr>
<tr>
<td>Q11</td>
<td>202</td>
<td>4</td>
<td>5</td>
<td>4.84</td>
<td>.366</td>
<td>.134</td>
</tr>
<tr>
<td>Q12</td>
<td>202</td>
<td>1</td>
<td>5</td>
<td>4.50</td>
<td>.700</td>
<td>.490</td>
</tr>
<tr>
<td>Q13</td>
<td>201</td>
<td>1</td>
<td>5</td>
<td>3.81</td>
<td>.973</td>
<td>.947</td>
</tr>
<tr>
<td>Q14</td>
<td>201</td>
<td>1</td>
<td>5</td>
<td>3.66</td>
<td>1.317</td>
<td>1.735</td>
</tr>
<tr>
<td>Q15</td>
<td>202</td>
<td>2</td>
<td>5</td>
<td>4.70</td>
<td>.531</td>
<td>.281</td>
</tr>
<tr>
<td>Q16</td>
<td>202</td>
<td>1</td>
<td>5</td>
<td>4.62</td>
<td>.579</td>
<td>.335</td>
</tr>
<tr>
<td>Q17</td>
<td>201</td>
<td>3</td>
<td>5</td>
<td>4.69</td>
<td>.516</td>
<td>.266</td>
</tr>
<tr>
<td>Q18</td>
<td>202</td>
<td>3</td>
<td>5</td>
<td>4.75</td>
<td>.444</td>
<td>.197</td>
</tr>
</tbody>
</table>
## Appendix A (continued)

### Table 4

*Factor Loadings for Exploratory Factor Analysis with Direct Oblimin Rotation of PEPC Scale*

<table>
<thead>
<tr>
<th>Question</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q11. I need to answer honestly when my HCP asks questions about my health.</td>
<td>.783</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q18. I like getting information about my pregnancy from my health care provider.</td>
<td>.748</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2. It is important for my health care provider to teach me about my pregnancy.</td>
<td>.719</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q15. Keeping appointments for care will help keep my baby healthy.</td>
<td>.707</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3. It is important for me to understand how my blood tests affect my health.</td>
<td>.687</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q6. I will come to the clinic for check-ups like my health care provider tells me.</td>
<td>.679</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1. Telling my health care provider about my health problems is important.</td>
<td>.518</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q17. Telling my health care providers if I have problems with my medications can help them take care of me.</td>
<td>.510</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q8. I feel comfortable talking to my health care provider.</td>
<td>.418</td>
<td>.382</td>
<td></td>
</tr>
<tr>
<td>Q10. I need to see my health care provider to learn about my baby’s health.</td>
<td>.327</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q7. The information that my health care provider gives me can affect my health.</td>
<td></td>
<td>.854</td>
<td></td>
</tr>
<tr>
<td>Q14. Answering the questions my health care provider asks can affect my health.</td>
<td></td>
<td>.843</td>
<td></td>
</tr>
<tr>
<td>Q12. My health care provider will help me figure out solutions if I have problems taking care of myself.</td>
<td></td>
<td></td>
<td>.833</td>
</tr>
<tr>
<td>Q16. I ask questions if I do not understand how to take my medications.</td>
<td></td>
<td></td>
<td>.594</td>
</tr>
<tr>
<td>Q9. I work with my health care provider to plan my appointments.</td>
<td></td>
<td></td>
<td>.579</td>
</tr>
<tr>
<td>Q13. I make a list of questions that I want to ask my health care provider at my next visit.</td>
<td></td>
<td></td>
<td>.499</td>
</tr>
<tr>
<td>Q4. I feel at ease asking my health care provider questions.</td>
<td></td>
<td></td>
<td>.420</td>
</tr>
<tr>
<td>Q5. It is important that I ask for help at the clinic if I cannot afford my medication.</td>
<td></td>
<td></td>
<td>&lt;.30</td>
</tr>
</tbody>
</table>
**Table 5**

*Structure of 15-Item PEPC Scale: Proposed Scale Construction and Resulting Subscales*

<table>
<thead>
<tr>
<th>Theorized Domains and Items</th>
<th>Items Loaded to Factors</th>
<th>Subscales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustained Commitment to Involvement in Care</td>
<td>10, 15, 18</td>
<td>11, 18, 2, 15, 3, 6, 1, 17</td>
</tr>
<tr>
<td>Perceived Relevance of Care to Successful Outcome</td>
<td>2, 3, 7, 14</td>
<td>7, 14</td>
</tr>
<tr>
<td>Adherence to Professional Recommendations</td>
<td>6, 16</td>
<td>12, 16, 9, 13, 4</td>
</tr>
<tr>
<td>Interacting with Health Care Provider</td>
<td>1, 4, 5, 8, 9, 11, 12, 13, 17</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Items 5, 8, and 10 were deleted from the scale during revision.*
### Table 6

*Factor Correlations of the PEPC scale*

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>.254</td>
<td>.608</td>
</tr>
<tr>
<td>2</td>
<td>.254</td>
<td>-</td>
<td>.261</td>
</tr>
<tr>
<td>3</td>
<td>.608</td>
<td>.261</td>
<td>-</td>
</tr>
</tbody>
</table>
### PEPC-15 Scale and Subscales Scores

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>Potential</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Score of PEPC-15 items</strong></td>
<td>66.94 (6.13)</td>
<td>15 – 75</td>
<td>51 – 75</td>
</tr>
<tr>
<td><strong>Subscale COMMITMENT</strong></td>
<td>38.09 (2.61)</td>
<td>8 – 40</td>
<td>31 – 40</td>
</tr>
<tr>
<td><strong>Subscale RELEVANCE</strong></td>
<td>7.41 (2.42)</td>
<td>2 – 10</td>
<td>2 – 10</td>
</tr>
<tr>
<td><strong>Subscale RELATIONSHIP</strong></td>
<td>21.50 (2.86)</td>
<td>5 – 25</td>
<td>9 – 25</td>
</tr>
</tbody>
</table>
**Appendix B: Instruments**

**PEPC scale 18-items**

<table>
<thead>
<tr>
<th>Dyess Patient Engagement in Prenatal Care scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>form #</strong></td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
</tr>
<tr>
<td><strong>Clinic:</strong></td>
</tr>
</tbody>
</table>

**Instructions to participants:**

The following items represent feelings or thoughts you may have about your pregnancy healthcare. There are no “right” answers. Please circle one answer for each statement using the following format:

1 – Disagree Strongly
2 – Disagree
3 – Neither agree nor disagree
4 – Agree
5 – Agree Strongly

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Neither agree or disagree</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Telling my health care provider about my health problems is important.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. It is important for my health care provider to teach me about my pregnancy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. It is important for me to understand how my blood tests affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I feel at ease asking my health care provider questions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. It is important that I ask for help at the clinic if I cannot afford my medication.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I will come to the clinic for check-ups as my health care provider tells me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. The information that my health care provider gives me can affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I feel comfortable talking to my health care provider.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. I work with my health care provider to plan my appointments.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. I need to see my health care provider to learn about my baby's health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
## Appendix B (Continued)

### PEPC scale 18-items

<table>
<thead>
<tr>
<th>11. I need to answer honestly when my health care provider asks questions about my health.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. My health care provider will help me figure out solutions if I have problems taking care of myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. I make a list of questions that I want to ask my health care provider at my next visit.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. Answering the questions my health care provider asks can affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. Keeping appointments for care will help keep my baby healthy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. I ask questions if I do not understand how to take medications.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17. Telling my health care providers if I have problems with medications can help them take care of me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. I like getting information about my pregnancy from my health care provider.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Appendix B (Continued)

**PEPC 15-item scale**

<table>
<thead>
<tr>
<th>PEPC 15-item scale</th>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Neither agree or disagree</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Today's date:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gestational age in weeks:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Clinic:</strong> [Garland, Irving, Maple, Oak West, MFM]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Instructions to participants:*

The following items represent feelings or thoughts you may have about your pregnancy health care. There are no "right" answers. Please circle one answer for each statement using the following format:

1 – Disagree Strongly
2 – Disagree
3 – Neither agree nor disagree
4 – Agree
5 – Agree Strongly

1. Telling my health care provider about my health problems is important.  
2. It is important for my health care provider to teach me about my pregnancy.  
3. It is important for me to understand how my blood tests affect my health.  
4. I feel at ease asking my health care provider questions.  
5. I will come to the clinic for check-ups as my health care provider tells me.  
6. The information that my health care provider gives me can affect my health.  
7. I work with my health care provider to plan my appointments.  
8. I need to answer honestly when my health care provider asks questions about my health.  
9. My health care provider will help me figure out solutions if I have problems taking care of myself.  
10. I make a list of questions that I want to ask my health care provider at my next visit.  
11. Answering the questions my health care provider asks can affect my health.  
12. Keeping appointments for care will help keep my baby healthy.  
13. I ask questions if I do not understand how to take medications.  
14. Telling my health care providers if I have problems with medications can help them take care of me.  
15. I like getting information about my pregnancy from my health care provider.
Figure 1

Scree Plot
Chapter 4

Psychometric Development of the Patient Engagement in Prenatal Care Scale

Abstract

**Background/Problem:** Prenatal care impacts maternal and infant outcomes, and patient engagement in prenatal care (PEPC) is an important facet of health care utilization during pregnancy. Measurement of PEPC can inform interventions aimed at improving prenatal care.

**Purpose:** This Phase II of the instrument development study aimed to assess reliability and construct validity of the PEPC scale. The research questions were: (1) What is the evidence of internal consistency indicating that the PEPC instrument is a reliable instrument? and (2) What is the evidence that the items on the PEPC instrument provide a quantifiable measure of the construct of PEPC?

**Methods:** The 15-item PEPC scale from a previous Phase I instrument development study was completed by 197 participants during their prenatal appointments. The coefficient alpha and confirmatory factor analysis was used to assess the internal reliability and construct validity, respectively.

**Results:** The alpha coefficient of the 15-item scale showed good reliability (Cronbach’s $\alpha = .81$). The CFA supported a 3-factor loading model with slightly better values in the 12-item PEPC, and the 12-item scale demonstrated acceptable reliability in this sample ($\alpha = .77$). The resulting PEPC-12 scale was a brief instrument that will be easy to administer and useful in future clinical studies.
Keywords: patient engagement, prenatal care, pregnancy, instrument, scale
Psychometric Development of the Patient Engagement in Prenatal Care Scale

The incidence of maternal deaths in the U.S. has continued a disturbing trend upward from 7.2 deaths per 100,000 births in 1987 to 18.0 in 2014 (Centers for Disease Control and Prevention, 2018). While the cause of the overall rise remains unclear, the causes of most maternal deaths have been identified. Many conditions contributing to poor maternal outcomes, such as hypertension and diabetes, can be managed effectively during prenatal care. Because of the positive impact that prenatal care has on maternal and infant outcomes, early and adequate prenatal care for women has been named a Healthy People 2020 objective (U.S. Department of Health and Human Services, 2014).

While many different components of prenatal care have been researched (Ickovics et al., 2016; Kitsantas, Gaffney, & Cheema, 2012; Sunil, Spears, Hook, Castillo, & Torres, 2010; Sword et al., 2012; Thielen, 2012), the maximum effectiveness of prenatal care has not likely been realized. Prenatal care contributes to optimal pregnancy outcomes for mothers and infants, and the effectiveness of prenatal care depends on the degree of patient engagement in care throughout pregnancy. Factors affecting the use and effectiveness of prenatal care have been evaluated (Boerleider, Wiegers, Manniën, Francke, & Devillé, 2013; Chiavarini, Lanari, Minelli, & Salmasi, 2014; Heaman et al., 2014; Kotelchuck, 1994); however, the engagement of pregnant women in their care during pregnancy has not been measured as a single construct.

In recent years, patient engagement has represented the underpinning of a health care revolution: improved patient health outcomes with a reduction in health care costs (Barello, Graffigna, Vegni, & Bosio, 2014). Patient engagement in health care is
generally understood as a set of patient behaviors related to their participation in health care, and patients’ perceptions of their health have been recognized to affect their health care decision-making (Pomey, Ghadiri, Karazivan, Fernandez, & Clavel, 2015).

The purpose of this Phase II study was to further develop the Patient Engagement in Prenatal Care (PEPC) scale and produce a psychometrically sound instrument to measure the affective domain of PEPC in pregnant women. Accomplishing this purpose initially involved the identification and operationalization of scale items that conceptually reflected the attributes of PEPC, and initial validation of the instrument.

The following research questions were addressed by this study:

3. What is the evidence of internal consistency indicating that the PEPC instrument is a reliable instrument?

4. What is the evidence that the items on the PEPC instrument provide a quantifiable measure of the construct of PEPC within a social ecological model framework?

Identifying the construct of PEPC is important because the phrase patient engagement has been widely used without a common definition in health care (Gallivan, Kovacs Burns, Bellows, & Eigenseher, 2012). Policy makers and health care professionals acknowledge the value of patient engagement in their care; however, they have not shared a clear definition of patient engagement (Barello et al., 2014). A quantitative measure for PEPC will provide a tool for research of health care during pregnancy aimed at improving birth outcomes (Dyess-Nugent, 2017).
Theoretical Framework

While most human behavior theories focus on the individual perspective, a multiple-level approach may be necessary to bring about population improvements in health (Glanz, Rimer, & Viswanath, 2015). Engaging in prenatal care involves individuals, and also multiple levels of a population. Because of the interaction of multiple societal layers on prenatal care utilization, a social ecological theory was used to provide the philosophical foundation for this study. A contemporary version of the Social Ecological Model (SEM) provided a framework for the study (Simons-Morton, McLeroy, & Wendel, 2012). The five levels of SEM which were used as the framework for this study include: (1) intrapersonal, (2) interpersonal, (3) organizational, (4) community, and (5) public policy. Individuals exist within layers of larger social systems. These layers of social influence are both shared and strengthening (Golden & Earp, 2012). Factors within multiple levels of an SEM influence health behaviors (Glanz et al., 2015).

Review of Literature

Several properties of prenatal care have been studied, including intrapersonal interactions with health care providers (Coley & Aronson, 2013), the number of prenatal care visits (Nimi, Fraga, Costa, Campos, & Barros, 2016), health literacy during pregnancy (Docherty, Bugge, & Watterson, 2012), and facilitators of prenatal care utilization (Boerleider et al., 2013; Kitsantas et al., 2012; Tucker Edmonds, Mogul, & Shea, 2015). The term engagement was found in the literature as a general reference to patient access and use of prenatal care (Hamilton & Campbell, 2013).
The measurement of a singular construct of engagement in *prenatal* care was not found in the literature; however, the concept of general patient engagement in health care has been a topic of study in recent years (Drenkard, 2014; Fumagalli, Radaelli, Lettieri, Bertele’, & Masella, 2015; Simmons, Wolever, Bechard, & Snyderman, 2014), and Graffigna, Barello, Bonanomi, and Lozza (2015) developed the Patient Health Engagement (PHE) scale to measure stages of patients’ engagement with the management of their chronic disease.

**Definition of Concept: Patient Engagement in Prenatal Care (PEPC)**

The following domains were previously determined to be necessary for PEPC (Dyess-Nugent, 2017), and were used to define PEPC for this study. These attributes were determined to be each influenced by another during a pregnancy, and PEPC was understood to be influenced by determinants at multiple levels of the SEM.

**Perceived Relevance of Prenatal Care to Successful Pregnancy Outcomes**

A definitive characteristic of perceived relevance was its subjective quality. Perceived relevance was based on the individual’s opinions concerning the value of prenatal care in the context of the current pregnancy episode. Perceived relevance of prenatal care by the patient was seen as necessary for engagement in care to occur ( Docherty et al., 2012; Dyess-Nugent, 2015).

**Sustained Commitment to Involvement in Prenatal Care**

PEPC requires participation in ongoing activities, such as return appointments, laboratory tests, and imaging studies. Pregnancy care is a dynamic process over the course of several months. PEPC results from an active participation. Initiation of prenatal care begins with the woman’s first visit with a health care provider, ideally
during the first trimester of her pregnancy. Although various schedules for return visits have been proposed, guidelines are used globally for multiple health care interactions spaced throughout the pregnancy for optimal health promotion and timely intervention if pregnancy complications arise (American College of Obstetricians and Gynecologists & American Academy of Pediatrics, 2012; Health Canada, 2000; National Institute for Clinical Excellence, 2008). Many factors affect entry into pregnancy care, such as geographical and financial access to care, culture, and maternal nativity (Boerleider et al., 2013; Chiavarini et al., 2014); however, the patient’s decision to initiate and continue prenatal care remains essential.

**Adherence to Health Behaviors Recommended During Pregnancy**

Engagement in care involves the woman considering the advice given by her health care provider and following that advice as appropriate. One of the main goals of prenatal care is to adapt maternal behavior in ways that promote the health of the mother and baby. Adherence to appropriate health behaviors such as nutritious diet, adequate exercise, and avoidance of potentially harmful substances is essential to full engagement in prenatal care.

**Interacting with Health Care Provider During Pregnancy**

PEPC requires the woman to become an active participant in her care. Open communication within the patient/health care provider relationship is an attribute of engagement. High quality pregnancy care is only possible when the patient fully discloses her health history and provides continuing honest responses during visits for care.
Design

Within the framework of the Social Ecological Model (McLeroy, Bibeau, Steckler, & Glanz, 1988), PEPC was found to be influenced by many health care determinants. The defining attributes of PEPC exist primarily as an individual’s interests, values, and attitudes. Interests are defined as preferences for an activity, values are concerned with preferences for life goals or ways of life, and attitudes are feelings about social objects (Waltz, Strickland, & Lenz, 2017). Affective measures seek to assess these properties; therefore, the intended instrument will be a self-report measure, which is the most direct method to determine affect (Waltz et al., 2017). This research study design was an instrument development with psychometric testing.

Methods

The literature review confirmed the importance of PEPC and the relevance of patient engagement in current health care. The lack of an instrument to measure PEPC was also elucidated; therefore, this study further addressed the development of the PEPC instrument.

Sample

Convenience sampling was used in this study. Over a 3-month period, women from metro Dallas area in their 2nd or 3rd trimester of pregnancy who met criteria for participation in this study were approached and 205 participated. Less than 10% of the women approached refused to participate. The same protocol as the Phase I study was used. The inclusion and exclusion criteria were detailed in Chapter 3. In brief, those included were adult English-speaking women seeking prenatal care. Excluded from the sample were women with mental illness or those carrying a baby with an anomaly.
Based on a common guideline of 5-10 participants per scale item (DeVellis, 2017; Polit & Beck, 2017), the target sample size was 200 participants taking the 15-item PEPC survey, allowing for missing data or participant withdrawal from the study.

**Protection of Human Subjects**

The study protocol was approved by the University of Texas at Tyler Institutional Review Board (IRB) and the Hospital System Office of Research Administration. The same recruitment protocol was used and is detailed in Chapter 3.

**Instrument**

A researcher-developed sociodemographic form along with the Phase I developed PEPC scale was used (see Appendix C). The PEPC is a 15-item, five-point Likert-type scale, ranging from 1 (disagree strongly) to 5 (agree strongly) with a possible score range from 15 to 75. A higher total score indicated a higher prenatal care engagement. In the Phase I instrument development study, exploratory factor analysis was done with a total of 202 pregnant women and determined a 3-factors structure (see Table 1), which explained a total of 54.5% variance for prenatal engagement. Internal consistency reliabilities (Cronbach’s alphas) were: total scale .83, COMMITMENT .87 (8 items), RELEVANCE .89 (2 items), and RELATIONSHIP .73 (5 items).

**Data collection**

After the study was explained by the researcher or a research assistant, and consent obtained, the participant was asked to complete the survey on a paper-and-pencil format. The researcher was available to respond to participant questions beyond those the research assistant was trained to address. Data collection occurred from August to November 2018.
Data Analysis

The participants’ characteristics data and internal consistency reliability for the scale were analyzed using IBM SPSS © Version 25. Confirmatory factor analyses (CFA) was conducted using MPlus Version 8 © to evaluate the construct validity (Waltz et al., 2017). The factorial structure was analyzed using the estimator of weighted least squares, which does not assume normal distribution for the variables and provides the best option for modelling categorical data (Brown, 2006). Multiple factor solutions were considered, and multiple fit indices of the models were evaluated in order to find the best representation of the data. Parameters for acceptable model fit as suggested by Hu & Bentler (1999) were defined by the following criteria: Chi-square test of model fit ($p < .05$), Root Mean Square Error Approximation (RMSEA $\leq .06$), Comparative Fit Index (CFI $\geq .95$), Tucker-Lewis Index (TLI $\geq .95$), and Weighted Root Mean Square Residual (WRMR $< 1.0$).

Results

Of the 205 women in this study, the majority were from the low-risk clinic, and the participants’ races represented the urban Dallas population served in this public hospital system, predominantly Hispanic White women and African American women (see Table 2). The sample of 205 questionnaires revealed 197 cases in which all 15 items had completed responses and 8 questionnaires missing a single item response. Ages ranged from 18 to 40 (M= 24, SD= 4.9), and the mean gestational age of participants was 29 (SD=8.2) weeks (See Table 2). Item analysis was conducted, and the total score on the
PEPC scale ranged from 54 to 75 with a mean of 68 (SD= 5.8, see Table 3), and the additional item statistics detailed in Table 3.

**Reliability**

The Cronbach’s alpha coefficient of the 15-item scale and each subscale provided acceptable values for reliability, with .81 for the whole scale, .82 for COMMITMENT, .85 for RELEVANCE, and .65 for RELATIONSHIP in this sample. Split-half analysis demonstrated evidence of reliability with a Spearman-Brown coefficient of .90 for the scale.

**Validity Assessment**

Construct validity was assessed with CFA, which is theory driven. The first model tested was a 15-item 4-factor model with factors that corresponded with domain items as informed by the expert panel review during the earlier instrument development study. This model resulted in a non-positive definite matrix due to highly correlated latent factors (Field, 2017) and had a suboptimal fit (RMSEA= .106, CFI= .96, TLI= .94, WRMR= 1.33). Based on information gained during the EFA completed with the Phase I study, an alternate 15-item 3-factor model was tested. Model 2 also resulted in a non-positive definite matrix due to highly correlated latent variables (r 1) and did not fit well to this data (RMSEA= .066, CFI= .98, TLI= .98, WRMR= .95).

In an attempt to improve the model, a few items were selectively removed (Field, 2017). The Phase I study EFA was reviewed for lower loading items that had been retained in the 15-item PEPC scale. “Telling about health problems”, “Telling about problems with medications”, and “I feel at ease asking questions” (Items 1, 4, and 14) were identified to have had weak primary loadings on the EFA and were removed for
Model 3. The 15-item instrument was revised, and three items were deleted, resulting in a 12-item version (see Table 5 & Appendix C). Therefore, this final alternate model tested for fit was a 12-item 3-factor model, which included the 3 factors and corresponding items identified in the Phase I study. The factorial structure was found to be statistically valid (RMSEA=.07, CFI=.98, TLI=.98, WRMR=.89) to explain the responses to the PEPC in this sample, and all subscales were well identified by the hypothesized items (see Figure 1). The correlation between the COMMITMENT factor and RELATIONSHIP factor was high at .93 (SE = .03). Each of the subscale loadings average value was greater than .70; however, item 10 had a low loading value of .542, and only 29.3% of the variance was explained. Overall, the goodness-of-fit indices indicated an acceptable fit to this sample (see Table 5). Review of the modification indices indicated no evidence of large localized points of ill fit in the solution (largest modification index = 15.33, largest standardized expected parameter change = 2.50).

The alpha coefficient for the final 12-item scale version demonstrated acceptable reliability in this sample ($\alpha = .77$); however, the three subscales were more variable in terms of reliability ($Commitment, \alpha = .76; Relevance, \alpha = .85; Relationship, \alpha = .63$), which may be a result of the reduction in items. Split-half analysis for the scale showed acceptable reliability (Spearman-Brown coefficient = .85). Participant scores of PEPC-12 scale and subscales are described in Table 6.

**Discussion**

In the Phase I study, theory-related validity was established through content validity; the Phase II study aimed to establish construct validity. The response patterns in the Phase I study led to a better understanding of how participants interpret the wording
of several items, and this Phase II study validated the model fit. However, the 12-item 3-factor model has problem areas. Two of the factors, COMMITMENT and RELATIONSHIP correlate highly. Consideration should be given to this area in future studies to test whether these two factors are indeed distinct from each other, or whether they should be collapsed into one factor. Overlap of these two domains may be expected because, in theory, a woman’s commitment to her care can be related to the relationship she has with her health care provider. Prenatal care is a relational exchange in health care. The interpersonal connection between a provider and patient has been documented to influence utilization of prenatal care (Coley & Aronson, 2013). RELEVANCE is not as highly correlated with the other subscales. Item 10 demonstrated a poor fit to the model in this sample. Future studies should determine whether the item should be retained or deleted from the scale.

The theoretical foundation for the PEPC instrument and the previously demonstrated reliability of this scale in this population are strengths of the instrument. The original PEPC scale was based on theory derived from a review of evidence in the literature and a concept analysis. After previous refinement of the scale, psychometric testing conducted during this confirmatory study contributed to the strength of the instrument development.

The study had limitations and threats to validity. Social acceptability bias is likely when there exists a socially acceptable preference for responding to questions, and questions about the level of engagement in prenatal care were recognized to carry that attribute. Participants may have provided answers that indicated a falsely inflated level of engagement if they perceived being engaged in prenatal care as more socially
acceptable. Also, the sample might be biased. Simply by presenting for prenatal care, women would likely have at least a baseline level of engagement in prenatal care. The study did not include women who were not seeking care during their pregnancy. Development of this instrument with a sample from a population attending safety net hospital clinic may limit its generalizability to other populations, specifically those who are not marginalized or socioeconomically disadvantaged.

Alternative approaches to validating the PEPC scale are possible. Measuring the participants’ prenatal care appointment attendance could provide insight into the instrument’s validity. The correlation between a woman’s PEPC scale score and her rate of clinic attendance could be useful to assess criterion-related validity, which may be predictive or concurrent (Di lorio, 2005). A correlation study of infant outcomes and the mother’s PEPC scale score may be another opportunity of criterion-related scale validation to explore in the future. Future validation steps should also include CFA(s) using different samples to cross-validate the model.

Administration of the 12-item PEPC scale will be necessary to continue psychometric testing of the revised instrument. The administration and analysis of the PEPC scale in other populations, including women who have private insurance or the assurance of universal health care, would add to the assessment of the scale reliability in other populations.

Conclusion

The effectiveness of prenatal care in optimizing pregnancy outcomes for mothers and infants depends on the participation of pregnant women in their care. In a setting where prenatal care is an option for women, the woman’s choice to utilize care, or not, is
a decision she makes initially and again for each visit to her provider. The 12-item PEPC scale is a brief questionnaire which is easy to complete during a prenatal visit and may provide a valuable tool for clinicians to use. Measuring PEPC will help inform decision-makers in ways that can improve care utilization. Psychometric testing of the revised 12-item PEPC scale provides a sound foundation for initial use of a reliable instrument.
References


Appendix A: Tables

Table 1

*Structure of 15-Item PEPC Scale: Proposed Domains and Resulting Subscales*

<table>
<thead>
<tr>
<th>Originally Theorized Domains</th>
<th>Subscales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustained Commitment to Involvement in Care</td>
<td>COMMITMENT</td>
</tr>
<tr>
<td>Perceived Relevance of Care to Successful Outcome</td>
<td>RELEVANCE</td>
</tr>
<tr>
<td>Adherence to Professional Recommendations</td>
<td>RELATIONSHIP</td>
</tr>
<tr>
<td>Interacting with Health Care Provider</td>
<td>RELATIONSHIP</td>
</tr>
</tbody>
</table>
Appendix A (Continued)

Table 2

*Participant Characteristics and Location of Care*

<table>
<thead>
<tr>
<th>Race</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian or Alaska Native</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Black or African American</td>
<td>60</td>
<td>29.3</td>
</tr>
<tr>
<td>Native Hawaiian or Other Pacific Islander</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other Race</td>
<td>16</td>
<td>7.8</td>
</tr>
<tr>
<td>White</td>
<td>127</td>
<td>62.0</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Hispanic or Latino</td>
<td>134</td>
<td>65.4</td>
</tr>
<tr>
<td>Not Hispanic or Latino</td>
<td>71</td>
<td>34.6</td>
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<table>
<thead>
<tr>
<th>Clinic</th>
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<th>%</th>
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<tbody>
<tr>
<td>Neighborhood Low-Risk Clinic 1</td>
<td>73</td>
<td>35.6</td>
</tr>
<tr>
<td>Neighborhood Low-Risk Clinic 2</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td>Neighborhood Low-Risk Clinic 3</td>
<td>7</td>
<td>3.4</td>
</tr>
<tr>
<td>Neighborhood Low-Risk Clinic 4</td>
<td>69</td>
<td>33.7</td>
</tr>
<tr>
<td>MFM High Risk Clinic</td>
<td>52</td>
<td>25.4</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>24 (4.9)</td>
<td>18-40</td>
</tr>
<tr>
<td>GA (Weeks)</td>
<td>29 (8.2)</td>
<td>12-41</td>
</tr>
<tr>
<td>Total Score</td>
<td>68.1 (5.8)</td>
<td>54-75</td>
</tr>
</tbody>
</table>
Appendix A (Continued)

Table 3

PEPC-15 Scale Descriptive Statistics

<table>
<thead>
<tr>
<th>Items</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>M</th>
<th>SD</th>
<th>Var</th>
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</thead>
<tbody>
<tr>
<td>Q1</td>
<td>205</td>
<td>4</td>
<td>5</td>
<td>4.85</td>
<td>.359</td>
<td>.129</td>
</tr>
<tr>
<td>Q2</td>
<td>205</td>
<td>3</td>
<td>5</td>
<td>4.75</td>
<td>.489</td>
<td>.239</td>
</tr>
<tr>
<td>Q3</td>
<td>204</td>
<td>3</td>
<td>5</td>
<td>4.78</td>
<td>.458</td>
<td>.209</td>
</tr>
<tr>
<td>Q4</td>
<td>204</td>
<td>1</td>
<td>5</td>
<td>4.60</td>
<td>.698</td>
<td>.487</td>
</tr>
<tr>
<td>Q5</td>
<td>205</td>
<td>2</td>
<td>5</td>
<td>4.82</td>
<td>.422</td>
<td>.178</td>
</tr>
<tr>
<td>Q6</td>
<td>204</td>
<td>1</td>
<td>5</td>
<td>3.76</td>
<td>1.349</td>
<td>1.82</td>
</tr>
<tr>
<td>Q7</td>
<td>205</td>
<td>1</td>
<td>5</td>
<td>4.30</td>
<td>.826</td>
<td>.683</td>
</tr>
<tr>
<td>Q8</td>
<td>204</td>
<td>2</td>
<td>5</td>
<td>4.81</td>
<td>.452</td>
<td>.205</td>
</tr>
<tr>
<td>Q9</td>
<td>205</td>
<td>3</td>
<td>5</td>
<td>4.67</td>
<td>.549</td>
<td>.301</td>
</tr>
<tr>
<td>Q10</td>
<td>202</td>
<td>1</td>
<td>5</td>
<td>3.80</td>
<td>1.051</td>
<td>1.11</td>
</tr>
<tr>
<td>Q11</td>
<td>205</td>
<td>1</td>
<td>5</td>
<td>3.74</td>
<td>1.361</td>
<td>1.85</td>
</tr>
<tr>
<td>Q12</td>
<td>204</td>
<td>1</td>
<td>5</td>
<td>4.73</td>
<td>.621</td>
<td>.385</td>
</tr>
<tr>
<td>Q13</td>
<td>204</td>
<td>3</td>
<td>5</td>
<td>4.74</td>
<td>.464</td>
<td>.215</td>
</tr>
<tr>
<td>Q14</td>
<td>205</td>
<td>3</td>
<td>5</td>
<td>4.70</td>
<td>.501</td>
<td>.251</td>
</tr>
<tr>
<td>Q15</td>
<td>205</td>
<td>4</td>
<td>5</td>
<td>4.84</td>
<td>.364</td>
<td>.132</td>
</tr>
<tr>
<td>Total Score</td>
<td>197</td>
<td>54</td>
<td>75</td>
<td>68.07</td>
<td>5.79</td>
<td>33.51</td>
</tr>
</tbody>
</table>
### Appendix A (Continued)

Table 4

**Subscales and Items of PEPC-12**

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Item numbers from 15-item scale &amp; Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMITMENT</td>
<td>2, 3, 5, 8, 12, 15</td>
</tr>
<tr>
<td></td>
<td>It is important for my health care provider to teach me about my pregnancy.</td>
</tr>
<tr>
<td></td>
<td>It is important for me to understand how my blood tests affect my health.</td>
</tr>
<tr>
<td></td>
<td>I will come to the clinic for check-ups as my health care provider tells me.</td>
</tr>
<tr>
<td></td>
<td>I need to answer honestly when my health care provider asks questions about my health.</td>
</tr>
<tr>
<td></td>
<td>Keeping appointments for care will help keep my baby healthy.</td>
</tr>
<tr>
<td></td>
<td>I like getting information about my pregnancy from my health care provider.</td>
</tr>
<tr>
<td>RELEVANCE</td>
<td>6, 11</td>
</tr>
<tr>
<td></td>
<td>The information that my health care provider gives me can affect my health.</td>
</tr>
<tr>
<td></td>
<td>Answering the questions my health care provider asks can affect my health.</td>
</tr>
<tr>
<td>RELATIONSHIP</td>
<td>7, 9, 10, 13</td>
</tr>
<tr>
<td></td>
<td>I work with my health care provider to plan my appointments.</td>
</tr>
<tr>
<td></td>
<td>My health care provider will help me figure out solutions if I have problems taking care of myself.</td>
</tr>
<tr>
<td></td>
<td>I make a list of questions that I want to ask my health care provider at my next visit.</td>
</tr>
<tr>
<td></td>
<td>I ask questions if I do not understand how to take medications.</td>
</tr>
</tbody>
</table>
Appendix A (Continued)

Table 5

*Models Tested and Fit Indices*

<table>
<thead>
<tr>
<th>Model</th>
<th>Chi-Square</th>
<th>df</th>
<th>p</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
<th>WRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 Items, 4 factors</td>
<td>278.29</td>
<td>84</td>
<td>&lt;.001</td>
<td>.106</td>
<td>.96</td>
<td>.94</td>
<td>1.33</td>
</tr>
<tr>
<td>15 Items, 3 factors</td>
<td>165.49</td>
<td>87</td>
<td>&lt;.001</td>
<td>.066</td>
<td>.98</td>
<td>.98</td>
<td>.95</td>
</tr>
<tr>
<td>12 Items, 3 factors</td>
<td>101.58</td>
<td>51</td>
<td>&lt;.001</td>
<td>.070</td>
<td>.98</td>
<td>.98</td>
<td>.89</td>
</tr>
</tbody>
</table>

Acceptable fit values: $\chi^2$ $p < .05$, RMSEA $\leq .06$, CFI/TLI $\geq .95$, WRMR $< 1.0$
### PEPC-12 Scale and Subscales Scores

<table>
<thead>
<tr>
<th></th>
<th>Range</th>
<th>Potential</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>M (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Score of PEPC-12 items</td>
<td>53.88 (4.95)</td>
<td>12 – 60</td>
<td>42 – 60</td>
</tr>
<tr>
<td>Subscale COMMITMENT</td>
<td>28.78 (1.88)</td>
<td>6 – 30</td>
<td>22 – 30</td>
</tr>
<tr>
<td>Subscale RELEVANCE</td>
<td>7.50 (2.53)</td>
<td>2 – 10</td>
<td>2 – 10</td>
</tr>
<tr>
<td>Subscale RELATIONSHIP</td>
<td>17.53 (2.08)</td>
<td>4 – 20</td>
<td>12 – 20</td>
</tr>
</tbody>
</table>
Appendix B: Figures

Figure 1

*PEPC-12 CFA Final Model: Standardized Correlations and Loadings (SE)*
Appendix C: Instruments

**PEPC 15-item scale**

<table>
<thead>
<tr>
<th>Dyess Patient Engagement in Prenatal Care scale</th>
<th>form # B818</th>
</tr>
</thead>
<tbody>
<tr>
<td>Today's date:</td>
<td></td>
</tr>
<tr>
<td>Age:</td>
<td></td>
</tr>
<tr>
<td>Gestational age in weeks:</td>
<td></td>
</tr>
<tr>
<td>Clinic:</td>
<td>Garland</td>
</tr>
</tbody>
</table>

Instructions to participants:
The following items represent feelings or thoughts you may have about your pregnancy health care. There are no “right” answers. Please circle one answer for each statement using the following format:

1 – Disagree Strongly
2 – Disagree
3 – Neither agree nor disagree
4 – Agree
5 – Agree Strongly

<table>
<thead>
<tr>
<th>Item</th>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Neither agree or disagree</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Telling my health care provider about my health problems is important.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. It is important for my health care provider to teach me about my pregnancy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. It is important for me to understand how my blood tests affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I feel at ease asking my health care provider questions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. I will come to the clinic for check-ups as my health care provider tells me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. The information that my health care provider gives me can affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. I work with my health care provider to plan my appointments.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I need to answer honestly when my health care provider asks questions about my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. My health care provider will help me figure out solutions if I have problems taking care of myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. I make a list of questions that I want to ask my health care provider at my next visit.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. Answering the questions my health care provider asks can affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. Keeping appointments for care will help keep my baby healthy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. I ask questions if I do not understand how to take medications.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. Telling my health care providers if I have problems with medications can help them take care of me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. I like getting information about my pregnancy from my health care provider.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

PEPC v15
Appendix C (Continued)

*PEPC 12-item scale*

<table>
<thead>
<tr>
<th>Items</th>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Neither agree or disagree</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is important for my health care provider to teach me about my pregnancy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. It is important for me to understand how my blood tests affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. I will come to the clinic for check-ups as my health care provider tells me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. The information that my health care provider gives me can affect my health</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. I work with my health care provider to plan my appointments.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I need to answer honestly when my health care provider asks questions about my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. My health care provider will help me figure out solutions if I have problems taking care of myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I make a list of questions that I want to ask my health care provider at my next visit.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Answering the questions my health care provider asks can affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Keeping appointments for care will help keep my baby healthy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. I ask questions if I do not understand how to take medications.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. I like getting information about my pregnancy from my health care provider.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Chapter 5

Summary and Recommendations

Patient engagement in prenatal care is an important construct for understanding effective utilization of health care resources during pregnancy. In addition, it might also be an important factor to predict the health outcomes for both mothers and infants. However, the inability to measure or even discuss PEPC as a defined variable hinders research and the development of nursing interventions designed to make improvements in the use of prenatal care. A search of the literature revealed no agreed upon definition of PEPC or an instrument to measure this construct. To address this gap, the development of an instrument to measure PEPC was undertaken.

The process of instrument development began with an analysis of the concept of PEPC, and four domains of PEPC were theorized. This concept analysis laid the theoretical foundation for the remainder of the instrument development. Items were generated a priori as affective statements for the scale, because PEPC was understood to encompass the pregnant patient’s values and attitudes about prenatal care. The scale was scored so that the total sum of all Likert-type item responses would indicate the level of PEPC. After two rounds of expert panel review, items were reduced from 35 to 18 and the PEPC scale was constructed and piloted.

In the Phase I study, the 18-itme PEPC scale was administered to a sample of pregnant women seeking prenatal care, in clinics for low-risk and high-risk pregnancies.
Item analysis and exploratory factor analysis (EFA) was conducted. As a data-driven tool, EFA suggested a latent 3-factor structure, which was slightly different than the original theorized 4-factor structure. There was evidence of internal reliability for the scale and 3 subscales in the sample. Poor performing items were deleted, and the PEPC scale was revised to a 15-item version. The reduction in items did not compromise the reliability of the scale or subscales.

For the Phase II study, the 15-item PEPC scale was administered to a second sample of pregnant women in the same health system. Three models were tested, and the results of confirmatory factor analysis (CFA) indicated that a 3-factor model was the best fit. The scale was reduced to a parsimonious 12-item instrument. The originally theorized four domains of PEPC (Perceived Relevance of Prenatal Care to Successful Pregnancy Outcomes, Sustained Commitment to Involvement in Prenatal Care, Adherence to Health Behaviors Recommended During Pregnancy, and Interacting with Health Care Provider During Pregnancy) evolved into three subscales (RELEVANCE, COMMITMENT, and RELATIONSHIP). The overall objective was to develop a reliable short scale that had content and construct validity in order to measure PEPC, and this objective was met. The resulting PEPC-12 instrument should be useful in future research; and, further evidence for its reliability, validity and usefulness should be expanded to other populations of pregnant women.
References

CDC.gov. (2019). *Pregnancy Mortality Surveillance System | Maternal and Infant Health | CDC*. [online] Available at:

Appendix A: Expert Panel Review

[Name, credentials]
[Facility]
[email address]
[City], [State] [Zip]

[Month day], 2017

Dear [name],

I am writing to you as an expert in the field of prenatal care. I am a PhD candidate in the School of Nursing at the University of Texas at Tyler. I am working on my dissertation project entitled *Psychometric development of the Dyess Patient Engagement in Prenatal Care scale*. To measure this important concept, I intend to develop a psychometrically sound instrument. Currently, I am in the item-writing stage. Based on a concept analysis, I have developed a self-report tool to assess *patient engagement in prenatal care* in the affective domain. I hope you will consider reviewing my instrument for content validity.

In recent years, patient engagement has come to represent the underpinning of a health care revolution: improved patient health outcomes with a reduction in health care costs. Patient engagement in health care is generally understood as a set of patient behaviors, and patients’ perceptions of their health are recognized to affect their health care decision-making. The effectiveness of prenatal care depends on patient engagement in care throughout pregnancy. Many factors affecting the use and effectiveness of prenatal care have been evaluated however, the engagement of pregnant women in their care during pregnancy has not been measured as a single construct.

If you agree to evaluate my tool, I will ask you to:

1. Complete the experts’ rating form. Please rate each item on a scale of 1 (the item is not relevant or representative of *patient engagement in prenatal care*) to 4 (the item is highly relevant and representative of *patient engagement in prenatal care*);
2. Identify which domain of *patient engagement in prenatal care* each item reflects;
3. Give feedback on the overall clarity and comprehensiveness of the instrument;
4. Provide any comments or suggestions that you may have about existing items or any that I may not have considered.

Thank you for your time and consideration.

Sincerely,

Phyllis Dyess-Nugent, PhDc, MSN, RN, WHNP-BC
pdyess@patriots.uttyler.edu
Appendix A (Continued)

**Experts Rating Form**

Rating Instructions: For each scale item please indicate two things.

1. How relevant each item is to the overall construct of *patient engagement in prenatal care* by placing a number in the first box to the right of each item.
   - 1 = Not Relevant at all
   - 2 = Slightly Relevant
   - 3 = Moderately Relevant
   - 4 = Highly Relevant

2. Please indicate the domain that each item best reflects by CHECKING the appropriate box to the right of the item. Statements not reflecting any domain should be left blank. (See domain descriptions attached.)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Perceived relevance of care to successful outcomes</th>
<th>Sustained commitment to involvement in prenatal care</th>
<th>Adherence to professional health recommendation during pregnancy</th>
<th>Interacting with Health Care Provider During Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Example responses*:

1. It is important for my nurse to teach me about my pregnancy.

2. The information that my nurse gives me can affect my health.

3. I need to answer honestly when my nurse asks questions about my health.

4. Answering the questions my nurse asks can affect my health.

5. It is important for me to understand how my blood tests affect my health.

6. I make a list of questions that I want to ask my nurse at my next visit.

7. Regular exercise is important for my health during pregnancy.
### Appendix A (Continued)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Reference Rating</th>
<th>Perceived Relevance of Care to Successful Outcomes</th>
<th>Sustained Commitment to Involvement in Prenatal Care</th>
<th>Adherence to Professional Health Recommendations During Pregnancy</th>
<th>Interacting with Health Care Provider During Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. To be healthy I need to ask questions about my diet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. If I have a new health problem, I can wait until my next appointment to tell my nurse.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Keeping appointments for care will help keep my baby healthy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. It is important that I ask for help at the clinic if I cannot afford my medication.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I like getting information about my pregnancy from my nurse.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I ask questions about how to change my appointments if I need to.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. It is important for me to avoid drinking alcohol during my pregnancy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. If I miss a clinic visit I will call to make another appointment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. It is okay if I miss appointments in early pregnancy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. I schedule appointments on days that I will have a ride to the clinic.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. I write my clinic appointments on my calendar to plan ahead.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. I ask questions if I do not understand how to take my medications.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. I will go to the hospital if I get very sick during my pregnancy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. I will come to the clinic for check-ups like my nurse tells me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendix A (Continued)

<p>| D O M A I N S |
|---------------|---------------|---------------|---------------|</p>
<table>
<thead>
<tr>
<th><strong>Relevance Rating</strong></th>
<th>Perceived relevance of care to successful outcomes</th>
<th>Sustained commitment to involvement in prenatal care</th>
<th>Adherence to professional health recommendations during pregnancy</th>
<th>Interacting with Health Care Provider During Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>22. I will go to the hospital if I have symptoms of a pregnancy emergency.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. The only time I should go to the hospital for care is when I am in labor.</td>
<td></td>
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</tr>
<tr>
<td>24. It is okay if I do not take my vitamins since I eat good foods.</td>
<td></td>
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</tr>
<tr>
<td>25. Eating a healthy diet is a top priority in pregnancy.</td>
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<tr>
<td>26. I need to see my nurse to learn about my baby's health.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. Telling my nurse about my health problems is important.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. Telling my nurses if I have problems with my medications can help them take care of me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. I feel at ease asking my nurse questions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. My nurse will help me figure out solutions if I have problems taking care of myself.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. I feel comfortable talking to my nurse.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32. I feel comfortable making suggestions to my nurse.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. My nurse gives me information that I need about my pregnancy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34. My nurse helps me to know what food is good for my baby.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. I work with my nurse to plan my appointments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Definitions of Patient Engagement in Prenatal Care and Composite Domains

Patient Engagement in Prenatal Care (PEPC) is a multidimensional phenomenon of varying levels experienced by pregnant women. PEPC includes understanding the importance of prenatal care, presence in a relationship with a health care professional during pregnancy, and demonstration of behaviors promoting health of self and baby.

**Proposed Composite Domains:**

**Perceived relevance of care to successful outcomes** is based on the individual’s perceptions and opinions concerning the value of prenatal care in the context of the current pregnancy episode.

**Sustained commitment to involvement in prenatal care** includes participation in ongoing activities throughout the pregnancy, such as return appointments, laboratory tests, and imaging studies.

**Adherence to professional health recommendations during pregnancy** involves the woman giving attentive consideration to the advice given by her health care provider and following that advice in ways that promote the health of the mother and baby.

**Interacting with Health Care Provider During Pregnancy** requires the woman to become an active participant in care as opposed to a passive bystander and communicate openly within the patient/health care provider relationship.
Appendix A (Continued)

Experts Rating Form

Please rate the following:

1. Clarity of instrument:  
   1 = not clear at all  
   2 = slightly clear  
   3 = moderately clear  
   4 = very clear

Suggestions for improvement:

2. Comprehensiveness of instrument:  
   1 = not comprehensive at all  
   2 = slightly comprehensive  
   3 = moderately comprehensive  
   4 = very comprehensive

Suggestions for improvement:

3. Comments or suggestions about existing items or any additional items:
# Appendix B: Surveys

<table>
<thead>
<tr>
<th>Dyess Patient Engagement in Prenatal Care scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRB # Sp2018-118</td>
</tr>
</tbody>
</table>

## Participant Demographics

<table>
<thead>
<tr>
<th>Date:</th>
<th>form #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>MRN</td>
</tr>
<tr>
<td>Telephone Number:</td>
<td></td>
</tr>
</tbody>
</table>

### Circle self-identified racial group:

<table>
<thead>
<tr>
<th>American Indian or Alaska Native</th>
<th>Asian</th>
<th>Black or African American</th>
<th>Native Hawaiian or other Pacific Islander</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other race</td>
<td>White</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Circle self-identified ethnicity group:

<table>
<thead>
<tr>
<th>Hispanic or Latino</th>
<th>Not Hispanic or Latino</th>
</tr>
</thead>
</table>
## Appendix B (Continued)

**PEPC scale 18-items**

**Dyess Patient Engagement in Prenatal Care scale**

<table>
<thead>
<tr>
<th>form #</th>
<th>Today's date (mmddyy):</th>
<th>1</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Gestational age today in weeks:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic:</td>
<td>Garland</td>
<td>Irving</td>
<td>Maple</td>
</tr>
</tbody>
</table>

**Instructions to participants:**

The following items represent feelings or thoughts you may have about your pregnancy health care. There are no “right” answers. Please circle one answer for each statement using the following format:

1 – Disagree Strongly
2 – Disagree
3 – Neither agree nor disagree
4 – Agree
5 – Agree Strongly

<table>
<thead>
<tr>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Neither agree or disagree</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. Telling my health care provider about my health problems is important.

2. It is important for my health care provider to teach me about my pregnancy.

3. It is important for me to understand how my blood tests affect my health.

4. I feel at ease asking my health care provider questions.

5. It is important that I ask for help at the clinic if I cannot afford my medication.

6. I will come to the clinic for check-ups as my health care provider tells me.

7. The information that my health care provider gives me can affect my health.

8. I feel comfortable talking to my health care provider.

9. I work with my health care provider to plan my appointments.

10. I need to see my health care provider to learn about my baby’s health.
Appendix B (Continued)

PEPC scale 18-items

<table>
<thead>
<tr>
<th></th>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Neither agrees or disagree</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. I need to answer honestly when my health care provider asks questions about my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. My health care provider will help me figure out solutions if I have problems taking care of myself.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. I make a list of questions that I want to ask my health care provider at my next visit.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. Answering the questions my health care provider asks can affect my health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. Keeping appointments for care will help keep my baby healthy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. I ask questions if I do not understand how to take medications.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17. Telling my health care providers if I have problems with medications can help them take care of me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. I like getting information about my pregnancy from my health care provider.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Dyess Patient Engagement in Prenatal Care scale

<table>
<thead>
<tr>
<th>Today’s date:</th>
<th>Age:</th>
<th>Gestational age in weeks:</th>
<th>form # B818</th>
</tr>
</thead>
</table>

| Clinic: Garland Irving Maple Oak West MFM |

Instructions to participants:
The following items represent feelings or thoughts you may have about your pregnancy health care. There are no “right” answers. Please circle one answer for each statement using the following format:

1 – Disagree Strongly
2 – Disagree
3 – Neither agree nor disagree
4 – Agree
5 – Agree Strongly

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Neither agree or disagree</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Telling my health care provider about my health problems is important.</td>
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<td>4</td>
<td>5</td>
</tr>
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<td>3. It is important for me to understand how my blood tests affect my health.</td>
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<td>5</td>
</tr>
<tr>
<td>4. I feel at ease asking my health care provider questions.</td>
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<td>5</td>
</tr>
<tr>
<td>5. I will come to the clinic for check-ups as my health care provider tells me.</td>
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<td>5</td>
</tr>
<tr>
<td>6. The information that my health care provider gives me can affect my health</td>
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<td>7. I work with my health care provider to plan my appointments.</td>
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<td>2</td>
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<td>5</td>
</tr>
<tr>
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<td>9. My health care provider will help me figure out solutions if I have problems taking care of myself.</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

PEPC v15
Appendix C: Institutional Reviews

Office of Research and Technology Transfer

Institutional Review Board

April 24, 2018

Dear Ms. Dyoss,

Your request to conduct the study: Psychometric Development of the Dyoss Patient Engagement in Prenatal Care Scale, IRB #SP2018-11B has been approved by The University of Texas at Tyler Institutional Review Board under expedited review. This approval includes the use of signed HIPAA informed consent, waiver of study participation consent and your assurance of participant knowledge of the following prior to study participation: this is a research study; participation is completely voluntary with no obligations to continue participating, and with no adverse consequences for non-participation; and assurance of confidentiality of their data. Also, please cc: Dr. Lee on approval documents.

In addition, please ensure that any research assistants are knowledgeable about research ethics and confidentiality, and any co-investigators have completed human protection training within the past three years, and have forwarded their certificates to the IRB office (G. Duke).

Please review the UT Tyler IRB Principal Investigator Responsibilities, and acknowledge your understanding of these responsibilities and the following through return of this email to the IRB Chair within one week after receipt of this approval letter:

- This approval is for one year, as of the date of the approval letter
- The Progress Report form must be completed for projects extending past one year. Your protocol will automatically expire on the one year anniversary of this letter if a Progress Report Is not submitted, per HHS Regulations prior to that date (45 CFR 46.108(h) and 109(e): http://www.hhs.gov/ohrp/policy/conrev0107.html
- Prompt reporting to the UT Tyler IRB of any proposed changes to this research activity
- Prompt reporting to the UT Tyler IRB and academic department administration will be done of any unanticipated problems involving risks to subjects or others

EQUAL OPPORTUNITY EMPLOYER
Appendix C (Continued)

- Suspension or termination of approval may be done if there is evidence of any serious or continuing noncompliance with Federal Regulations or any aberrations in original proposal.
- Any change in proposal procedures must be promptly reported to the IRB prior to implementing any changes except when necessary to eliminate apparent immediate hazards to the subject.
- Expedited approval with signed HIPAA consent
- Waiver of Study Participation Consent
- CC: Dr. Lee on approval documents

Best of luck in your research, and do not hesitate to contact me if you need any further assistance.

Sincerely,

[Signature]

Gloria Duke, PhD, RN
Chair, UT Tyler IRB
March 12, 2018

Re: UT at Tyler IRB application

Dear Phyllis:

As the Vice President of Nursing for Women’s & Infants’ Specialty Health (WISH) at Parkland Health and Hospital Systems (PHHS), it my pleasure to confirm the institutional support for your IRB application to UT at Tyler for your nursing research study, Psychometric Development of the Dysse Patient Engagement in Prenatal Care Scale, to be conducted within the WISH clinic system.

My role as the Vice President of Nursing means that I am responsible for all research activities and the support mechanisms that enable PHHS to continue its outstanding history of clinical sciences. This includes everything from grant management to common research resources, such as those proposed for your project. True to the collaborative spirit of PHHS, your project brings together faculty from multiple disciplines, departments, and institutes on campus to study.

On behalf of WISH and PHHS, my office will do whatever it can to facilitate the successful conduct of this project. We wish you every success in your application.

Sincerely,

[Signature]

Marjorie Quinn-Honzia, MPA, RN, NEA-BC
Vice President of Nursing
Women & Infants’ Specialty Health
Parkland Health & Hospital System
From: Susan Partridge  
Vice President, Office of Research Administration  

Esmaeil Persa, M.D., MPH, CCHP  
Executive Vice President & Chief Strategy and Integration Officer  

RE:  
Parkland Health & Hospital System Study Site Approval  

IRB Number: SP2018-118; PMH 052018-001  

Principal Investigator: Phyllis Dyess-Nugent, MSN, RN WHNP-BC, Director of Nursing  
Study Title: Psychometric Development of the Dyess Patient Engagement in Prenatal Care Scale  

Dear Investigator:  

Your study, as approved by the University of Texas Southwestern (UTSW) at Tyler Institutional Review Board (IRB), has received site approval from Parkland Health & Hospital System (PHHS). This approval is contingent upon compliance with UTSW Tyler IRB rules and regulations, with PHHS institutional policies and any of the requirements that apply to your study covered in the general instructions included with this letter. For any questions or concerns regarding how to conduct your study at Parkland, please visit our Frequently Asked Questions (FAQs) page online at: http://www.parklandhospital.com/phhs/program-supporting-your-study.aspx.  

If you have any questions related to this approval letter, PHHS research policies and procedures or compliance requirements, please contact the Office of Research Administration at researchdepartment@phhs.org or by telephone at 214-590-3170.  

Sincerely,  

Susan Partridge, BSN, MBA  
Vice President, Office of Research Administration (OR)  
Parkland approval date  
Parkland Health and Hospital System  

Cc: Gloria Duke, Professor and Associate Dean, Office of Research, UT at Tyler; Anna Barden, Director Research Compliance, Parkland  

Office of Research Administration, Rev. 05.8.2018  
6000 Harry Hines Blvd. (Dallas, TX 75390)  
214-590-1170 | Fax 214-590-4167 | researchdepartment@phhs.org
Parkland Health & Hospital System
General Instructions for Research Site Approval

To maintain site approval in good standing, please observe the following requirements:

Department Specific Study Requirements

IRB Approval
1. Maintain full compliance with the guidelines, instructions and limitations of the UTSW at Tyler IRB approval letter. Parkland (PHHS) Office of Research Administration (ORA) cannot issue site approval unless the study is currently approved by the UTSW at Tyler IRB.

2. If the study involves extracting or collecting data, the researcher is limited to the collection and extraction of data elements approved by the IRB and listed in the HIPAA Authorization and/or HIPAA Waiver contained in the IRB documentation.

Study Modifications
1. Any modifications in the study protocol must be submitted to the UTSW at Tyler IRB for approval before the changes can be implemented. Notify the Parkland ORA of any study modifications. Additional Parkland review may be required if the modifications are determined to have a significant impact on activities and services provided by PHHS in support of your study.

2. Modifications of studies requiring additional Parkland services must be evaluated and approved by UTSW Office of Research Administration prior to Parkland site approval.

Acknowledgement of Parkland in Research Publications and Presentations

The following are some of the ways that Parkland’s contribution to the research can be acknowledged in publications and presentations:

- Author affiliation with Parkland.
- Citing Parkland in the Methods section.
- List Parkland Health & Hospital System (instead of “our hospital” or “a safety net hospital”) as the study site or source of study data and describe appropriately.
- List Parkland Health & Hospital System methods or programs.
- Parkland Health & Hospital System support in terms of funding or use of resources.
- Citing Parkland Health & Hospital System contributions to the work and to manuscript preparation (Examples below):
- Acknowledgements: The authors would like to acknowledge the support and cooperation received from the following individuals at Parkland Health and Hospital System, Dallas, TX, USA: [list of names with credentials] (administrative support for conducting the study), [list of names with credentials] (the ward manager) and [list of names with credentials] the [list of names with credentials] the (staff members of the study wards), for participating in the study intervention and surveys, [list of names with credentials] for reviewing ideas and solutions generated during intervention, and [list of names with credentials] in clinical decision support for partial assistance with data collection. The above mentioned contributors received no compensation for their work other than their usual salary. They have no conflicts of interest relevant to this article.
- Funding Support: The study was funded by a research grant received from the University of Texas System Patient Safety IP: name; Research Grant#: xxxxxxx. In addition, Parkland Health and Hospital System provided partial salary support (x%) for MEF and in-kind support for the duration of the study.
Appendix D: Consents

THE UNIVERSITY OF TEXAS AT TYLER

Informed Consent to Participate in Research

Institutional Review Board # Sp2018-118
Approval Date: April 11, 2018

Project Title: Psychometric Development of the Dyess Patient Engagement in Prenatal Care Scale

Principal Investigator: Phyllis Dyess-Nugent, PhD(c), MSN, RN, WHNP-BC

To the Participant:

You are being asked to take part in this study at The University of Texas at Tyler (UT Tyler). This permission form explains:

- Why this research study is being done.
- What you will be doing if you take part in the study.
- Any risks and benefits you can expect if you take part in this study.

After talking with the person who asks you to take part in the study, you should be able to:

- Understand what the study is about.
- Choose to take part in this study because you understand what will happen

Description of Project

This study will help me as a nurse researcher to understand how you feel about getting health care in pregnancy. In order to do this, I will ask you to fill out a survey.

I will ask a total of 950 women to take this survey. Then, I will see how well the questions measures how women feel about health care during pregnancy.

Research Procedures

If you agree to be in this study, we will ask you to do the following things:

- Voluntarily complete a survey on paper
- Finish the survey before you leave the clinic today
- The survey will take you 5 to 15 minutes to do
Appendix D (Continued)

- Provide some basic information about yourself
- Allow the researcher to access your electronic medical record to look at your clinic visits and pregnancy history
- Agree to ask the researcher if you have questions

**Side Effects/Risks**

There are no known side effects or risks with this study. However, you may have concerns with my access to personal information, such as name and health. All personal information that identifies you will be removed before it is used in the study. Your identity will remain confidential. Only the researcher will know.

**Potential Benefits**

While taking the survey may not benefit you, you will be helping researchers. We will understand how health care providers can make prenatal care better. We will understand better how women feel about their prenatal care. This will add to what is known about how women get care in pregnancy.

**Understanding of Participants**

1. I have been given a chance to ask any questions about this research study. The researcher has answered my questions.

2. If I complete this survey I know it means that:

   - I am taking part in this study because I want to. I chose to take part in this study after having been told about the study and how it will affect me.

   - I know that I am free to not be in this study. If I choose to not take part in the study, then nothing will happen to me as a result of my choice.

   - I know that I have been told that if I choose to be in the study, then I can stop at any time. I know that if I do stop being a part of the study, then nothing will happen to me.

   - I will be told about any new information that may affect my wanting to continue to be part of this study.
• The study may be changed or stopped at any time by the researcher or by The University of Texas at Tyler.

• The researcher will get my written permission for any changes that may affect me.

3. I have been promised that that my name will not be in any reports about this study unless I give my permission.

4. I also understand that any information collected during this study may be shared as long as no identifying information such as my name, address, or other contact information is provided). This information can include health information. Information may be shared with:

• Organization giving money to be able to conduct this study
• Other researchers interested in putting together your information with information from other studies
• Information shared through presentations or publications

5. I understand The UT Tyler Institutional Review Board (the group that makes sure that research is done correctly and that procedures are in place to protect the safety of research participants) may look at the research documents. These documents may have information that identifies me on them. This is a part of their monitoring procedure. I also understand that my personal information will not be shared with anyone.

6. I have been told about any possible risks that can happen with my taking part in this research project.

7. I also understand that I will not be given money for any patents or discoveries that may result from my taking part in this research.

8. If I have any questions concerning my participation in this project, I will contact the principal researcher: Phyllis Dyess-Nugent (469-766-8529) or email pdyess@patriots.utttyler.edu.

9. If I have any questions concerning my rights as a research subject, I will contact Dr. Gloria Duke, Chair of the IRB, at (903) 566-7023, gduke@uttyler.edu.
or the University’s Office of Sponsored Research:

The University of Texas at Tyler
c/o Office of Sponsored Research
3900 University Blvd
Tyler, TX  75799

I understand that I may contact Dr. Duke with questions about research-related injuries.

CONSENT/PERMISSION FOR PARTICIPATION IN THIS RESEARCH STUDY
I understand the purposes, my expectations, risks and benefits of this study, my questions have been answered to my satisfaction, and I agree to participate.

Completion of this survey implies my consent to participate.
Appendix D (Continued)

Research Participant Authorization to use PHI
IRB Approved July 2007

The University of Texas at Tyler
Institutional Review Board

RESEARCH PARTICIPANT AUTHORIZATION TO USE PROTECTED
HEALTH INFORMATION

This form is to be signed by research participants in addition to the written
Informed Consent, or, in the case that a written informed consent is authorized to
be waived and is not used, this form must be signed anytime that protected health
information will be used during a research project.

This does not authorize release of protected health information from any health care
organization or provider.

◆ Your records are confidential but may be revealed to appropriate institutional or
federal authorities.

There is a federal law (HIPAA), which protects the confidentiality of your health
information. This section of the informed consent explains how your health information
will be used and disclosed for this study and describes your rights, including the right to
see your health information. Any information collected about you in this study is
confidential and your name will not be released in any reports or publication without your
expressed consent.

By signing this document, you allow the researcher to use your Personal Health
Information to carry out this Study. This may include information in your medical
records such as medical histories, blood samples, x-rays, physical examinations and any
other data created or collected during the Study.

By signing this document, you also allow the researcher to release your Health
Information to the Institutional Review Board (a group at the University that oversees all
research), the study Sponsor (organization that provides funds for conducting the study)
and any representatives who work on behalf of Sponsor to conduct the Study. Other
persons/investigators directly involved in this study may also receive your Personal
Health Information. Research data sent to the sponsor or other persons does not include
your name, address, or social security number. Instead, you will be assigned a patient
identification number. Your non-identifiable information may also be given to the U.S.
Food and Drug Administration and other government health agencies around the world
upon their request.

The Sponsor may also reanalyze the results of the study at a later date and combine them
with results of other studies. While using the information in these ways, the sponsor may
give it to its affiliated companies in the US or other countries. The sponsor may also
share the information with its business partners or companies it hires to provide study-
related services. Again, no identifying information about you will be released at any time except by an identification number.

The information may be given to the FDA or other government health agencies as part of applications to gain approval of treatments or to meet other reporting requirements such as reporting side effects. The results of the study may also be presented to other health care professionals and published in scientific journals or publications but your identity will not be disclosed.

♦ You have a right to see and make copies of your medical records.

To ensure the reliability of the Study, however, you agree that you will not be able to see or copy your records related to the Study until the Sponsor has completed all work related to the Study. At that time, you may ask to see the Investigator’s copy of your medical records.

♦ You may cancel your authorization at any time.

This authorization to use and disclose your Health Information does not have an expiration date. You may cancel your authorization at any time by sending a written notice to the Researcher/Investigator named in this consent at the following address:

The University of Texas at Tyler
Institutional Review Board
c/o Office of Sponsored Research
3900 University Blvd
Tyler, TX 75799

If you cancel your authorization, the Investigator will no longer use or disclose your Health Information for this Study. However, we are required to record anything that relates to safety of drugs.

I understand the above with regard to my privacy rights.

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Research Participant Signature</td>
<td>Date</td>
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Witness
Appendix E: Recruitment Flyer

Tell us about your pregnancy care!

We are looking for women to participate in a research study survey that will help us understand how women feel about prenatal care and the experience of health care during pregnancy.

To participate you must be:
- 18 years of age or older
- Pregnant now
- Able to have a conversation in English
- Able to read English

Tell your nurse if you are interested in participating!

Phyllis Dyess-Nugent, RN, WHNP-BC
pdyess@patriots.uttyler.edu
NAME: Dyess-Nugent, Phyllis M.

POSITION TITLE: Doctoral Student

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>Degree Certification</th>
<th>Completion Date</th>
<th>Field of Study</th>
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<td>Southwest MS Comm College Summit, MS</td>
<td>A.D.N.</td>
<td>05/1986</td>
<td>Nursing</td>
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<tr>
<td>UT Southwestern Medical Center Dallas, TX</td>
<td>Women’s Health NP Certificate</td>
<td>1995</td>
<td>Nursing, Women’s Health</td>
</tr>
<tr>
<td>Angelo State University San Angelo, TX</td>
<td>B.S.N.</td>
<td>12/2003</td>
<td>Nursing</td>
</tr>
<tr>
<td>The University of Texas at Tyler Tyler, TX</td>
<td>M.S.N.</td>
<td>05/2010</td>
<td>Nursing, Education</td>
</tr>
<tr>
<td>The University of Texas at Tyler Tyler, TX</td>
<td>Ph.D.</td>
<td>05/2019</td>
<td>Nursing Science</td>
</tr>
</tbody>
</table>

A. Personal Statement

My program of research focuses on prenatal care utilization and patient engagement. Additional research interests of mine include perinatal care quality and multidisciplinary team learning through simulation.
B. Positions and Honors

2015 – present  
Director of Nursing, Perinatal Services / Labor & Delivery  
Parkland Health & Hospital System  
Dallas, TX

2012 – 2015  
Nurse Manager, Labor & Delivery Triage  
Parkland Health & Hospital System  
Dallas, TX

2011 – 2012  
Adjunct Faculty  
College of Nursing, Texas Women’s University  
Dallas, TX

2008 – 2012  
Staff Women’s Health Nurse Practitioner  
Parkland Health & Hospital System  
Dallas, TX

1996 – 2008  
Women’s Health Nurse Practitioner  
Denton, TX

1995 – 1996  
Women’s Health Nurse Practitioner  
UT Southwestern Medical Center at Dallas  
Dallas, TX

1993 – 1994  
Staff Nurse, Labor & Delivery  
Lewisville Memorial Hospital  
Lewisville, TX

1991 – 1993  
Nurse Manager, Labor & Delivery  
Southwest MS Regional Medical Center  
McComb, MS

1986 – 1991  
Staff Nurse, Labor & Delivery  
Southwest MS Regional Medical Center  
McComb, MS

Professional Recognition

Daisy Nurse Leader Award 2017

D Magazine, Excellence in Nursing award, 2018

Dallas-Ft. Worth Great One Hundred Nurse 2018
Publications, Presentations, & Professional Scholarship Activity

Participating author, poster presentation: *Eliminating barriers to clinical decision making & EBP*, 1st Annual Inter-Professional Evidence Based Practice Conference, UT Tyler, Tyler TX in 2014.


Poster Presentation: *Optimizing post-cesarean birth pain management and reducing opioid use.* Poster accepted for presentation at the state conference of the Texas Association of Women’s Health Obstetric and Neonatal Nurses in Frisco, TX in May 2019.

Peer Reviewer
Maternal and Child Health Journal
Nursing Forum