

Improving Self-Management in Pregnancy

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8/28/2022

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**Abstract**

Prenatal education provides the necessary resources to expecting parents to enhance knowledge and promote understanding of the maternal changes and conditions commonly associated with pregnancy. Improving educational material includes adapting the presentation and dispersion of the material according to the education level of the patient/learner. This patient centered education allows for both improved comprehension and compliance with recommended pregnancy care practices. A literature review was conducted and identified that educational materials provided to patients not only in pregnancy, but other chronic health conditions, can improve their self-management ability. Improved self-management practices in turn helped decrease healthcare utilization costs. Reviewed literature included subjects such as education, healthcare utilization, self-management, and pregnancy.

The purpose of this Doctor of Nursing Practice (DNP) project is to implement an evidence-based adaptive educational material for pregnant individuals and promote self-management during pregnancy. Some items that were included within the handout included but was not limited to pregnancy induced symptoms i.e., nausea, reflux, round ligament pain, and sleep disturbances. To do this, Michigan State University (MSU) DNP students developed a gender-neutral evidence based, educational handout for pregnant clients and their partners. The DNP students worked alongside a Certified Nurse Midwife (CNM) whose responsibility was to disperse the handout as well as track the amount of non-emergent calls and/or text messages received pre and post resource implementation to evaluate its effectiveness.

**Keywords:** Self-management, Prenatal education, Pregnancy, Healthcare Utilization

## **Introduction**

Healthcare utilization contributes to unnecessary cost and over burdens the health care system. Research done by Nassery et. al. Showed “Overuse is impacted by a perfect storm of factors in the USA and can cause financial, physical, and psychological harm to patients” (Nassery, 2015). This is evident for pregnant individuals having unnecessary healthcare visits and admissions. Research performed in Australia found that proper antenatal education improved the ability for pregnant women to care for themselves at home and utilize hospital services appropriately (Saime, 2022). By facilitating improvements in patient education and comprehension, providers in turn, also facilitate the implementation of condition specific self-management techniques that result in decreased healthcare utilization. Engagement in self-management techniques require adaptations due to the multiple variables and challenges that each patient faces, including health literacy and the availability of and accessibility to healthcare resources (McDonald, 2018).

Healthcare information has become widely accessible for patients with the growing number of online resources. These resources have their utility; however, they may present a barrier for providers as not all resources are evidence based. To mitigate the risk of misinformation providers should provide and encourage the use of evidence-based resources for their patients. Providing patient education for all health conditions, including pregnancy is important to ensure best possible outcomes (Demarco, 2011).

Collaboration between providers and patients is required to promote condition specific knowledge and understanding that fosters confidence in the patients' ability to manage their condition. This includes comprehension of the educational material provided and finding quality information on their own. Research by Purdue University Global concluded that "benefits of being health literate include greater patient safety, less hospitalizations, a greater ability to care for oneself, and a better overall health status" (McDonald, 2018). The purpose of this paper is to evaluate how providing evidence based educational materials and promoting self-management throughout pregnancy will decrease healthcare utilization.

## **Background**

According to the CDC (Centers for Disease Control and Prevention) (2020) the birth rate in 2020 in the U.S (United States) was 11.0 per 1,000 of the population. The total number of births in the U.S in 2020 was 3,613,647 (Osterman, 2022 p.2). Of these pregnant individuals an estimated 77.7% of them began prenatal care within the first trimester (Osterman, 2022 p.6). Pregnant individuals have the potential for elevated healthcare utilization as well as increased healthcare costs related to the organic changes for which the carrier's body and fetus undergo during pregnancy.

According to the Healthcare Utilization Analysis conducted by the Agency for Healthcare Research and Quality (AHRQ), pregnant individuals utilized the emergency department and were discharged for maternal care other than delivery resulting in an estimated cost of 1.9 billion dollars throughout the United States in 2020 (AHRQ, 2021).

Due to the increased healthcare utilization and cost associated with pregnancy and prenatal care, the development of a means for reducing unnecessary utilization, cost, as well as provider burden, is advantageous.

In 2017, the estimated total healthcare costs incurred for those with diabetes in the United States (US) was \$327 billion (Whitehouse, 2019). A study by Strawbridge et al. (2017) illustrated the efficacy of EBP educational interventions focused on increasing patient knowledge and providing tools for better self-management of chronic disease. The education focused on topics relating to modifiable risk factors which hold high importance in diabetes management such as blood glucose self-monitoring and foot care. This education was intended for the participants in the Diabetes Self-Management Training (DSMT) (Strawbridge, 2017). Results from the study found that DSMT users achieved a 14% odds reduction of hospitalizations and emergency room visits and is cost effective in development and implementation (Strawbridge, 2017). That same year estimated healthcare costs for those with Chronic Obstructive Pulmonary Disease (COPD) was \$32 billion, accounting for nearly 700,000 hospital admissions (Hosseini, 2019). To combat the overuse of healthcare resources Hosseini et al. implemented a disease specific, inpatient education program backed by the GOLD guidelines and taught by Registered Respiratory Therapists (RRTs). Hosseini et al. (2019) found that for those who received the intervention, hospital length of stay as well as associated costs were significantly reduced (Hosseini, 2019).

The effectiveness of educational programs used to improve self-management techniques, and decreased utilization of healthcare resources in patients that have chronic conditions and may be generalized for the application of educational

interventions to the pregnant population. This may yield significant benefits to patients, providers, and the healthcare system overall. It is reasonable then, to apply this concept of patient self-management education to the pregnant population to decrease healthcare utilization, reduce cost, and promote positive patient outcomes.

### **Problem Statement/Clinical Question**

In pregnant persons, does promoting knowledge of self-management practices using an evidence based educational pamphlet result in decreased healthcare utilization (non-emergent texts/calls)?

### **Organizational Assessment “Gap” Analysis” of Project Site**

To better evaluate current strengths and weaknesses of the project site MSU DNP students utilized a SWOT table for organization. This small Nurse Midwife led practice had several areas in which it could improve its current practices. It also had several areas in which there were limitations and threats to its structure. Several areas of strength include the promotion of holistic medicine, acceptance of most insurances, and following of the nursing model. Several main weaknesses were the size, competing healthcare organizations, and availability of misinformation through multimedia resources. Refer to Appendix A to see a complete list and table of strengths, weaknesses, opportunities, and threats. This project is appropriate for this site because there is a need for improved evidence based educational materials to promote self-management and decrease un-needed correspondence between patients and the provider. For a small practice with so many patients, focus needs to be on larger issues in pregnancy rather than questions that can be answered with provided resources.



## **Purpose of the Project**

The aim of this project was to improve the ability of pregnant individuals to self-manage while decreasing healthcare utilization through implementation of an evidence based educational resource. Healthcare utilization was measured by the amount of non-emergent correspondence (emails, phone calls, and text messages) received by the clinic containing topics covered by the educational pamphlet created by the graduate students, in collaboration with the Midwife, and dispersed to pregnant clients during their first office visit (or subsequent visit if already an established patient receiving care). Correspondence received by the Midwife pre, and post dispersion of education was recorded to assess correlation between the evidence based educational tool and the number of correspondences received.

## **Evidence Based Practice Model/QI Model**

The Iowa Model of evidence-based practice was the foundation being followed for the educational improvement intervention (Iowa, 2017). Identification of the issue within the practice, lack of a brief organized evidence based educational material packet was found. Evaluation of the issue by the current provider and MSU DNP students was deemed important for the population based on case load, and level of low priority correspondence being received. The MSU DNP students then evaluated literature for importance, and efficacy, of educational materials on self-management and healthcare utilization. After determining there was sufficient evidence, MSU DNP students introduced a brief evidence based educational packet into the practice for dispersion

among all pregnant individuals. The CNM within the office tracked received correspondences from patients for 3 months prior to implementation, during implementation, and after implementation, to see if there is a change in low priority questions frequency. Questions were deemed low priority if they were able to be answered within the handout provided. Evaluation of these results was done by researchers to see if pregnant individuals were better able to self-manage pregnancy by not reaching out to their provider as much after disseminating informational packets.

## **Literature Review**

To evaluate similar educational interventions and their applicability to similar populations MSU DNP students evaluated articles from two different databases, CINAHL and PubMed. The search terms utilized included: Pregnant\* and self-management\* and educat\*. These search terms yielded a total of 227 articles, 137 from CINAHL and 90 from PubMed. After screening nine articles were found to have relevance to the use of educational materials for self-management in pregnant individuals. A PRISMA diagram was utilized to organize the search and process, see Appendix B. Inclusion criteria included articles between the years 2017-2022, implementation of an education-based intervention, and articles written in English. Exclusion criteria included being written prior to 2017, focused on breast feeding or birthing outcomes, focus on immunizations, focus on self-managed abortions.

There was limitations in searching this subject including the lack of studies done within the United States. Many of the applicable studies or reviews were conducted in small populations within Middle Eastern countries. Many of the articles also had a focus

on self-managed abortion practices. To broaden the review other conditions that had educational interventions relating to healthcare utilization results were included. This resulted in a total of nine articles deemed suitable for inclusion within this research. The literature was organized in a literature table located in Appendix C.

### **Meta-analysis/ Utilization Assessment**

There was one meta-analysis and one utilization management article found during the search. Authors grouped these articles together due to their similarities in findings. The systematic review performed by Sushko et al. identified 30 applicable studies focusing on gestational diabetes management, improved education, and self-management techniques. Unfortunately, many of the studies only provided data on the effects on blood pressure rather than on healthcare utilization. The educational intervention groups within these studies did show significant reductions in blood sugars with the largest coming from a telemedicine education intervention decreasing morning blood sugars from 124 mg/dl to 106 mg/dl (Sushko, 2021 p.6). The other much smaller utilization assessment was designed to evaluate whether a community based educational program decreased healthcare expenditures short term in Camden, New Jersey. This study did not show statistically significant evidence in reducing expenditures related to emergency department visits and inpatient stays with pre and post intervention costs maintaining P values of 0.99 and 0.72 (Burton, 2017 p.97). Even with the lack of studies regarding healthcare utilization there is still evidence of the benefit of education for patients within these studies. The decrease in blood sugars seen in the meta-analysis and the improvement of HgbA1c by 0.9 for participants in the community education is beneficial for patients.

### **Randomized Control Trials/ Quasi-Experimental Trial**

There was a total of two randomized control trials (RCT) and one quasi-experimental research study which utilized educational interventions in improving self-management of pregnant individuals. These trials had different educational interventions, but one concluded that education based on Bandura's SET could have a positive effect on self-efficacy and improve the ability for individuals to practice self-management (Motlagh et al, 2019 p.60). The intervention group improved their self-care behaviors by  $18.85 \pm 1.95$  according to the study (Motlagh et al, 2019 p.59). A quasi-experimental study conducted by Mohebbi et al. evaluated the Health Belief Model (HBM) based self-management interventional program. The results of utilizing this model showed that after 6-months within the educational program participants self-management increased from  $60.31 \pm 8.08$  to  $84.18 \pm 8.77$  (Mohebbi et al., 2019 p.172). The other RCT showed that educational interventions were effective in promoting health literacy and in improved self-care competencies during pregnancy (Solhi, 2019 p.9). Solhi et. al. (2019) showed that "there was a significant difference in the mean value of the total self-care score before the intervention ( $62.90 \pm 6.29$ ), at 1 month ( $76.77 \pm 4.28$ ) and at 2 months ( $78 \pm 3.98$ ) after the intervention in the intervention group ( $P < 0.001$ )" (p.8). Overall, each of these research studies showed a significant increase in self-management behaviors post educational intervention.

### **Systematic Review/ Observational Analysis**

There was one systematic review and one observational analysis and three observational studies that were similar in their educational interventions regarding

patients with different chronic conditions. These studies provided good evidence of improved self-management for patients with osteoarthritis and the other for patients with asthma. The first study conducted by Yildirim et. al. showed that asthma self-management education (ASME) intervention group “made 0.82 ED visits in MI and 0.55 in NY on average in 2010, while in 2011, their average number of ED visits decreased to 0.41 in MI and 0.43 in NY” (Yildirim et al., 2021 p.1642). Three observational studies reviewed reveal a positive correlation between patient self-management education and decreased health care utilization. A claims-based study by Strawbridge et al. (2017) compared a sample of Medicare beneficiaries with a new diagnosis of diabetes that had used diabetes self-management training (DSMT) from 2009-2011 (N=14,860) to a nonuser group. Participants of this study were followed for 1 year, starting 6 months after their diabetes diagnosis as well as a yearlong follow up period. During this time, healthcare utilization (including any hospital and emergency department (ED) services as well as any hospitalization because of diabetes related ambulatory care) and costs between DSMT users and nonusers were compared. Costs included all Medicare Parts A and B expenditures. Results showed that those who received DSMT had a 14.21% predicted probability (roughly 3 fewer per 100) of hospitalization compared to 16.23% for nonusers. Additionally, the hospitalizations and ED visits were decreased by 13% among users than nonusers during the follow-up interval (Strawbridge et al., 2017). Strawbridge et al. (2017) also found that DSMT users account for approximately \$830 less in Medicare expenditures (CI 95%, -\$1198, -\$470) compared to nonusers (Strawbridge et al., 2017). Strengths of this study include that the DSMT trainers were required to get accreditation in evidence-based curriculum and the brevity of the

educational intervention. Limitations of this study include observational design as well as differences between users and nonusers such as health status, patient engagement, and medical care quality.

Similarly, findings from a study conducted by Claasen et al. (2018) shows the efficacy of educational programs at reducing healthcare utilization among participating patients with osteoarthritis (OA). There were 146 patients included within the study that were diagnosed with knee or hip OA and had not yet undergone a joint replacement surgery. Included as well were 54 of their partners, all of whom attended a multidisciplinary educational program. After obtaining baseline patient data, including demographic information and pre-intervention healthcare utilization, researchers utilized the following assessment tools. To assess participant's illness perception related to their OA, several different measurement tools were utilized including the Brief Illness Perception Questionnaire (IPQ). The Dutch General Self-Efficacy Scale (GSES) was also provided and assisted researchers in their evaluation of changes in perceptions of their condition and changes of the patient physically during the study (Classen, 2018). Researchers then tracked changes in healthcare contacts over time utilizing data analysis with the exact McNemar's test and Wilcoxon Signed-Rank test. Results showed a reduction in the proportion of patients in the intervention group who visited a physiotherapist or exercise therapist, or general practitioner (40% versus 25%) in addition to an increased knowledge of OA and a positive change in patient perceptions of their OA (Classen, 2018). The education included what patients could do for themselves to manage their OA including lifestyle changes like diet, exercise, compliant medication uses and weight loss. It also provided information on when to seek guidance

for treatment and promoted realistic expectations regarding the results of surgical intervention (Claassen, 2018). Limitations of this study included an uncontrolled design, small sample size, and a 25% loss to follow up.

In their 2019 retrospective observational study, Hosseini et al. sought to investigate the efficacy of inpatient self-management education provided by Registered Respiratory Therapists (RTs) to patients with chronic obstructive pulmonary disease (COPD). The study was a matched case-control design and the sample included 84 inpatients in which researchers performed a review of medical record data and a retrospective review of administrative data. The patients had a diagnosis of COPD and were admitted in 2016-2017 to an academic hospital. A statistical analysis via the IBM © SPSS © Statistics 25 and Wilcoxon signed-rank test provided data related the difference in hospitalization costs and LOS (length of stay) pre and post intervention (Hosseini et al., 2019). Testing revealed that the median cost of hospitalization, pre-patient education was \$10,554 which was much higher than the education cost of 0\$ seen in the post-education group. Tests also show that the post-education LOS (0) was significantly lower than the pre-education LOS (5). Strengths of the study include education performed by trained professionals using EBP supported by GOLD guidelines and facilitating improved self-efficacy as well as medication adherence, and exacerbation prevention. Limitations include a relatively small sample size within an academic hospital with confounders such as patient characteristics including smoking history, marital status, gender, socioeconomic status, coping strategies, depression, physical limitations, and number of visits. Therefore, according to Hosseini et al. (2019) patient education for patients with COPD reduces healthcare utilization through

providing patients the confidence to take action in their own health plan and improve self-efficacy.

## **Conclusion**

Despite an overall lack of research specific to decreasing healthcare utilization with educational materials in pregnancy, there were benefits gleaned from educational interventions on not only patient health but also healthcare utilization in other chronic conditions. Based on the review of literature, educational interventions for pregnant individuals have been deemed beneficial in improving self-management behaviors.

## **Goals, Objectives, and Expected Outcomes**

The goal of this DNP project was to reduce non-emergent healthcare utilization by pregnant individuals through the implementation of an evidence based educational resource that focuses on prevention and self-management strategies of pregnancy associated conditions. It was expected that during the 3-month intervention period, as client's knowledge regarding pregnancy and self-management skills improve, healthcare utilization (text messages, emails, phone calls) would be reduced.

## **Methods**

This evidence-based practice (EBP) quality improvement project used an educational pamphlet to improve self-management and decrease healthcare utilization in pregnant individuals. Expected outcomes for this project include an improved sense of self management in pregnancy and decreased healthcare utilization. The project followed the Plan Do Study Act framework.



## **Plan**

The project began with evaluation of the needs of a Certified Nurse Midwife run obstetrics clinic. Once a need (organized evidence based informational packet) was identified, an evidence-based literature review for separate stages, concerns, and homeopathic remedies during pregnancy was pursued. The importance of education within pregnancy as well as other chronic conditions was also researched and found applicable to the needs of the clinic. Organization of this information and the process for implementation was developed prior to dispersion within the clinic. Topics for education include common issues in pregnancy, preventing problems in pregnancy, key vitamins, and minerals during pregnancy, caloric intake during pregnancy, weight gain during pregnancy, recommended online resources, when to contact your provider, preventing problems in pregnancy, and places to write notes during appointments.

## **Do**

Once the pamphlet was developed and deemed appropriate, dispersion within the office began. MSU graduate students made sure that the brochure was gender neutral and at an 8<sup>th</sup> grade reading level to better facilitate education. The full pamphlet can be seen in Appendix D. This informational brochure was handed out to all pregnant individuals who were less than nine months pregnant. After having the brochure for three months the provider was to evaluate and organize data related to how often they were contacted by patients with questions that could have been answered within the brochure.

## **Study**

The data collection tool utilized for this project was observation. The Nurse Midwife associated with this practice observed the amount of correspondence that they received prior to and throughout the process. Data from the Nurse Midwives monitoring of correspondence was evaluated to see if implementation of educational handouts decreased healthcare utilization. This was measured by comparing pre-educational handout correspondence numbers to post-implementation correspondence numbers. Data was organized by the CNM in table format listing date, time, format (text, call, or email), and determination of appropriateness of correspondence (See appendix E).

## **Act**

After evaluation of results, the efficacy and sustainability of the brochure was to be discussed with the nurse midwife. If the project was deemed beneficial to the patients, then long term implementation of the brochure for patients was left to the provider within the office. Training done prior to implementation of the brochures will remain applicable as the office continues to disperse the educational material.

## **Project Site and Population**

The proposed project took place in an independently owned and operated women's wellness center in Manistee, Michigan. According to data from the United States Census Bureau (2022), Manistee is a community in Northern Michigan which as of 2021, is home to a population of 6,302 people. The community is predominately white (89.1%), high school educated, married (43.4%), single (33.9%), with no religious affiliation (59.2%), or catholic (20.6%). Healthcare is the predominate industry, employing approximately 13% of the population. 13.7% of the population live at or

below the poverty line and 26,593 people receive social assistance. (U.S. Census Bureau, 2022).

The community is home to one hospital, a county medical care facility, assisted living facilities, primary care offices, dental offices, and ophthalmology offices. There are tribal services run by the Little River Band of Indians as well as a casino. There is no OB/GYN provider within the county and the nearest labor and delivery unit is 35 miles away. The nearest PICU is approximately 50 miles away from the clinic. Manistee has both public and private elementary and high schools. There is also a public bus service that provides affordable and safe transportation throughout Manistee County.

The participants of the project were the CNM, pregnant clients, and Michigan State University (MSU) graduate students. The midwife and her staff provided eligible candidates with the EBP pamphlet and tracked correspondence. Inclusion criteria was pregnant clients of the wellness center, less than nine months gestation, and correspondence with the CNM related to frequently asked questions or problems covered by the EBP pamphlet. Exclusion criteria was pregnant persons greater than nine months gestation and non-pregnant clients.

### **Ethical Considerations/Protection of Human Subjects**

Michigan State University Internal Review Board (IRB) approval was obtained prior to initiating the DNP project. All data was HIPPA compliant, and the project did not include any personal identifiers from participants. All information included within the handouts was evidence based to ensure the highest standards of care were being provided to all willing participants. There was minimal to no risk of providing improved

educational material to patients. Benefits included better self-management and fewer correspondence between provider and patient.

### **Setting Facilitators and Barriers**

The clinic was staffed by a Certified Nurse Midwife (CNM) with more than thirty years of combined experience as a labor and delivery nurse and midwifery care. She also partnered with two professional midwives and employed several birth assistants and doulas. She has personally trained first responders in infant resuscitation as the nearest labor and delivery unit is approximately 35 minutes away. This partnership with the community is mutually beneficial, as she also performs home deliveries, which can increase travel time to these units as well as emergency departments. Because of her commitment to safety, properly trained first responders can assist if emergent services are needed. This preparation provides peace of mind to the CNM as well as the patient and their loved ones that there is competent help in the event of an emergency. The office has 3 birthing suites and birthing tubs. Office visits take place in the parlor located in front of the building, in a comfortable, private, and intimate setting. Appointments are scheduled hourly. Physical exams and lab draws take place in the exam room that is separate from the front to promote privacy, but to also promote comfort and foster a trusting connection between the midwife, patient, and their family. Other services provided at the office are sonography, tocodynamometer, glucose intolerance testing, pelvic exams, as well as holistic and homeopathic adjunctive therapies for labor. The mission of the clinic is to provide a patient centered, safe, and welcoming environment for pregnant persons to deliver their children, whether at the clinic or in the home. Some

of these facilitators and barriers have been organized into an Ishikawa Fishbone Diagram which can be seen in Appendix F.

The MSU graduate students did not have any direct patient contact. There was a briefing between the MSU graduate students and the CNM prior to the distribution of the EBP pamphlets to discuss the project and review the process of data collection prior to implementation. The MSU library and EBP guidelines for maternal care and midwifery were resources that were used to develop the educational pamphlet. Constraints of the project was a relatively short period of implementation, as well as a generally small population of eligible participants, and varying levels of self-management, confidence, and participant backgrounds. Facilitators of project implementation included a clinical staff that was committed to providing individualized, holistic prenatal care, and promoting positive outcomes for their clients. There were no anticipated barriers to the implementation of the project.

## **The Intervention and Data Collection Procedure**

### **Intervention Process**

Review of literature has shown that improved education within pregnancy and other chronic conditions can improve self-management and decrease healthcare utilization. With the importance of education being highlighted, MSU graduate students developed an evidence based educational pamphlet for dispersion. To assess the effectiveness of the educational handout researchers, and the CNM, measured inappropriate calls. The CNM and MSU graduate students determined that inappropriate calls were to be determined by whether the answers to the questions

being called about can be found within the brochure or if the correspondence is truly something that needs to have provider notification, also listed in the brochure.

Discussion of time frames as well as expectations with the CNM was important to formalize the process and ensure data was not lost due to process errors. As the CNM was the only one providing the pamphlets, there was no need to educate other staff members on the utilization of the pamphlet. A total of three people, not including patients, were involved in the process of implementation.

After evaluating patients for eligibility, the CNM dispersed the educational packet to all pregnant patients who are 6 months or less gestational age. The patient was expected to review the information initially with the provider and bring it with them to appointments. During this time frame the CNM was to be tracking how many texts, emails, and phone calls she had received from patients. After a three-month time frame the CNM was to turn over total correspondence prior to the educational packet and after dispersion of the packet.

Once all data had been submitted MSU grad students were to organize and evaluate the data to see if there was any correlation between the education and the amount of correspondence the CNM received. At this stage the CNM was not needed for involvement as they have provided all necessary information. The data was to be communicated with the provider to provide them with the value of the intervention. The data was then going to be compared using percentage change in correspondence over the interventional period.

## **Timeline**

The timeline of this project began with the approval of the Institutional review board (IRB) which was obtained during the month of September 2022. Soon after, during September, the educational packet was reviewed with the provider and the process was discussed. To obtain a larger population, this took place over 3 months, ending in December. Evaluation of results from this survey as well as the amount of correspondence that the CNM had been tracking was to be performed. Results were then going to be evaluated and organized for presentation. Full timeline can be seen in Appendix G.

### **Measurement Instruments/Analysis**

To evaluate if the educational packet could reduce the number of correspondences received after business hours this DNP project reviewed, phone calls, text messages, and emails received by the CNM. These correspondences were deemed inappropriate if they included questions which could be answered by the educational material. Pre-intervention correspondence was to be logged by the CNM and was going to be compared with post material dispersion correspondence to evaluate if the material made a significant difference in patients' ability to self-manage and decrease healthcare utilization.

Individuals included in this analysis included the CNM, MSU graduate students, and patients. The goal of this data was to show a significant difference in the amount of after-hours correspondence received by a CNM. Due to the practice being so small results would be difficult to generalize for larger populations. Appropriate statistical analysis would be analyzed using percentage change in number of correspondences

received. If this data showed a decrease in un-needed correspondence, then providers should consider implementing similar educational interventions for their patients. The decreased off hours workload and ability to focus on more critical patient care aspects could prove beneficial not only to obstetric providers but also providers who care for patients with other chronic conditions.

### **Sustainability Plan**

The sustainability of this project will depend on the applicability over time and available resources. Primary resources being utilized for this project was paper, printer, printer ink, and staples. If the office can financially sustain these products the informational packet should continue to exist. Evaluation of up-to-date evidence regarding pregnancy will also need to be evaluated at intervals deemed appropriate by the provider to ensure that the packet does not provide misinformation after a period.

### **Results**

Prior to project implementation, the CNM reviewed her texts and clinic phone calls and messages and reported at least 279 unnecessary correspondences over a 3-month period. Based on findings garnered during the literature review process, the positive correlation between educational interventions and self-management across multiple healthcare domains, the assumption of the DNP students was that the results of this project would reflect a similar outcome. However, the effectiveness of the educational pamphlet on reducing unnecessary call volumes and workload for the CNM will remain unknown as the clinic doors abruptly closed in late September 2022. The MSU DNP students were led to believe that the intervention and data collection was still



underway at the clinic until December 2022 when correspondence ceased. January 2023 the CNM reached out to explain the hardships of the clinic and then ceased all future correspondence with the DNP students henceforth rendering data collection a total loss. The intention of the MSU DNP students was to compare pre-implementation correspondence and cross examine it to post-implementation correspondence. Unfortunately, the CNM did not report any data to the DNP students for analysis even though it was requested and agreed upon. Due to this no official statement can be made based on the student's data other than the assumption that it would have had a positive correlation.

### **Discussion/Implications for Nursing**

The results of this QI may affect how to organize and disseminate educational materials for pregnant individuals. Patient education is important within all domains and phases of healthcare and condition management. Evaluation of how this educational material is delivered and perceptions of knowledge and its effects of self-management may promote the adaptation of improved evidence based educational material. Due to a lack of data on the effect of education's link to self-management in pregnancy specifically, this project was hopeful to find a correlation with EBP educational materials and efficacious self-management. If the educational materials were found beneficial then it is reasonable for Nurse Midwives to implement similar educational programs to improve their patient's self-management during pregnancy.

While there are no findings to report due to the fall out of the CNM from the project as mentioned. Retrospectively, the authors of this paper submit that perhaps the

project implementation was an intervention that came too late. It is possible that the additional workload of tracking correspondence (while discussed at great length and mutually agreed to by the DNP students and CNM), was too taxing for the CNM. Perhaps, if the DNP students could have been able to meet on a more regular basis with the CNM, they could have tracked the data rather than the CNM (this was offered but declined per the CNM) which could have at least produced tangible data for analysis. The regular presence of the DNP students might have also facilitated more of an interpersonal relationship with the CNM, making it more likely for her to continue with the project or at least provide notice that the clinic would be closing. However, regardless of the method used to track and analyze data, the project would have still been confounded by the closure of the clinic by reducing the time of implementation as well as further reducing population size. It is the belief of the DNP students that had the clinic not closed, the results would positively correlate patient education with reduced call volumes and workload.

### **Cost-Benefit Analysis/Budget**

Costs to implementing the evidence based informational packet included things such as paper, printer ink, and staples. These are items that are already currently in most offices, extra will be used, to print and put together these packets. The most expensive item required for the project was Lexmark printer ink at \$87.99. Paper for the printer was \$8.49. Staples costed \$2.99. These up-front costs would be mitigated as these items are currently in the office for other uses. The benefit of this project is that having less correspondence and greater independence of patients will outweigh the minimal costs of printing and stapling the packets together. The costs would be taken

on by the office, but like previously stated these items were already within the office being used.

## **Conclusion**

The lack of consistent simplified educational material has led to decreased self-management practices in pregnancy. Improving, and providing, these educational materials should improve patients' self-management and decrease healthcare utilization. Research has shown that educational interventions in chronic conditions as well as pregnancy can improve self-management and decrease healthcare utilization. Ensuring an appropriate literacy level for patients and using up to date evidence-based recommendations will provide patients with the best possible chances to allow them to manage common symptoms during pregnancy.

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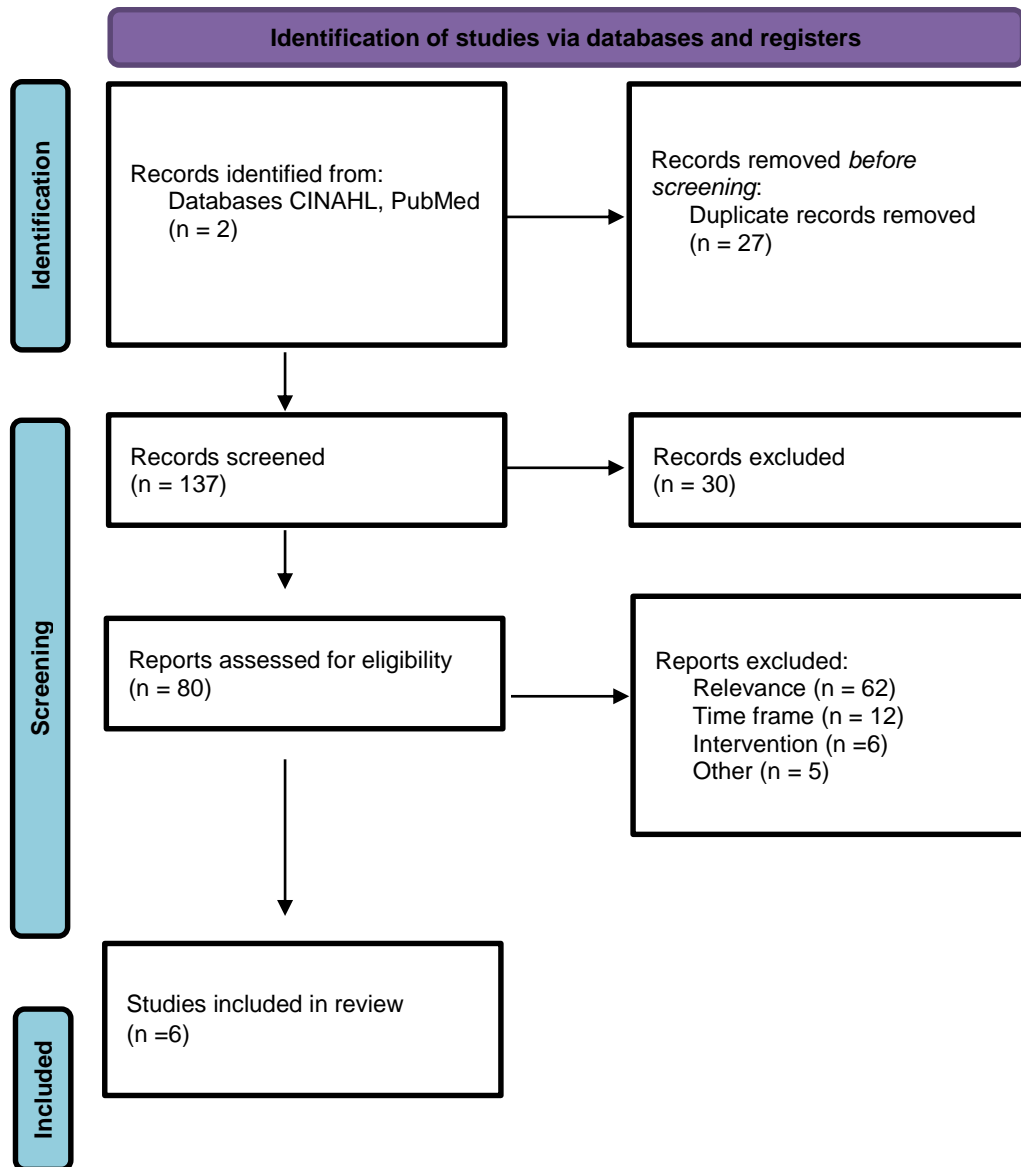
## Appendix A

### SWOT Analysis

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| <b>Strengths</b> <ul style="list-style-type: none"><li>– Patient centered</li><li>– Nursing Model</li><li>– Holistic Approach</li><li>– Insurance Acceptance</li></ul>                               | <b>Weaknesses</b> <ul style="list-style-type: none"><li>– Limited resources</li><li>– Over accessibility</li><li>– Safety (Emergent birthing situations i.e.. Shoulder dystocia, hemorrhage, infant resuscitation)</li></ul> |
| <b>Opportunities</b> <ul style="list-style-type: none"><li>– Growth- additional providers/patients</li><li>– Community Partners (Fire Dept.)</li><li>– Free educational classes for public</li></ul> | <b>Threats</b> <ul style="list-style-type: none"><li>– Large hospital systems</li><li>– Misinformation available through internet</li><li>– Preconceived misconceptions of nurse midwifery</li><li>– Roe V Wade</li></ul>    |

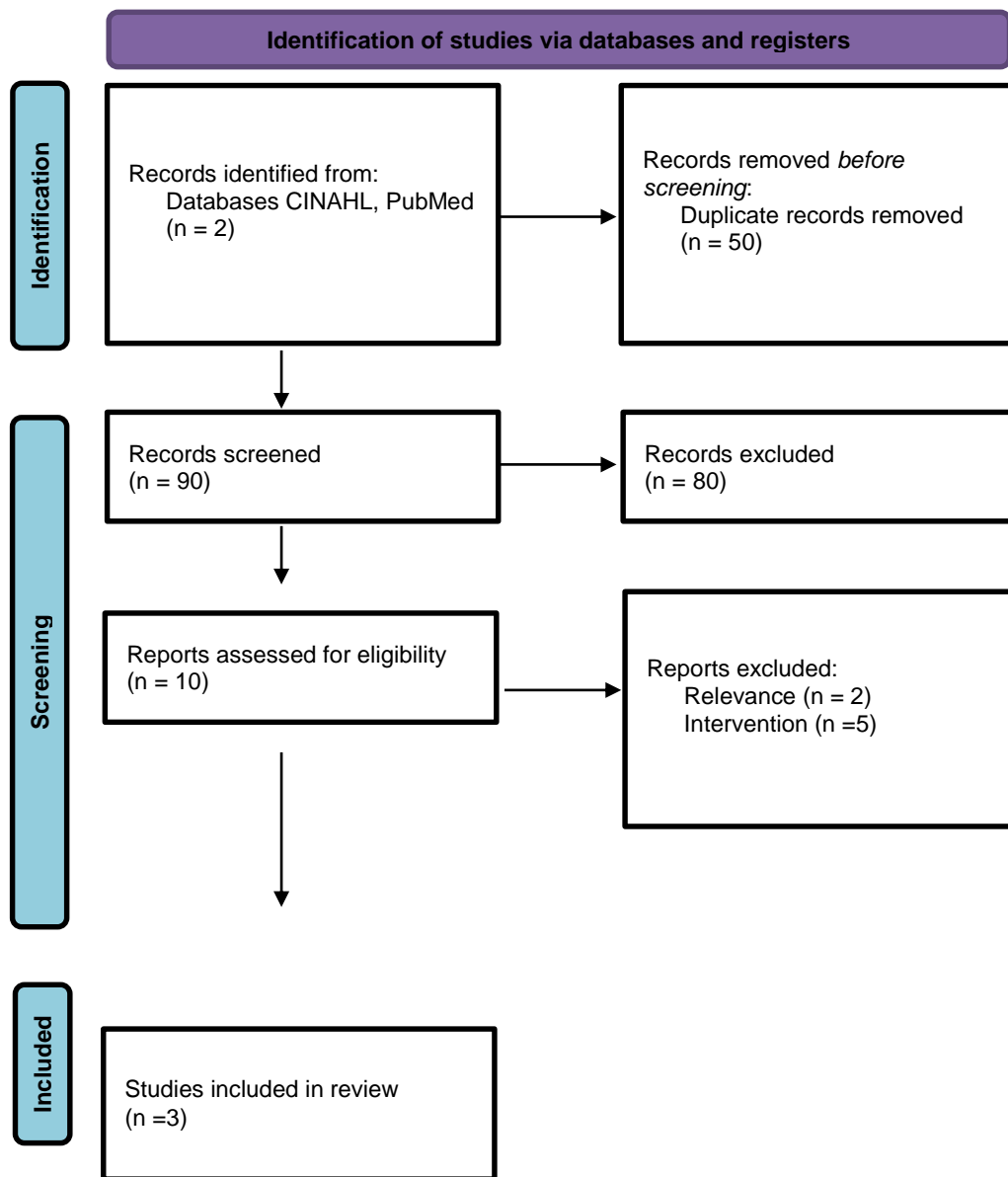
## Appendix B

PRISMA Diagram for “Pregnan\* and self-management\* and educat\*\*” search.





PRISMA Diagram for “educat\* and self-management\* and healthcare utilizat\*\*” search.



## **Appendix C**

### **Literature Table**

| Citation  | Design/Level of Evidence/<br>Purpose  | Sample   | Intervention   | Measurement:<br>Variables and<br>Instruments  | Findings  | Strengths/Limitations/<br>Implications  |
|---|---|--|--|---|---|---|
| <p>Motlagh, A. E., Babazadeh, R., Akhlaghi, F., &amp; Esmaily, H. (2019). Effect of an educational intervention program based on Bandura's self-efficacy theory on self-care, self-efficacy, and blood sugar levels in mothers with pre-diabetes during pregnancy. <i>Evidence Based Care Journal</i>, 9(2), 53–64. <a href="https://doi.org/10.22038/ebcj.2019.37173.1959">https://doi.org/10.22038/ebcj.2019.37173.1959</a></p> | <p>Design: Randomized Control Trial</p> <p>Level of evidence: Level II</p> <p>Purpose: This study aimed at investigating the effect of an educational intervention program based on Bandura's Self-Efficacy Theory (SET) on self-care, self-efficacy, and blood sugar levels in mothers with pre-diabetes during pregnancy.</p> | <p>Sample: 100 pregnant women, 2 randomized groups. All have prediabetes</p> | <p>Intervention group: educational training based on the constructs of Bandura's SET. Control Group was provided standard care</p> | <p>Variables: Age, Sex, Gravida, Para, perceptions of pregnancy, ability to care for self, ability to attend education, educational materials</p> <p>Measurement tools: 5-point-Likert- Type Rating system Questionnaire</p> <p>Mann-Whitney U test</p> | <p>The intervention group obtained higher scores regarding self-care behaviors, and a sense of self-efficacy compared to the control group. Their blood sugars were also significantly lower.</p> | <p>Strengths: No conflicts of interest, RCT</p> <p>Limitations: Small population size, non-generalizable</p> <p>Implications: Education based on Bandura's SET could increase sense of self efficacy and improve self-care behaviors.</p> |

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| <p>Mohebbi, B., Tol, A., Sadeghi, R., Mohtarami, S. F., &amp; Shamshiri, A. (2019). Self-management intervention program based on the health belief model (Hbm) among women with gestational diabetes mellitus: A quazi-experimental study. <i>Archives of Iranian Medicine</i>, 22(4), 168–173.</p> | <p>Design: Quasi-experimental Study</p> <p>Level of evidence: Level III</p> <p>Purpose: determine the effect of theory-based educational intervention program among women with gestational diabetes mellitus</p> | <p>Sample: 110 Women between 17-41 newly diagnosed with gestational diabetes</p> | <p>The self-management education program was presented in four sessions lasting 35-40 minutes for each during a month. The content of educational programs included basic information regarding GDM facts, figures and self-management based on HBM</p> | <p>Variables: Age, Sex, Gravida, Para, perceptions of pregnancy, ability to care for self, ability to attend education, educational materials</p> <p>Instruments/ Measurements: baseline HgbA1C, Scoring of Health behavior model regarding self-management, associated P values.</p> | <p>theory- based educational intervention focusing on diabetes risk in GDM women, improving perceived self-efficacy to adopt healthy behaviors, identifying common barriers to healthy lifestyle behaviors should be provided to both patients</p> | <p>Strengths: Randomized quasi-experimental study, associated significance of data post intervention</p> <p>Limitations: Small sample size, no educational requirements for subjects</p> <p>Implications: Running intervention programs using educational and consulting strategies can lead to better self-management and health improvement</p> |
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| <p>Solhi, M., Abbasi, K., Azar, F. E. F., &amp; Hosseini, A. (2019). Effect of health literacy education on self-care in pregnant women: A randomized controlled clinical trial. <i>International Journal of Community Based Nursing and Midwifery</i>, 7(1), 2–12.</p> | <p>Design: Randomized Controlled Trial</p> <p>Level of Evidence: Level II</p> <p>Purpose: The study aimed to determine the effect of health literacy education on self-care in pregnant women</p> | <p>Sample: A sample size of 300 pregnant women was reduced to 80 total pregnant women. 40 in the control group, and 40 in the intervention group. These were then split between 2 different centers so that individuals could exchange information</p> | <p>Self-care and health literacy questionnaires were filled out. The intervention group followed four sessions of the educational program: covering topics on health literacy and self-care during pregnancy and its impact on self-care in pregnant women. Each session lasted 45 minutes</p> | <p>Variables: Age, Sex, Gravida, Para, perceptions of pregnancy, ability to care for self, ability to attend education, educational materials</p> <p>Instruments/ Measurements: two dedicated questionnaires on self-care (21 questions) and on health literacy (24 questions) Results were based on a 4-point Likert Scale, Kolmogorov-Smirnov testing for distribution Reliability and maintainability analysis</p> | <p>Educational interventions to promote health literacy in pregnant women of Pakdasht was effective in improving their self-care status during pregnancy.</p> | <p>Strengths: RCT, no conflicts of interest, findings of significant change with intervention group</p> <p>Limitations: small sample size, non-generalizable, self-reporting of participants</p> <p>Implications: It is recommended that intervention for the promotion of physical and mental self-care during pregnancy should emphasize on increasing women's health literacy in the areas of computational comprehension, reading comprehension, and behavior.</p> |
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| <p>Sushko, K., Menezes, H. T., Strachan, P., Butt, M., &amp; Sherifali, D. (2021). Self-management education among women with pre-existing diabetes in pregnancy: A scoping review. <i>International Journal of Nursing Studies</i>, 117, 103883. <a href="https://doi.org/10.1016/j.ijnurstu.2021.103883">https://doi.org/10.1016/j.ijnurstu.2021.103883</a></p> | <p><b>Design:</b><br/>Scoping review/ meta-analysis</p> <p><b>Level of Evidence:</b><br/>Level I</p> <p><b>Purpose:</b><br/>synthesize the evidence regarding prenatal diabetes education and support for women with type 1 and type 2 diabetes</p> | <p><b>Sample:</b><br/>511 identified citations, 30 studies were included in the final review. Approximately 44% of the pooled sample were women with type 1 diabetes, 46% had gestational diabetes mellitus, and 10% had type 2 diabetes</p> | <p><b>Interventions:</b><br/>Identification of key characteristics of prenatal education and support interventions for women with type 1 and type 2 diabetes, finding that multidisciplinary healthcare teams provide frequent outpatient self-management education, supplemented with self-management support</p> | <p><b>Variables:</b><br/>Age, Sex, Gravida, Para, perceptions of pregnancy, ability to care for self, ability to attend education, educational materials, methods of the studies, availability of research</p> <p><b>Instruments/ Measurements:</b><br/>Searches utilizing EMBASE, Cinahl, and Medline, Medical Research Council Framework evaluation of randomization,</p> | <p><b>Findings:</b> This review found that prenatal education for women with type 1 and type 2 diabetes consists of frequent outpatient sessions focused on diabetes self-management, is provided by multidisciplinary healthcare teams, and is supplemented with self-management support. However, these studies were limited in methods and there was a lack of research focused on type 2 diabetes.</p> | <p><b>Strengths:</b> Large scoping review of evidence, review of evidence over last 4 years. No external funding or competing interests.</p> <p><b>Limitations:</b> Lack of methods and adequate articles found, lack of research for type 2 diabetes</p> <p><b>Implications:</b> Lack of sources within the last 4 years for educational based interventions for the management of gestational diabetes</p> |
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| <p>Yildirim, M., Griffin, P., Keskinocak, P., O'Connor, J. C., &amp; Swann, J. L. (2021). Estimating the impact of self-management education, influenza vaccines, nebulizers, and spacers on health utilization and expenditures for Medicaid-enrolled children with asthma. <i>Journal of Asthma</i>, 58(12), 1637–1647. <a href="https://doi.org/10.1080/02770903.2020.1821056">https://doi.org/10.1080/02770903.2020.1821056</a></p> | <p><b>Design:</b> Systematic Review</p> <p><b>Level of Evidence:</b> Level V</p> <p><b>Purpose:</b> Quantification of the effect of a set of interventions including asthma self-management education, influenza vaccination, spacers, and nebulizers on healthcare utilization and expenditures for Medicaid-enrolled children with asthma in New York and Michigan.</p> | <p><b>Sample:</b> Children aged 0-17 with asthma from New York and Michigan enrolled in the Medicaid Program.</p> | <p><b>Interventions:</b> Asthma self-management education (AS-Me), focused on influenza vaccinations, nebulizer and spacer education, National Asthma Education and Prevention Program (NAEPP)</p> | <p><b>Variables:</b> ED (Emergency Department) utilization indicator, IP (International Program) utilization indicator, utilization expenditures, and asthma medication expenditures per person per year.</p> <p><b>Instruments/Measurements:</b> Difference-in-difference (DiD) regression model</p> | <p><b>Findings:</b> All the interventions reduced both utilization and asthma medication costs. Asthma self-management education, nebulizer, and spacer interventions reduced the probability of emergency department (20.8–1.5%, 95%CI 19.7–21.9% vs. 0.5–2.5%, respectively) and inpatient (3.5–0.8%, 95%CI 2.1–4.9% vs. 0.4–1.2%, respectively) utilizations</p> | <p><b>Strengths:</b> Large descriptive study, all interventions decreased expenditures</p> <p><b>Limitations:</b> latest available data was from 2010 and 2011, many unobservable factors affecting interventions,</p> <p><b>Implications:</b> This analysis provides evidence to policymakers about the benefits of the interventions of influenza vaccines, spacers, AS-ME, and nebulizers on health outcomes of pediatric asthma patients.</p> |
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| <p>Claassen, A. A. O. M., Schers, H. J., Koëter, S., Van Der Laan, W. H., Kremers-Van De Hei, K. C. A. L. C., Botman, J., Busch, V. J. J. F., Rijnen, W. H. C., &amp; Van Den Ende, C. H. M. (2018). Preliminary effects of a regional approached multidisciplinary educational program on healthcare utilization in patients with hip or knee osteoarthritis: An observational study. <i>BMC Family Practice</i>, 19(1), 1–9. <a href="https://doi.org/10.1186/s12875-018-0769-7">https://doi.org/10.1186/s12875-018-0769-7</a></p> | <p><b>Design:</b><br/>Observational Study</p> <p><b>Level of evidence:</b><br/>Level III</p> <p><b>Purpose:</b> The objective of the present study was to determine preliminary effects of this OA educational program on healthcare utilization (HCU) and clinical outcomes.</p> | <p><b>Sample:</b> 3 districts in the Nijmegen area of the Netherlands, 18 years or older and had a clinical diagnosis of OA in the knee or hip (diagnosed by a general practitioner (GP) or medical specialist), 146 total patients</p> | <p><b>Interventions:</b><br/>The organized knee and hip OA educational program consisted of two 1.5-h meetings. The program was led by a physiotherapist and a GP,</p> | <p><b>Variables:</b><br/>Age, sex, perceptions of illness</p> <p><b>Instruments/Measurements:</b><br/>Western Ontario University Index of osteoarthritis (WOMAC), Brief illness perception questionnaire (IPQ), Patient Activation Measure (PAM-13), Short Questionnaire to Assess physical activity (SQUASH)</p> | <p><b>Findings:</b> short-term preliminary effects of a multidisciplinary educational program may result in decreased HCU. However, a controlled trial with long-term follow-up is needed to further explore effects on HCU behavior in patients with hip or knee OA.</p> | <p><b>Strengths:</b> no competing interests, evaluation of a multidisciplinary approach</p> <p><b>Limitations:</b> Uncontrolled design, small sample size</p> <p><b>Implications:</b> Results show that a multidisciplinary educational program may result in a decrease in healthcare utilization and has a positive effect on illness perceptions and knowledge on OA due to clear and consistent information on OA and its treatment options</p> |
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| <p>Burton, J., Eggleston, B., Brenner, J., Truchil, A., Zulkiewicz, B. A., &amp; Lewis, M. A. (2017). Community-Based Health Education Programs Designed to Improve Clinical Measures Are Unlikely to Reduce Short-Term Costs or Utilization Without Additional Features Targeting These Outcomes. <i>Population Health Management</i>, 20(2), 93–98. <a href="https://doi.org/10.1089/pop.2015.0185">https://doi.org/10.1089/pop.2015.0185</a></p> | <p><b>Design:</b><br/>Utilization analysis</p> <p><b>Level of Evidence:</b> III</p> <p><b>Purpose:</b> The purpose of this study is to test whether the strategies implemented in Camden through the Coalition's Diabetes Self-Management Education (DSME) program reduced hospital utilization and costs.</p> | <p><b>Sample:</b><br/>Participation and demographic information for approximately 125 participants as well as clinical measures for a subset of those participants. Camden New Jersey</p> | <p><b>Interventions:</b><br/>Attendance to the coalitions Diabetes Self-management Education Program (DSME), 8 class diabetes and education and nutrition curriculum 50 minutes each.</p> | <p><b>Variables:</b><br/>Socioeconomic status, race, clinical variables, progression of disease, genetics, adherence to medical regimen</p> <p><b>Instruments/Measurements:</b><br/>Multivariate regression models with generalized estimating equations (GEEs), logistic gamma hurdle models</p> | <p><b>Findings:</b> no bend in the cost curve for those participating in the DSME programs as had been previously found for some care management interventions for high health care utilizers.<sup>9</sup> DSME deployed at the community level.</p> | <p><b>Strengths:</b> Did show a decrease in A1c by almost one full point in participants of the program</p> <p><b>Limitations:</b> Many medical needs not associated with diabetes may lead to hospital stays and ER visits. Those were not taken into accordance. Small time frame with a limited number of participants. Only 48 people completed the education program.</p> <p><b>Implications:</b> Although there wasn't a decrease in utilization costs there were benefits for the patient</p> |
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| <p>Hosseini, H., Pai, D., &amp; Ofak, D. (2019). COPD: Does inpatient education impact hospital costs and length of stay? <i>Hospital Topics</i> 97 (4), 165-175. <a href="https://doi.org/10.1080/00185868.2019.1677540">https://doi.org/10.1080/00185868.2019.1677540</a></p> | <p><b>Design:</b> Retrospective observational study with matched case control.</p> <p><b>Level of Evidence:</b> VI</p> <p><b>Purpose:</b> To assess the effectiveness of COPD inpatient education using respiratory therapy staff in an academic health system.</p> | <p><b>Sample:</b> Retrospective administrative &amp; medical record data from 84 patients admitted with COPD as a diagnosis admitted between 2016-2017.</p> | <p><b>Interventions:</b> Self-management interventions provided to patients at the bedside by trained RT's during admission to acute care, progressive &amp; intermediate care units.</p> <p>Effectiveness of inpatient education was compared before and after the interventions. Hospital LOS and hospitalization costs are primary outcomes.</p> | <p><b>Variables:</b> Age, gender, marital status, number of visits, smoking status, and length of stay (LOS).</p> <p><b>Instruments/Measurements:</b> Statistical analysis with IBM SPSS Statistics 25. <i>Post hoc</i> regression analyses</p> | <p><b>Findings:</b> Statistical analyses revealed that COPD education received during inpatient stay appears to reduce hospitalization costs and length of stay. <i>Post hoc</i> regression analyses reveal that age, gender, marital status was significantly associated with LOS. Whereas smoking, LOS, and number of visits were significantly associated with hospitalization costs.</p> | <p><b>Strengths:</b> Consistent, guideline directed patient education provided to inpatients in all areas of care. Retrospective, observational data obtained through medical records provides unbiased information/results. Results are inclusive of any disease severity. Few studies examine actual hospital cost and LOS based on response to COPD inpatient education.</p> <p><b>Limitations:</b> Small sample size of 84 at an academic hospital. Length of study was only 7 months to account for lag in administrative billing.</p> |
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|  |  |  |  |  |  | <p>Lack of diversity among sample population. Confounders such as health literacy, socio-economic status, coping techniques, physical limitations, and depression.</p> <p>Implications: COPD patient education may be an effective strategy at reducing hospital costs and healthcare utilization. Empowering patients to take responsibility for their health outcomes by improving self-efficacy has proven valuable.</p> |
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| <p>Strawbridge, L., Lloyd, J., Meadow, A., Riley, G., Howell, B. (2017). One-year outcomes of diabetes self-management training among Medicare beneficiaries newly diagnosed with diabetes. <i>Medical Care</i>. 55(4). 391-396. Wolters Kluwer Health, Inc.</p> | <p>Design: Claims-based observational study with 1-year follow-up beginning 6 months after diagnosed with diabetes</p> <p>Level of Evidence: III</p> <p>Purpose: Short-term benefits of diabetes self-management training (DSMT) are established; however, longer-term impacts among Medicare beneficiaries are not known.</p> | <p>Sample: Twenty percent random sample of Medicare beneficiaries newly diagnosed with diabetes during 2009-2011 who used DSMT (N=14,680) matched to a nonuser comparison group.</p> | <p>Interventions: Diabetes Self-Management Training (DSMT)</p> | <p>Variables: Pretreatment value of the outcome. Medicare FFS population. Glycemic control, weight, medication use, and cardiovascular risk factors.</p> <p>Instruments/Measurements: health service utilization and costs between DSMT users and non-users were compared. Health service utilization included any utilization of the hospital or emergency department and any hospitalization</p> | <p>Findings: Multivariate regression results found that DSMT users had 14% reduced odds of hospitalization, lower numbers of hospital admissions, and ED visits (3 fewer per 100 for each), and \$830 lower Medicare expenditures (CI 95%, -\$1195, -\$470) compared to non-users. The odds of any hospitalization due to diabetes-related ambulatory care sensitive conditions and any ED visit were lower for DSMT users compared with nonusers, but the reductions were</p> | <p>Strengths: Results support literature showing the health benefits of diabetes self-management programs. Aligns with other studies that find lower health care utilization and costs among individuals using preventive services and those who adhere to disease management strategies. DSMT findings are important given predicted increases in diabetes and Medicare beneficiaries.</p> <p>Limitations: Observational design. Although confounders were controlled through</p> |
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|  |  |  |  | <p>s due to diabetes-related ambulatory care sensitive conditions as well as the number of hospitalizations and ED visits with the follow-up year. Costs included Medicare A &amp; B expenditures.</p> | <p>not statistically significant.</p> | <p>a doubly robust methodology, there may be unobservable characteristics that differ between the groups.</p> <p>Implications:<br/>Study results show a beneficial impact of DSMT on health care utilization and cost outcomes in the year following the intervention. Beneficiaries who used any DSMT services had significantly lower odds of any hospitalization, fewer admissions and ED visits, and lower Medicare expenditures in the follow-up year than nonusers. These findings highlight opportunities to reduce the burden</p> |
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|  |  |  |  |  |  | of diabetes on both Medicare beneficiaries and the health care system. |
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## **Appendix D**

### **Pamphlet**

# What to Expect During Pregnancy





## Promoting Healthy Babies

Eating a well-balanced diet and making healthy lifestyle choices play a key role in the growth and development of your baby. See the recommendations below for ways to improve your health and the health of your growing baby.

**Folic Acid:** Folic acid is a vitamin B that can help prevent major birth defects. Take a vitamin with at least 400 micrograms (mcg) of folic acid every day, during pregnancy. You should be able to buy this from any pharmacy or stores like Wal-Mart, Meijer, or Walgreens.

**Prenatal Vitamins:** Prenatal vitamins provide your growing baby with nutrients that support healthy development, and are available in pill, gummy, and smoothie form. These can be taken with food or at bedtime to minimize nausea or GI upset. These are also available over the counter and should be taken daily.

**Smoking:** The best time to quit smoking is before you get pregnant but quitting at any time during pregnancy can help your baby get a better start on life. Learn more about the dangers of smoking and find help to quit.

**Alcohol:** A baby can be exposed to the same level of alcohol as the mother during pregnancy. There is no known safe amount of alcohol used during pregnancy.

**Marijuana Use:** Marijuana use during pregnancy can be harmful to your baby's health. The chemicals in marijuana (in particular, tetrahydrocannabinol or THC) pass through your system to your baby and can harm your baby's development.

**Vaccinations:** Did you know a baby gets disease immunity (protection) from mom during pregnancy? This immunity can protect a baby from some diseases during the first few months of life, but immunity decreases over time.

## Key Vitamins and Minerals During Pregnancy

| Nutrients (Daily Recommended Amount)   | Why You and Your Fetus Need It  | Best Sources  |
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| Calcium (1,300 milligrams for ages 14 to 18; 1,000 milligrams for ages 19 to 50) | Builds strong bones and teeth   | Milk, cheese, yogurt, sardines, dark green leafy vegetables                             |
| Iron (27 milligrams)   | Helps red blood cells deliver oxygen to your fetus                              | Lean red meat, poultry, fish, dried beans and peas, iron-fortified cereals, prune juice |
| Iodine (220 micrograms)  | Essential for healthy brain development   | Iodized table salt, dairy products, seafood, meat, some breads, eggs                    |
| Choline (450 milligrams)   | Important for development of your fetus's brain and spinal cord                 | Milk, beef liver, eggs, peanuts, soy products   |
| Vitamin A (750 micrograms for ages 14 to 18; 770 micrograms for ages 19 to 50)   | Forms healthy skin and eyesight<br>Helps with bone growth                       | Carrots, green leafy vegetables, sweet potatoes   |
| Vitamin D (600 international units)  | Builds your fetus's bones and teeth.<br>Helps promote healthy eyesight and skin | Sunlight, fortified milk, fatty fish such as salmon and sardines                        |

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| Vitamin B6 (1.9 milligrams)  | Helps form red blood cells.<br>Helps the body use protein, fat, and carbohydrates  | Beef, liver, pork, ham, whole-grain cereals, bananas  |
| Vitamin B12 (2.6 micrograms) | Maintains nervous system.<br>Helps form red blood cells  | Meat, fish, poultry, milk (vegetarians should take a supplement)  |
| Folic acid (600 micrograms)  | Helps prevent birth defects of the brain and spine.<br>Supports the general growth and development of the fetus and placenta | Fortified cereal, enriched bread and pasta, peanuts, dark green leafy vegetables, orange juice, beans. Also, take a daily prenatal vitamin with 400 micrograms of folic acid. |

Prenatal Vitamins. (ACOG, 2022).

## How much should I eat during pregnancy?

If you are pregnant with one fetus, you need an extra 340 calories per day starting in the second trimester (and a bit more in the third trimester).

That is approximately the calorie count of a glass of skim milk and half a sandwich. Women carrying twins should consume about 600 extra calories a day, and women carrying triplets should take in 900 extra calories a day (ACOG, 2022).

## Weight Gain During Pregnancy

| <b>Body Mass Index (BMI)<br/>Before Pregnancy</b> | <b>Rate of Weight Gain in<br/>the Second and Third<br/>Trimesters* (Pounds<br/>Per Week)</b> | <b>Recommended Total<br/>Weight Gain with a<br/>Single Fetus (in<br/>Pounds)</b> | <b>Recommended Total<br/>Weight Gain with Twins<br/>(in Pounds)</b> |
|---|--|--|---|
| Less than 18.5<br>(underweight)                   | 1.0 to 1.3   | 28 to 40   | Not known   |
| 18.5 to 24.9 (normal<br>weight)                   | 0.8 to 1.0   | 25 to 35   | 37 to 54  |
| 25.0 to 29.9 (overweight)                         | 0.5 to 0.7   | 15 to 25   | 31 to 50  |
| 30.0 and above (obese)                            | 0.4 to 0.6   | 11 to 20   | 25 to 42  |

Weight gain chart. (ACOG, 2022).

## Ways to Manage Common Issues During Pregnancy

The body undergoes many changes during pregnancy and these changes may result in some uncomfortable symptoms. Most of these discomforts will resolve once the baby is delivered. Below is a list of commonly occurring symptoms of pregnancy.

**Swollen Feet/ Ankles:** Elevate your feet frequently, exercise, wear loose clothing and shoes, wear compression stockings, drink plenty of water and avoid salt.

**Leg Cramps:** Increase Calcium in your diet (foods high in calcium- milk, yogurt, cheese, green leafy vegetables), elevate legs, stretch frequently, use heat or massage, make sure you have been taking in enough salt.

**Hemorrhoids:** Elevate feet and pelvis when having a bowel movement, drink plenty of fluids, eat plenty of whole grains, fruits, and vegetables, apply cold compresses with witch hazel.

**Backache:** Pregnancy hormones cause joints to stretch. Try standing tall to improve your posture, rest with weight off your back, wear supportive shoes, sleep on a firm mattress, exercise, stretch, and avoid standing or sitting for extended periods of time. Use ice or moist heat to painful areas or soak in a warm bath. Sleep on your side with back supported and pillow between knees to support hips.

**Shortness of Breath:** Because of increased blood volume and the increasing size of your fetus, it is not unusual to experience shortness of breath, especially with exertion. Use good Posture, sit upright with your chest pointed up, take frequent rest breaks.

## Ways to Manage Common Issues During Pregnancy

**Heartburn:** Eat small frequent meals instead of 3 large meals, sit up straight after meals, sleep with upper body propped up, sip milk or hot tea. Avoid acidic and spicy foods.

**Varicose Veins:** Twisted or enlarged veins. Elevate legs when laying or sitting, use support stockings, and walk daily. Try to avoid crossing your legs.

**Constipation:** Eat more green leafy vegetables and whole grains, increase water intake, walk daily, eat prunes, and fiber (including supplements like Metamucil) raise feet on a stool when having a bowel movement.

**Nausea/ Morning Sickness:** Increase intake of Vitamin B6, eat small frequent meals every 2-3 hours, drink lesser amounts of fluid often throughout the day, try bland foods like dry toast or crackers, potatoes, and noodles. Avoid greasy, fried, spicy, or hot foods. Ginger root tea, ginger gum, ginger ale, and capsules can help minimize nausea. Acupressure bands to pressure points on the wrists may also help. If your nausea and vomiting continue after trying lifestyle changes and OTC meds, you may need a prescription. *Contact your provider during business hours to develop a plan.*

**Insomnia (Inability to sleep):** Take a hot bath, set a bedtime routine, avoid TV or cellphones while in bed, try herbal teas like chamomile, avoid caffeinated beverages especially towards bedtime.

## Ways to Manage Common Issues During Pregnancy

**Mild Headaches:** Use neck roll exercises, relaxation techniques, soothing herbal teas, alternate hot and cold showers, neck massage, and Tylenol. Make sure you are drinking at least 6-8 large glasses of water daily. Magnesium is an element that can help prevent headaches, leg cramps, promotes sleep, and can calm nausea and morning sickness. Talk to your provider about magnesium supplementation as every pregnancy is different.

**Bladder infection:** Drink lots of water and increase acidic foods and beverages like cranberry juice, increase vitamin C, pay strict attention to hygiene, wear cotton underwear, urinate after intercourse, and do not hold your bladder.

**Yeast Infections:** An itchy, clumpy white vaginal discharge that can be prevented by using plain yogurt or acidophilus capsules in the vagina. Wear cotton or breathable underwear. Avoid tight clothing, highly fragranced soaps, or cleansers.

**Round Ligament Pain:** A sharp or jabbing pain on one or both sides of the abdomen, usually during the 2<sup>nd</sup> trimester. You can wear elastic belly bands, do prenatal yoga, or rest frequently to alleviate symptoms.

**Intercourse:** You can have sex while you are pregnant, however, make sure that your vagina is well lubricated (you might need to try a water-based product), and you may need to try various positions (side-lying, on top, standing, or on your hands/knees) to be comfortable. Talk to your partner about what feels good and what does not. Avoid sex if you are leaking amniotic fluid, bleeding heavier than spotting, in pre-term labor, or have been diagnosed with placenta previa. Oral sex is okay if there are no active herpes lesions.

## Recommended Online Resources

<http://www.kellymom.com>

<http://www.cdc.gov/pregnancy.html>

<https://evidencebasedbirth.com>

<https://www.lli.org>

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<https://www.acog.org/womens-health/pregnancy/during-pregnancy>

## When to contact your provider

Below are some of the more serious conditions that pregnant individuals may experience. Should these symptoms go untreated, you and your unborn child are at risk. It is important to be open and honest with your provider to ensure the best outcome for you and your baby.

Absence of Fetal movement- Babies begin moving usually between 16 and 24 weeks. If at 24 weeks, you haven't felt the baby move, *notify the provider*. If the baby has been moving but doesn't seem to be moving as much over a 24-hour period. *Notify the provider*.

Nausea/ Vomiting that will not go away or you can't keep food or fluids down over a 24-hour period.



## When to contact your provider

Vaginal bleeding or drainage (not mucous).

Severe, continuous headache that won't go away with rest, herbal teas, or medications.

Painful urination- Burning, stinging, difficult to start and stop peeing. Pain in the lower back area.

Severe stomach pain- May feel like stabbing or shooting pains that do not go away with rest.

You do not gain weight or have weight loss in between visits.

Fever higher than 100.1 and unrelieved with Tylenol or tepid baths.

New onset of blurred or double vision.

Fainting spells or dizziness.

You do not urinate as often as usual, and your urine is dark.

Swollen face or hands that won't go away.

Feelings of depression or hopelessness, thoughts of self-harm.

## Be engaged during appointments

It is important that you take an active role during your appointments. You should try and take notes on things that are discussed with your provider during your appointments. You should also try and produce several questions prior to each appointment to ask during your appointment and write them down in the sections provided. At the appointment write down the answers to your questions. This will help you learn more about your pregnancy while also getting some of your concerns answered while meeting with the provider. Some frequent questions asked may include: Can I exercise while I am pregnant? What foods should I avoid while pregnant? What pregnancy books would you suggest I read? It is encouraged that you produce some of your own as well!

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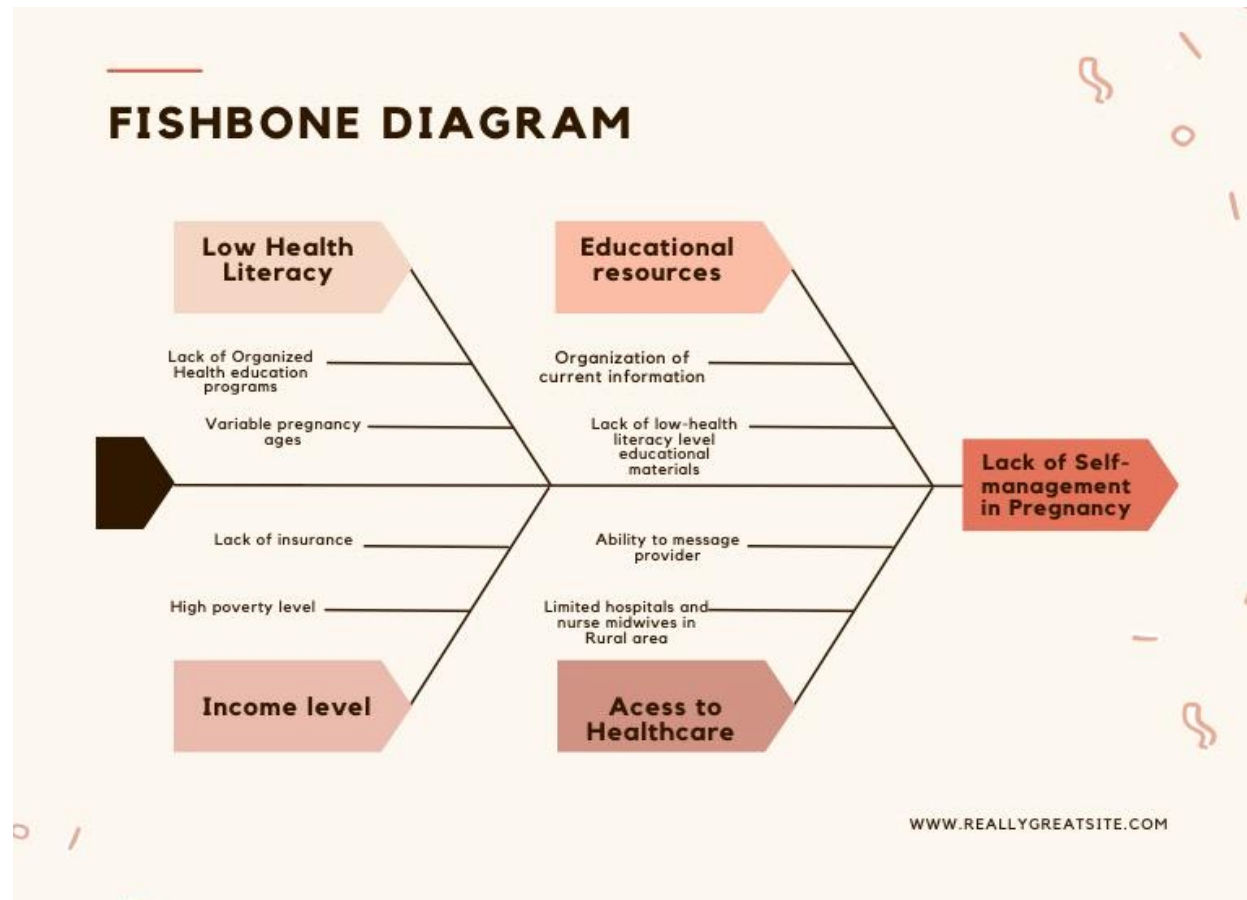
## Organization of Correspondence

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## Appendix F

### Ishikawa Fishbone Diagram



## Timeline

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