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Evaluation of an Educational Intervention to Inform and Empower Expectant Mothers

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Evaluation of an Educational Intervention to Inform and Empower Expectant Mothers

Abstract

Objective: To increase participant knowledge regarding avoidable cesarean sections (CS), and confidence to self-advocate and initiate conversation with their health care team regarding their birth plans, with a long-term goal of decreasing avoidable CS.

Design: Quality improvement initiative.

Setting/Local Problem: Obstetrics and gynecology clinic for low-income, underserved patients affiliated with an urban teaching hospital in Philadelphia, Pennsylvania.

Participants: Low-risk expectant mothers without prior cesarean sections.

Intervention/Measurements: Based on available literature, our educational intervention for the project included a brief video and modified pamphlet with information directly from the My Birth Matters free consumer toolkit. The intervention process consisted of a pre-intervention survey, video and modified pamphlet intervention, and post-intervention survey.

Results: Following implementation of the educational intervention, post-intervention survey results demonstrated statistically significant increases for both knowledge ($t=5.165$, $p<0.001$) and confidence ($t=2.563$, $p=0.017$) scores, and 93% of participants reported hearing new information.

Conclusion: This quality improvement initiative was successful in educating participants regarding CS and increasing confidence to self-advocate. Due to the ease of implementation and potential magnitude of impact, low-risk pregnant women would benefit from receiving this valuable information about CS. Due to the COVID-19 pandemic, this also provides clinics an opportunity to continue patient education, whether in-person education is feasible or not. If long-term outcomes indicate reduction of avoidable CS, this brief educational intervention will serve as a simple, easy tool to implement in a variety of patient populations to address the rising rates of CS in the United States.

Keywords

cesarean delivery, cesarean section, avoidable c-section, patient education, education intervention, low-risk mothers, childbirth plans, c-section knowledge, childbirth confidence, conversation with providers

Disciplines

Community Health and Preventive Medicine | Maternal and Child Health | Maternal, Child Health and Neonatal Nursing | Nursing | Nursing Midwifery | Public Health and Community Nursing | Public Health Education and Promotion | Women's Health

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Evaluation of an Educational Intervention to Inform and Empower Expectant Mothers

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University of Pennsylvania

Submitted in partial fulfillment of the requirements for the
Doctor of Nursing Practice Degree

24 **Abstract**

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26 confidence to self-advocate and initiate conversation with their health care team regarding their
27 birth plans, with a long-term goal of decreasing avoidable CS.

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37 results demonstrated statistically significant increases for both knowledge ($t=5.165$, $p<0.001$)
38 and confidence ($t=2.563$, $p=0.017$) scores, and 93% of participants reported hearing new
39 information.

40 **Conclusion:** This quality improvement initiative was successful in educating participants
41 regarding CS and increasing confidence to self-advocate. Due to the ease of implementation and
42 potential magnitude of impact, low-risk pregnant women would benefit from receiving this
43 valuable information about CS. Due to the COVID-19 pandemic, this also provides clinics an
44 opportunity to continue patient education, whether in-person education is feasible or not. If long-
45 term outcomes indicate reduction of avoidable CS, this brief educational intervention will serve

46 as a simple, easy tool to implement in a variety of patient populations to address the rising rates
47 of CS in the United States.

48 **Word Count:** 242

49 *Keywords:* Cesarean delivery, cesarean section, avoidable c-section, patient education,
50 education intervention, low-risk mothers, childbirth plans, c-section knowledge,
51 childbirth confidence, conversation with providers

52 **Précis**

53 After an educational intervention at a low-income women's health clinic, low-risk expectant
54 mothers demonstrated increased knowledge and confidence regarding cesarean sections and their
55 birth plans.

56 **Callouts**

- 57 1. Due to the increased rate of C-sections, educating expectant mothers and encouraging
58 shared decision-making are priorities to reduce avoidable C-sections.
- 59 2. This quality improvement initiative was successful in educating participants regarding
60 avoidable C-sections and increasing confidence to self-advocate and initiate
61 conversations with their healthcare team.
- 62 3. Due to the ease of implementation and potential magnitude of impact, low-risk pregnant
63 women would benefit from receiving this patient education about C-sections.

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69 **Evaluation of an Educational Intervention to Inform and Empower Expectant Mothers**

70 **Background and Significance**

71

72 The rising rate of cesarean sections (CS) represents a growing concern in both developing
73 and developed nations. Although CS can be valuable and lifesaving when medically necessary,
74 they are also surgical procedures associated with short and long term risks for mothers and
75 infants. In 2017, the Centers for Disease Control and Prevention (CDC) reported that one in
76 every three registered births in the United States (U.S.) were performed through CS. Between
77 1996 and 2009, the global CS rate increased by 60% without evidence of improved maternal and
78 fetal outcomes (Center for Disease Control and Prevention, 2019). The CDC and World Health
79 Organization (WHO) recently expressed concerns regarding these alarming figures. The WHO
80 considers the ideal CS rate 10-15%, stating rates “greater than 10% do not associate with
81 reduction in maternal and newborn mortality rates” (World Health Organization [WHO], 2018).
82 When compared to the U.S., other developed countries such as Norway, Finland, and Sweden
83 have average CS rates of approximately 16%, considerably more consistent with the standard set
84 by the WHO (WHO, 2018).

85 Cesarean delivery is considered the most common abdominal surgery in the world (Peahl
86 et al., 2019). With its significant increase in use, CS can pose associated risks for both mother
87 and baby. These risks include higher rates of maternal complications, longer recovery times,
88 higher neonatal intensive care unit admission rates, and impaired breastfeeding relationships
89 between mother and baby (Smith et al., 2016). According to the American College of Obstetrics
90 and Gynecologists (2018), maternal complications associated with CS include hemorrhage,
91 infection, repeat CS in subsequent pregnancies, formation of adhesions, placenta accreta or
92 previa, and hysterectomy. In addition, compared to vaginal delivery, infants born via CS have

93 higher risks of respiratory complications at birth and higher rates of asthma and allergies due to
94 lack of maternal antibody exposure from the vaginal canal (American College of Obstetrics and
95 Gynecologist Committee, 2018).

96 Considering nearly one third of U.S. childbirths are CS, along with the associated risks
97 for mothers and infants, the implementation of methods to help reduce CS rates is more
98 important than ever. The Joint Commission of the U.S. plans to begin public reporting of
99 hospitals with CS rates greater than 30% to help promote performance improvement (The Joint
100 Commission on Accreditation of Healthcare Organizations, 2019). In addition, a national
101 initiative set by the federal government in Healthy People 2020 aims to reduce first-time, low-
102 risk CS rates to 23.9% by 2020 (Office of Disease Prevention and Health Promotion, 2019).
103 CDC data from 2019 showed that 31.7% of all births, and 25.6% of NTSV (nulliparous, term,
104 singleton, vertex: “low-risk”), in the United States were CS (2020). In response to the Healthy
105 People 2020 objectives, the California Health Care Foundation (CHCF), California Maternal
106 Quality Care Collaborative (CMQCC), and Consumer Reports developed the [“My Birth Matters”](#)
107 [campaign](#). According to the campaign, women are encouraged to actively participate in their
108 birth plans while gaining awareness of CS overuse and strategies to promote vaginal birth (My
109 Birth Matters, 2018). The campaign’s non-clinical interventions showed an overall increase in
110 participant confidence, motivation, and self-advocacy about vaginal birth decisions and initiating
111 conversations about CS with their healthcare providers (My Birth Matters, 2018).

112 Although the reasons for increased CS rates are multifactorial, healthcare providers
113 strongly influence the ability of mothers to make informed decisions about their childbirths. An
114 urban teaching hospital in Philadelphia, Pennsylvania recorded over 5,000 births in 2017. Of
115 those 5,000 births, 32% were CS and 3% were repeat CS. Due to the high volume of deliveries at

116 this hospital, educating expectant mothers and encouraging informed, shared decision-making
117 between mothers and the health care team is a priority. Reducing CS in low-risk mothers requires
118 a multifaceted approach from multiple stakeholders including the patient. [Callout #1]

119 A literature review was performed across four domains: PubMed, the Cumulative Index
120 to Nursing and Allied Health Literature (CINAHL), Scopus, and Embase. The review began with
121 a broad assessment of the literature to gather available knowledge regarding the rising rates of
122 CS and how to effectively reduce these rates. Various studies claim that the cause of increased
123 CS rates is multifactorial and are potentially contributed to personal preference, fear of pain, and
124 cultural influences (Kingdon et al., 2018). This was followed by a review of the current evidence
125 regarding methods to decrease the rate of CS while maintaining attainable expectations in the
126 clinical setting. The final focused review was to identify the evidence to support the need for
127 additional patient education regarding avoidable CS.

128 Research suggests the best method for patient involvement is through education
129 (Kingdon et al., 2018). As supported in literature, providers can positively influence the
130 education mothers receive in order to increase knowledge about CS and encourage informed
131 decision making about their care and birth plans. Informing patients of the risks and benefits of
132 both CS and vaginal birth ensures patient confidence and involvement in birth plan development.
133 A Cochrane review determined that patient decision aids lead to increased patient participation
134 and informed decisions, development of realistic expectations, and decreased conflict
135 surrounding childbirth decision making (Kingdon et al., 2018). Similarly, the use of decision
136 aids, supported by a randomized controlled trial performed by Montgomery et al. in 2007,
137 resulted in a higher number of women choosing to have a vaginal birth (Emmett et al., 2011).

138 This reinforces the importance of education and shared decision-making with expectant mothers
139 during the childbirth planning process.

140 Prompted by the international rise in cesarean delivery rates, more healthcare facilities
141 are implementing measures to decrease CS rates and facilitate positive patient outcomes through
142 evidence-based approaches. In alignment with goals proposed by Healthy People 2020 and the
143 U.S. Joint Commission to reduce CS rates, the primary objective of this quality improvement
144 project is to assess the effectiveness of an educational intervention on low-risk pregnant
145 women's knowledge regarding CS, and confidence to self-advocate and initiate conversation
146 with healthcare providers regarding their childbirth plans.

147 **Theoretical Framework**

148 **Johns Hopkins Nursing Evidence-based Practice Model**

149 The Johns Hopkins Nursing Evidence-based Practice Model (JHNEBP) utilizes a three-
150 step approach to guide evidence-based research into direct clinical practice. Their model is
151 referred to as PET: Practice Question, Evidence, and Translation (Dang & Dearholt, 2017). It is
152 described as identifying a problem, searching for the most recent evidence, and applying the
153 evidence into clinical practice. The goal of the JHNEBP model is to ensure the latest research
154 and best practices are translated into patient care (Dang & Dearholt, 2017).

155 Implementation of the JHNEBP model assists with application of the most current
156 evidence-based research into clinical practice for improvement in patient outcomes. The model
157 supports evaluation of this quality improvement DNP project by identification of the growing
158 issue of global CS rates, presentation of an evidenced-based educational intervention in a
159 women's health clinic –affiliated with an urban teaching hospital that delivers most of the city's

160 births, and assessment of the intervention's effect on CS knowledge and confidence for self-
161 advocacy related to childbirth.

162 **Plan Do Study Act**

163 In addition to the JHNEBP Model, aspects of Plan Do Study Act (PDSA) methodology
164 for Quality Improvement were utilized for this quality improvement initiative. The Institute of
165 Healthcare Improvement's Model for Improvement with PDSA is concise, generalizable, and
166 complementary to JHNEBP. PDSA supports change and the promotion of high-quality patient
167 care through attainable process improvements (Institute for Healthcare Improvement, 2017).
168 The PSDA model supported this quality improvement project through utilization of small-scale
169 change in the clinical setting to enable improvement.

170 **Purpose Statement**

171 The purpose of this quality improvement project was to evaluate the effectiveness of an
172 educational intervention on low-risk pregnant women's knowledge regarding avoidable CS, and
173 confidence to self-advocate and initiate conversation with their healthcare team regarding their
174 childbirth plan. The goals included increased post-intervention knowledge about avoiding CS
175 unless necessary and self-reported confidence to initiate conversation with healthcare providers
176 about birth plans.

177 **Methods**

178 **Context**

179 The targeted population for the project included low-risk expectant mothers at an
180 obstetrics (OB) and gynecology clinic for low-income, underserved patients in Philadelphia, PA.
181 The clinic is a medical resident-run practice with approximately 15,000 outpatient visits per year

182 offering a variety of maternity services, including care for high-risk patients at their high-risk
183 clinic.

184 Like all quality improvement projects, potential risks may impede project progression.
185 Potential barriers for this educational intervention included resistance from clinic staff, inability
186 to acquire patients and engage patient participation, and interruption of workflow. Lack of
187 patient engagement could have led to a smaller sample size negatively impacting quality of
188 results and analysis. To promote buy-in and adequate participation, the intervention was created
189 with time constraints in mind. The entire intervention (pre-test, intervention, post-test) was brief,
190 taking no longer than ten minutes from start to finish, making it simple for patients to complete
191 while waiting for their appointments. Completing the entire intervention at once decreased
192 potential loss to follow-up. Additional unexpected difficulties included changes in practice,
193 complex work environments, alterations in scheduling and clinic visits, along with numerous
194 restrictions and delays due to the COVID-19 pandemic.

195 The financial cost of this project was minimal. The greatest expense was the printing
196 costs for the educational pamphlet. The video and two surveys utilized for the intervention were
197 viewed and completed on an iPad provided by the project team. The provided educational
198 material was part of a free consumer education campaign, My Birth Matters, and dissemination
199 of this information is encouraged. Utilization of this material was approved by a consultant to
200 California Health Care Foundation (CHCF) for the My Birth Matters campaign. The timeline for
201 the project was approximately 12 months from identification of the clinical problem to project
202 completion.

203 **Interventions**

204 This project proposed an educational intervention for OB patients at the clinic in
205 Philadelphia, Pennsylvania. Patients were eligible if they were 1) new to the OB clinic and 2)
206 had no past medical history of a CS. Exclusion criteria consisted of women with prior CS, non-
207 English speaking, and patients who already established care at the clinic. Project implementation
208 took place from August 10, 2020 to September 1, 2020. Supported by evidence that patient
209 education changes knowledge, beliefs, and practice, this informational session was presented to
210 expectant mothers in order to address the project's goals and outcomes of interest.

211 Implementation of the intervention consisted of one primary phase. This included patient
212 recruitment for the project; consent to participate; completion of the pre-test; completion of the
213 educational intervention, including a brief video and modified pamphlet; and completion of the
214 post-test. Patients were recruited by chart review based on eligibility criteria. The team members
215 reviewed the clinic schedule prior to arrival and determined appropriate candidates based on
216 patient medical records. Participants were then guided through a four-step implementation
217 process: Steps 1 & 4: Assessments, Steps 2 & 3: Interventions (See Figure 1).

218 On days of implementation, individual DNP team members met with potential eligible
219 patients in the waiting room before their office visits, or in the exam room prior to seeing their
220 provider. The patients were informed of the purpose of the project, the survey and teaching, and
221 given the option to participate in the study. Upon agreement to partake in the study, each
222 participant was assigned a unique identifier which was used to link their pre- and post-survey
223 results. The allocated number was determined using the date followed by numbers one through
224 ten. Implementation surveys and video were presented electronically on an Apple iPad. The
225 pamphlet was provided in paper form. Clear instructions were provided to all participants before

226 the intervention, and along the way if necessary. The entire intervention was completed, from
227 start to finish, during the patient’s clinic visit.

228 ***Step 2: Video Intervention***

229 The project team utilized a brief educational video from My Birth Matters campaign,
230 consistent with their free published toolkit (California Health Care Foundation, 2018). My Birth
231 Matters campaign was created in partnership with the California Health Care Foundation
232 (CHCF), California Maternal Quality Care Collaborative (CMQCC), and Consumer Reports in
233 2018 as part of a broader statewide effort to lower rates of low-risk, first-time CS in California
234 hospitals. Although there are four available educational videos, the group chose to incorporate
235 only one with a new mother discussing CS. The new mother in the [video](#) discussed the increased
236 prevalence of CS, even when mother and baby are healthy. She encouraged mothers to educate
237 themselves about steps to take to reduce their chances of having an avoidable CS. The video also
238 encouraged mothers to initiate a conversation with their healthcare team about their birth options
239 and plan, with a takeaway message that “your voice matters” (My Birth Matters campaign,
240 2018).

241 ***Step 3: Pamphlet Intervention***

242 After participants viewed the one-minute educational video, they were asked to review a
243 pamphlet as part of the educational intervention. The pamphlet was created by the team, adapted
244 from My Birth Matters campaign. The pamphlet information came directly from their free
245 consumer toolkit, including material from the other three videos that was not included in Step 2:
246 Video Intervention.

247 **Study of Interventions**

248 This quality improvement (QI) project utilized a pre-test/post-test design to collect and
249 analyze data determining the effectiveness of a CS-focused patient education intervention. The
250 JHNEBP Model was used as a framework for the project. The short-term goals of the educational
251 intervention were developed to improve patient knowledge about avoidable CS and confidence
252 to initiate conversation with their healthcare team regarding their birth plans. Success was
253 measured using pre-intervention and post-intervention surveys that assessed the impact of the
254 intervention on the goals mentioned above. Although this project focused on patient knowledge
255 and confidence, the long-term goal of this initiative is an overall reduction of avoidable CS,
256 which was not an outcome assessed in this project. The measurable outcomes for the project
257 included:

- 258 1. After a CS educational intervention, patients will demonstrate increased knowledge of
259 the importance of reducing avoidable CS.
- 260 2. After a CS educational intervention, patients will report increased confidence to self-
261 advocate and initiate conversation with their health care team regarding their birth plans.
- 262 3. Patients will self-report preferred vaginal delivery versus scheduled CS.

263 **Measures**

264 In order to measure the outcomes of this project, several methods were used for data
265 collection, including a demographic data questionnaire, pre-and post-survey design (baseline and
266 post-educational session), and option for feedback after completion of the intervention. The pre-
267 test/post-test design was chosen for this project because it allowed for immediate evaluation of
268 patient knowledge and confidence after the intervention phase. Given the absence of specific

269 tools assessing the construct of interest, the team members designed a specific eleven question
270 (Likert 1-5) survey (see Appendix A and B).

271 ***Step 1: Pre-Intervention Survey***

272 **Patient Survey.** A pre-intervention eleven item (5-point Likert scale: strongly disagree,
273 disagree, neutral, agree, and strongly agree) survey was created using Qualtrics software. The
274 survey was broken down into three instruments: participant knowledge regarding avoidance of
275 unnecessary CS, confidence to self-advocate and initiate a conversation with their healthcare
276 team regarding their birth plan, and participant preference in childbirth method. The knowledge-
277 based survey questions were created from an informational video (CMQCC, 2018) provided by
278 the My Birth Matter campaign, as well as a pamphlet created by the project team with
279 information downloaded directly from the My Birth Matters free consumer education toolkit.
280 The confidence-based survey questions were created by the team due to the lack of validated
281 surveys containing suitable questions pertaining to the study. The questions were designed to
282 evaluate participant confidence to advocate for themselves and initiate conversation with their
283 healthcare team regarding their childbirth plan.

284 Potential scores for the primary outcomes in pre-and-post surveys ranged from 8 to 40:
285 knowledge (5 to 25) and confidence (3 to 15). Higher scores indicated an increase in knowledge
286 about avoidable CS and increase in self-confidence to start a conversation about their birth plans
287 with their healthcare providers. Potential scores for the secondary outcome (patient preferences)
288 in the pre-and-post surveys ranged from 3 to 15, with higher scores indicating increased desire
289 for vaginal birth delivery.

290 **Demographics & Patient Characteristics.** The demographic data collected from the
291 questionnaire was utilized to identify characteristics and trends of participants. The areas of
292 interest included age, gestational age, number of prior child births, marital status, employment

293 status, and highest level of education (see Table 1). This information was useful in identifying
294 patterns related to marital status, gestational ages, and education levels.

295

296 ***Step 4: Post-Intervention Assessment***

297 The same eleven item (5-point Likert scale) pre-intervention survey measuring knowledge,
298 confidence, and preference was used for the post-intervention survey. This was used to measure
299 participant knowledge and confidence immediately after receiving the CS educational intervention
300 consisting of the video and pamphlet. Expected outcomes included increased participant
301 confidence and knowledge after receiving the educational intervention.

302 **Qualitative Feedback.** A brief follow-up section was included in the post-survey
303 including three questions that gathered participants' feedback on the project.

304 **Analysis Plan**

305 Demographic variables including race, level of education, sexual orientation, marital
306 status, employment status and prior vaginal childbirths were measured on a nominal level.

307 Demographic variables such as age and gestational age were measured on a scale level.

308 Descriptive statistics were used for analysis to summarize patient demographic characteristics
309 and other studied measures. The independent variable was the CS educational intervention for

310 low-risk mothers at the clinic without a history of CS. The dependent variables included: patient

311 knowledge of the importance of avoiding unnecessary CS and confidence to self-advocate and

312 initiate conversation with their health care team regarding their birth plans. After parametric

313 assumptions were met, a paired sample t-test was used to compare mean patient knowledge and

314 confidence scores between the pre- and post-intervention period.

315 **Ethical Considerations**

316 The Human Subjects Electronic Research Application (HS-ERA) for the University of
317 Pennsylvania was completed. The University of Pennsylvania Institutional Review Board (IRB)
318 determined this project qualified as a quality improvement initiative prior to DNP project
319 initiation. Given that the project did not meet the definition of Human Subjects research, no
320 further IRB review was required. There were no notable conflicts of interest. Names or other
321 identifying characteristics of participants, such as date of birth or data from medical charts, were
322 not collected. Participation in the study was confidential and voluntary. Each patient was
323 assigned a random identifier to link their pre- and post-survey results, however, no identifiable
324 information was used. The information collected from the electronic surveys was stored on
325 Qualtrics, along with a Microsoft Excel spreadsheet on a password protected computer.

326 **Results**

327 The educational intervention for this QI project assessed patient knowledge about
328 avoidable CS and confidence to initiate conversations about their birth plans with healthcare
329 providers. As previously mentioned, the intervention included a brief educational video and
330 modified pamphlet created from the My Birth Matters campaign. Implementation was
331 approximately one month with the entire intervention phase completed at each patient's
332 appointment. A total of 30 participants were recruited for the educational intervention. Three
333 participants were excluded after completion of the intervention: two participants with language
334 barriers (English not their primary language) and one participant with a history of CS. A total of
335 27 participants met inclusion criteria and were included in data analysis.

336 Demographic data analysis showed that participant ages ranged from 18 to 39-years-old,
337 41% between the ages of 25 and 29, and an average age of 27-years-old. Gestational ages ranged
338 from 3 to 36 weeks, 48% between 10 and 19 weeks, and an average of 14 weeks gestation.

339 Participant educational levels were primarily high school graduates or some college but no
340 degrees (74%). Most participants identified their race as Black or African American (56%),
341 sexual orientation as heterosexual (93%), marital status as single (74%), and prior vaginal
342 childbirths as zero to one (69%) (see Table 1).

343 Combined knowledge and confidence survey scores ranged from 25 to 36 on the pre-
344 survey, and 27 to 39 on the post-survey (on a scale of 8 to 40). A histogram was created
345 depicting normally distributed data. After computing a paired sample t-test to measure patients'
346 knowledge about CS, there was a statistically significant difference between pre-intervention
347 and-post intervention scores ($t=5.165$, $p<0.001$) (See Table 2). Patients' confidence scores also
348 showed a statistically significant difference between pre-intervention and post-intervention
349 ($t=2.563$, $p=0.017$) (See Table 2). [Callout #2] Knowledge regarding avoidable CS increased by
350 9% (pre-survey score 17.19 [1.94], post-survey score 19.59 [2.60]) and confidence increased by
351 2% (pre-survey score 12.9 [1.68], post-survey score 13.4 [1.45]) (see Table 2 and Figure 2).

352 **Discussion**

353 The primary outcomes measured were patient knowledge and confidence; observed
354 outcomes of the intervention were consistent with anticipated outcomes. In the pre-intervention
355 survey, most participants were unaware that 1) many CS are avoidable, and 2) having one CS
356 increases the likelihood of having repeat CS on subsequent deliveries. After the intervention,
357 correct responses to these two questions increased by 48% and 37% respectively. In the follow-
358 up questionnaire, 93% of participants self-reported hearing new information during the
359 intervention. Given the average participant age and education level, this quality improvement
360 project further demonstrates the importance of empowering low-risk expectant mothers to help
361 them make informed birth plan decisions.

362 Project results were comparable to findings from extensive [research](#) conducted by CHCF,
363 CMQCC, and Consumer Reports when developing My Birth Matters campaign, where there was
364 reported increased participant confidence with decision for vaginal birth and motivation to
365 advocate for themselves after their video intervention (CHCF, 2018). This initiative may reduce
366 avoidable CS in low-risk pregnant women without prior CS by educating expectant mothers
367 regarding the benefits of vaginal birth and importance of avoiding CS unless necessary, while
368 promoting confidence to effectively communicate with their health care teams. Ideally, low-risk
369 mothers who gain CS-related understanding and confidence become better advocates for
370 themselves, their babies, and childbirths.

371 A secondary exploratory outcome, self-reported childbirth delivery method preferences,
372 did not result in a statistically significant change between pre-and-post surveys ($t=0.348$,
373 $p=0.731$). However, 100% of participants self-reported planning for vaginal birth in the post-
374 survey, compared to only 96% in the pre-survey. Participant preference was chosen as a
375 secondary outcome due to the difficulty of changing a patient's decision within a limited amount
376 of time. Despite most participants already planning for vaginal births (the desired outcome of the
377 intervention) on their pre-surveys, many participants were clearly unaware of important
378 differences between vaginal and cesarean deliveries; this was evidenced by the significant
379 difference in knowledge scores in the pre/post-survey assessments.

380 The strengths of this quality improvement initiative included leadership support and
381 engagement, along with buy-in from stakeholders. Clinic management, staff, and patients were
382 receptive and supportive, allowing for successful implementation of the intervention. Every
383 eligible patient recruited willingly agreed to participate. Limitations of this quality improvement
384 project included a global pandemic affecting in-person appointments, number of participants, the

385 lack of a validated survey, an immediate post-intervention survey, project generalizability, and
386 the overall project time frame. Due to the COVID-19 pandemic, with additional regulations and
387 health safety requirements for office appointments, the data collection timeframe was shorter and
388 sample size smaller than anticipated. Many initial patient appointments were completed via
389 telemedicine to limit in-person contact, and unavailable to interview for the project. Another
390 limitation was the lack of validated surveys encompassing the desired project outcome
391 measurements. A validated and reliable measure did not exist for this project, so the project team
392 created a survey based on information from the My Birth Matters campaign. In addition,
393 administration of the post-survey closely after presentation of the educational intervention may
394 have contributed to favorable outcomes. Results may have been different if compared to a post-
395 survey that was given to patients after their clinic visit. Limitations to the generalizability of the
396 project include only English-speaking patients, a limited sample size, and specific underserved
397 patient population serviced by the clinic. Due to the lack of a translator for the surveys and
398 educational material, only English-speaking patients were eligible to participate. Therefore, the
399 project sample does not reflect the general population and may indicate patient sample bias.

400 [Callout #3]

401 **Conclusion**

402 Given the increasing national and global rates of CS, patient education and involvement
403 are necessary to increase patient knowledge regarding avoidable CS. At a clinic affiliated with an
404 urban teaching hospital in Philadelphia, where most of the city's deliveries are performed,
405 implementation of a patient educational intervention was associated with an increase in
406 confidence and knowledge post-intervention. Following review of a brief educational video and
407 pamphlet, low-risk mothers without histories of CS exhibited increased knowledge about CS and

408 self-reported confidence to initiate conversations about birth plans with their healthcare
409 providers. This educational intervention yielded both statistically and clinically significant
410 results and may help reduce future avoidable CS in the sample population of low-risk mothers.
411 The implications for practice and future quality improvement initiatives focus on additional
412 patient education regarding CS and encouragement for involvement in childbirth planning
413 conversations. The suggested next steps for this quality improvement project are follow-up after
414 childbirth to identify actual method of delivery and calculation of CS rates, as well as a
415 permanent educational implementation at the clinic. The educational intervention may produce
416 similar positive results if implemented for other patients delivering at the same urban teaching
417 hospital in Philadelphia, clinics for under-served pregnant women, obstetrician offices, or
418 anywhere patients would benefit from additional CS education.

419 According to the WHO, 68% of countries experienced disruptions to reproductive,
420 maternal, and childcare services due to COVID-19 (WHO, 2020). This quality improvement
421 initiative provides clinics an opportunity to continue patient education throughout the pandemic,
422 whether in-person education is feasible or not. The pamphlets can be distributed during patient
423 appointments or emailed to expectant mothers along with the video and other My Birth Matters
424 educational material. Due to the ease of implementation, potential magnitude of impact, and lack
425 of any negative associated consequences, low-risk pregnant women would benefit from receiving
426 this valuable information about CS. If long-term outcomes indicate reduction of avoidable CS
427 and decreased CS rates, this brief educational intervention will serve as a simple, easy tool to
428 implement in a variety of patient populations to address the rising rates of CS in the U.S.

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References

- 430
431
432 American College of Obstetrics and Gynecology Committee. (2018). ACOG Committee
433 Opinion No. 761: Cesarean Delivery on Maternal Request. *Obstetrics & Gynecology*,
434 *133*(1), e73-e77. <https://doi.org/10.1097/AOG.0000000000003006>
- 435 Center for Disease Control and Prevention. (2018). Retrieved November 5, 2019 from,
436 <https://www.cdc.gov/nchs/data/vsrr/vsrr-007-508.pdf>
- 437 Center for Disease Control and Prevention. (2020). Vital Statistics Rapid Release No. 008:
438 Births: Provisional Data for 2019. Retrieved November 7, 2020 from,
439 <https://www.cdc.gov/nchs/data/vsrr/vsrr-8-508.pdf>
- 440 Dang, D., & Dearholt, S. (2017). *Johns Hopkins nursing evidence-based practice: Model and*
441 *guidelines*. (3rd ed). Sigma Theta Tau International
- 442 Emmett, C. L., Montgomery, A. A., & Murphy, D. J. (2011). Preferences for mode of delivery
443 after previous caesarean section: What do women want, what do they get and how do
444 they value outcomes? *Health Expectations: An International Journal of Public*
445 *Participation in Health Care and Health Policy*, *14*(4), 397-404.
446 <https://doi.org/10.1111/j.1369-7625.2010.00635.x>
- 447 Institute for Health Care Improvement. (2017). QI essentials toolkit: PDSA worksheet.
448 Retrieved from http://www.ihc.org/QIToolkit_PDSASWorksheet.pdf
- 449 Joint Commission on Accreditation of Healthcare Organizations. (2019). Public Reporting of
450 high Cesarean Rates to Begin in July 2020. The Joint Commission.
451 <https://www.jointcommission.org/en/resources/news-and-multimedia/blogs/leading->

- 452 hospital-improvement/2019/02/public-reporting-of-high-cesarean-rates-to-begin-in-july-
453 2020/
- 454 Kingdon, C., Downe, S., & Betran, A. P. (2018). Women's and communities' views of targeted
455 educational interventions to reduce unnecessary caesarean section: A qualitative evidence
456 synthesis. *Reproductive Health*, 15(1), 130. <https://doi.org/10.1186/s12978-018-0570-z>
- 457 California Health Care Foundation (2018, June 15). *My birth matters: C-section consumer*
458 *education campaign*. (2018). Retrieved November 5, 2019,
459 from [https://www.chcf.org/project/my-birth-matters-c-section-consumer-education-](https://www.chcf.org/project/my-birth-matters-c-section-consumer-education-campaign/)
460 [campaign/](https://www.chcf.org/project/my-birth-matters-c-section-consumer-education-campaign/)
- 461 California Maternal Quality Care Collaborative (2018, June 20). *New mom explains C-sections*
462 [Video]. <https://www.cmqcc.org/my-birth-matters>
- 463 Office of Disease Prevention and Health Promotion. (2019). *Maternal, infant, and child health.*
464 *Healthy People 2020*. Retrieved November 5, 2019
465 from, [https://www.healthypeople.gov/2020/topics-objectives/topic/maternal-infant-and-](https://www.healthypeople.gov/2020/topics-objectives/topic/maternal-infant-and-child-health/objectives)
466 [child-health/objectives](https://www.healthypeople.gov/2020/topics-objectives/topic/maternal-infant-and-child-health/objectives)
- 467 Peahl, A. F., Smith, R., Johnson, T., Morgan, D., & Pearlman, M. (2019). Better late than never:
468 Why obstetricians must implement enhanced recovery after cesarean. *American Journal*
469 *of Obstetrics and Gynecology*, 1-16. <https://doi.org/10.1016/j.ajog.2019.04.030>
- 470 Smith H., Peterson N., Lagrew D., Main E., (2016). *Toolkit to support vaginal birth and reduce*
471 *primary cesareans: A quality improvement toolkit*. California Maternal Quality Care
472 Collaborative.
- 473 World Health Organization. (2018). WHO recommendations: Non-clinical interventions to
474 reduce unnecessary caesarean sections. *WHO*, 1-79. Retrieved

475 from [https://www.who.int/reproductivehealth/publications/non-clinical-interventions-to-](https://www.who.int/reproductivehealth/publications/non-clinical-interventions-to-reduce-cs/en/)
476 [reduce-cs/en/](https://www.who.int/reproductivehealth/publications/non-clinical-interventions-to-reduce-cs/en/)

477 WHO. (2020). Pulse survey on continuity of essential health services during the COVID-19
478 pandemic. WHO, 1-29. Retrieved from [https://www.who.int/publications/i/item/WHO-](https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS_continuity-survey-2020.1)
479 [2019-nCoV-EHS_continuity-survey-2020.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS_continuity-survey-2020.1)

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Table 1*Demographic Information (n=27)*

	Frequency (n)	Percent (%)
Age (years)		
18-24	7	25.9
25-29	11	40.7
30-34	7	25.9
35-40	2	7.4
Gestational Age (weeks)		
3-9	9	33.3
10-19	13	48.1
20-29	3	11.1
30-39	2	7.4
Race		
Black or African American	15	55.6
Hispanic	5	18.5
White	4	14.8
Other	2	7.4
Asian	1	3.7
Level of education		
High school graduate	10	37
Some college, no degree	10	37
Bachelor's degree	4	14.8
Less than HS	2	7.4
Master's degree	1	3.7
Sexual orientation		
Heterosexual	25	92.6
Bisexual	1	3.7
Other	1	3.7
Marital status		
Single	20	74.1
Married	5	18.5
Separated	1	3.7
Divorced	1	3.7
Employment status		
Unemployed	12	44.4
Full-time employed	10	37
Part-time employed	5	18.5
Prior vaginal childbirths		
Zero	9	34.6
One	9	34.6
Two	5	19.2
Three	3	11.5

Figure 1
Four Step Implementation Process

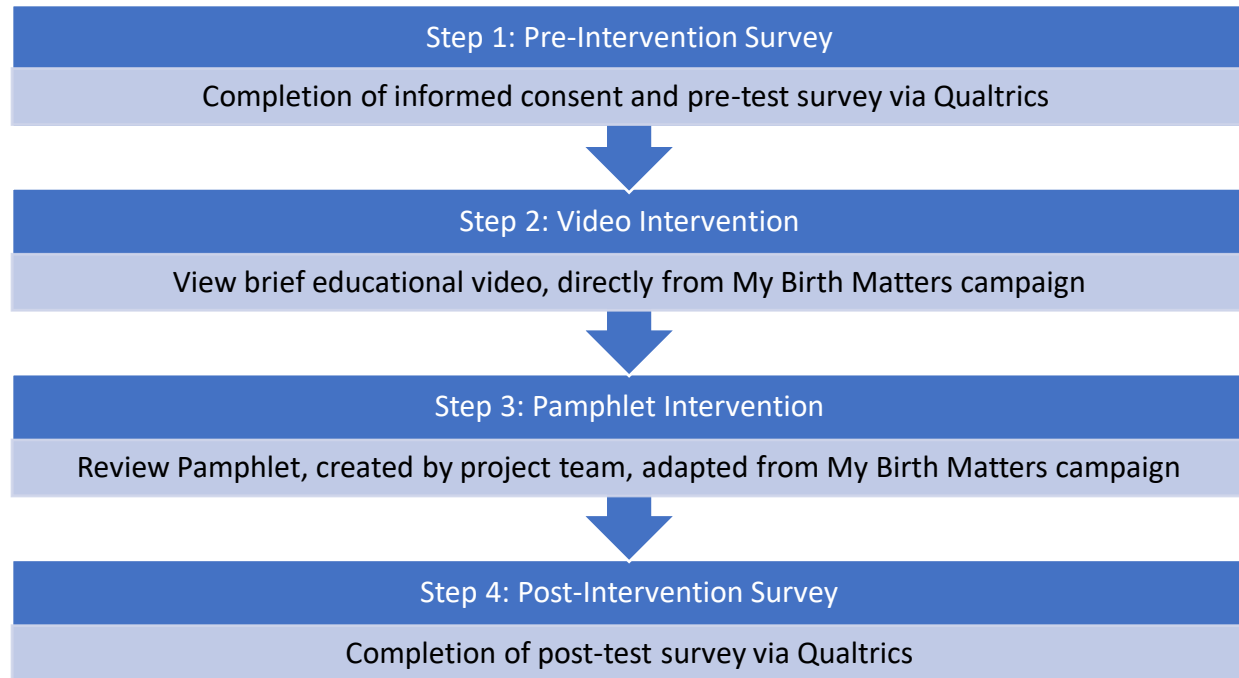


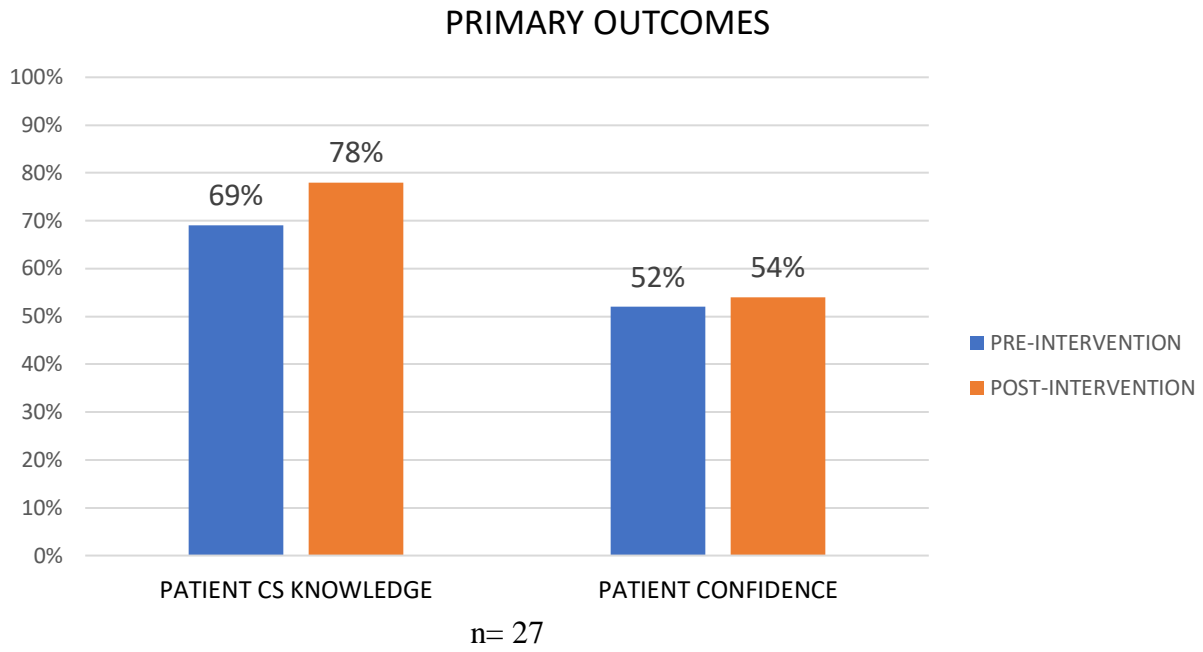
Table 2*Pre/Post Intervention Assessment of Primary Outcomes*

Primary Outcomes	n= 27			
	PRE Mean (SD)	POST Mean (SD)	t	p
Knowledge	17.2 (1.94)	19.4 (2.60)	5.165	<0.001
Confidence	12.9 (1.68)	13.4 (1.45)	2.563	0.017

SD = standard deviation

Figure 2

Percent of Total Pre/Post Scores on Primary Outcome Assessments



Appendix A

Electronic Patient Education Survey

Demographic Questions

1. What is your year of birth?
2. Gestational age in weeks (How many weeks pregnant are you?)
3. How many times have you given birth?
4. Choose one or more races that you consider yourself to be:
 - White
 - Black or African American
 - Asian
 - American Indian
 - Hispanic
 - Native Hawaiian
 - Other
5. Which of the following best describes your sexual orientation?
 - Heterosexual (straight)
 - Homosexual (gay)
 - Bisexual
 - Other
 - Prefer not to say
6. Are you married, widowed, divorced, separated, or never married?
 - Single
 - Married
 - Separated
 - Divorced
 - Widowed
7. What is the highest level of school you have completed or the highest degree you have received?
 - Less than high school degree
 - High school graduate (high school diploma or equivalent including GED)
 - Some college but no degree
 - Associate degree in college (2-year)
 - Bachelor's degree in college (4-year)
 - Master's degree
 - Doctoral degree
 - Professional degree (JD, MD)
8. Which statement best describes your current employment status?
 - Full-time employed
 - Part-time employed
 - Self-employed
 - Unemployed
 - Retired
 - Disabled
 - Student
 - Other
 - Prefer not to answer

Appendix B

Electronic Patient Education Survey

Below you are presented with a list of statements. Please indicate to what extent you agree or disagree with them by checking the appropriate option next to each statement.

Pre-Survey	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I plan to deliver my baby by scheduled cesarean section/c-section.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan to deliver my baby by vaginal birth method.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would ask for a c-section even if I know the complications.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recovery after vaginal delivery takes longer than c-section.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Complications of vaginal delivery are more common than c-section.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many c-sections can be avoided.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C-sections could be <i>lifesaving</i> if my healthcare team thinks it is absolutely necessary.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I have a c-section for this delivery, I am more likely to have another c-section next time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident about my <u>level of knowledge</u> around pregnancy and birth.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident to <u>start a conversation</u> with my provider about my childbirth options.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident to <u>make my own decisions</u> about my childbirth plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Post-Survey	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I plan to deliver my baby by scheduled cesarean section/c-section.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan to deliver my baby by vaginal birth method.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would ask for a c-section even if I know the complications.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recovery after vaginal delivery takes longer than c-section.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Complications of vaginal delivery are more common than c-section.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many c-sections can be avoided.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C-sections could be <i>lifesaving</i> if my healthcare team thinks it is absolutely necessary.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I have a c-section for this delivery, I am more likely to have another c-section next time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident about my <u>level of knowledge</u> around pregnancy and birth.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident to <u>start a conversation</u> with my provider about my childbirth options.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident to <u>make my own decisions</u> about my childbirth plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Feedback	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I enjoyed the information provided.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I heard new information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you give us permissions to follow up on your birth plan in your medical record after you give birth?

Yes, I give you permission for follow-up

No, I DO not give you permission for follow-up

Do you have any other comments, questions, or concerns?