

## ORIGINAL RESEARCH &amp; CONTRIBUTIONS

## Use of a Modified Reproductive Life Plan to Improve Awareness of Preconception Health in Women with Chronic Disease

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<http://dx.doi.org/10.7812/TPP/13-146>**Abstract**

**Objective:** Chronic diseases such as hypertension, diabetes, and obesity pose unique reproductive challenges for women. Preconception health results in improved reproductive outcomes. We designed an interventional study testing the use of a reproductive life plan to improve knowledge of preconception and contraception health in women with chronic diseases.

**Methods:** Primarily underserved, English- and Spanish-speaking women aged 18 to 40 years with active diabetes, hypertension, or obesity were recruited. We developed a revised reproductive life plan specific to these diseases. Two resident physicians performed reproductive plan counseling. Pre- and postcounseling surveys were administered to evaluate knowledge and attitudes about chronic disease and the effects on a potential pregnancy.

**Results:** Twenty-seven women (average age = 31 years) were surveyed. Of the subjects, 85.2% were obese, 29.6% had hypertension, and 7.4% had diabetes. Significant increases were reported in understanding risks of pregnancy associated with diabetes ( $p < 0.001$ ), hypertension ( $p < 0.001$ ), and obesity ( $p < 0.01$ ). After counseling, women increased their knowledge about a reproductive plan ( $p < 0.001$ ) and increased support and information to make reproductive health choices ( $p = 0.001$  and  $p < 0.01$ , respectively). The largest improvements in postcounseling variables occurred in women with the lowest precounseling test scores and in women without children.

**Conclusion:** A reproductive life plan is a brief, cost-effective preconception and contraception counseling tool in the primary care setting for women with chronic diseases. This tool increases knowledge about reproductive health and enables women with chronic diseases to make informed decisions about their reproductive future.

**Introduction**

Preconception care is a set of interventions intended to identify and to modify biomedical, behavioral, and social risks in women of reproductive age.<sup>1</sup> The goal of preconception care is to improve pregnancy outcomes and general women's health through prevention of disease and management of existing conditions. Research shows that focusing on preconception health can result in improved reproductive outcomes, healthier pregnancies, and healthier babies.<sup>2,3</sup> A reproductive life plan is an effective communication tool with patients regarding their reproductive goals.<sup>4</sup>

Women with chronic diseases face unique reproductive planning challenges. For women who do not desire pregnancy, chronic diseases may limit or influence their choice of a birth control method.<sup>5</sup> For women who wish to become pregnant, their chronic diseases may decrease the likelihood of pregnancy and increase the risk of premature birth and other maternal and fetal complications.

We focused on diabetes, hypertension, and obesity in our study. The burden of disease for diabetes is substantial: 9.3% of reproductive-aged women have diabetes, 2% of women have prediabetes (impaired fasting glucose), and gesta-

tional diabetes complicates 2% to 10% of pregnancies. The fetal implications of maternal diabetes include an increased risk of congenital malformations and spontaneous abortion. Women with gestational diabetes have increased risks of preeclampsia and operative deliveries. They also have higher rates of diabetes later in life as well as increased rates of hypertension and hyperlipidemia.<sup>6</sup> Preconception care can directly affect this risk; there is a direct correlation between increased hemoglobin A<sub>1c</sub> (HbA<sub>1c</sub>) and the incidence of congenital malformation. Previous studies have found that women with diabetes who received preconception care demonstrated improved glucose control during pregnancy and shorter hospital stays in comparison with women who did not receive preconception care.<sup>7</sup>

Approximately 3% of women of reproductive age are hypertensive, and hypertension affects 6% to 8% of pregnancies in the US.<sup>8</sup> The maternal risks associated with hypertension include preeclampsia, eclampsia, hemorrhagic stroke, cardiac disease, and renal disease. Fetal complications of maternal hypertension include intrauterine growth retardation, preterm birth, placental abruption, and fetal demise.<sup>9</sup>

With an estimated prevalence of more than 50%, maternal obesity is the most prevalent chronic disease among pregnant women. Although much remains to be learned of its full impact, obesity has been linked to decreased fertility and during pregnancy has been linked to increased rates of gestational diabetes and preeclampsia.<sup>10</sup> Obese women also have significantly higher rates of

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labor induction, primary and repeated cesarean delivery, and postcesarean complications, such as venous thromboembolism.<sup>11</sup> Perinatal mortality is increased 3-fold in obese women. The fetal implication of maternal obesity is major: the risk of intrauterine fetal demise increases 2 to 3 times in morbidly obese women.

In the move toward implementation of the primary care medical home, much of preconception care will be shifted to the primary care physician. Although there has been a major focus on the management of chronic diseases in the primary care setting, reproductive planning in high-risk populations has been variably neglected.<sup>11</sup> In our own clinical setting, the management of chronic diseases such as diabetes is standardized and protocol-driven, and our clinicians perform well in managing these patients. However, comprehensive reproductive planning is often underemphasized and even overlooked.<sup>12</sup> With increased demand on the primary care clinician's time, we must systematize reproductive planning to ensure that we meet our patients' needs.

Key issues—such as the optimization of health before pregnancy, the impact of medications on a potential pregnancy, and counseling about effective birth control methods—must be addressed to decrease perinatal morbidity and mortality caused by chronic diseases. Discussion and management of these issues with patients is central to decreasing the burden of perinatal morbidity and mortality associated with pregnancy. Standardization of the preconception visit using a reproductive life plan targeted toward chronic disease may enable clinicians to better address this issue in a format that is useful for patients, and one that builds on the physician-patient relationship.

We performed an interventional study using a reproductive life plan (see Appendix: Your Reproductive Life Plan at: [www.thepermanentjournal.org/files/Spring2014/Plan.pdf](http://www.thepermanentjournal.org/files/Spring2014/Plan.pdf)) that is based on the work done by the Preconception Health Council of California, Sacramento (<http://everywomancalifornia.org>) as well as the reproductive life plan created by the Utah state government. We

modified the reproductive life plan to include sections on diabetes, hypertension, and obesity. In this article, we describe our experience in piloting use of the reproductive life plan to counsel women of reproductive age with chronic disease.

## Methods

### Setting

The study was performed at San Francisco General Hospital Family Health Center, San Francisco, CA, which provides care to a diverse population of approximately 18,000 patients, most of whom are medically underserved. The current study focused on patients who speak either English or Spanish, which make up the 2 most common patient-spoken languages at the health center. The health center is also a primary clinical site for a residency training program. This study, a pre-posttest pilot study, was approved by the institutional review board for human research.

### Subjects and Materials

The health center registry identified 2100 women of childbearing age (which we narrowly defined as age 18 to 40 years) and 10% to 15% of these patients were found to have 1 or more of the chronic diseases targeted (diabetes, hypertension, and/or obesity). A random subset of patients was contacted through telephone calls and through recruitment in clinic. Patients were included in the study if they met at least 1 of the following criteria: 1) active diabetes (HbA<sub>1c</sub> concentration > 6.5%), 2) hypertension (blood pressure  $\geq$  140/90 mm Hg, or  $\geq$  130/80 mm Hg if concurrent diabetes was present), or 3) obesity (body mass index > 25 kg/m<sup>2</sup>). Patients were not excluded on the basis of uncontrolled vs controlled disease, but they were excluded if currently pregnant. The patients were invited to participate in the study and received a gift card of \$35 compensation at completion of the visit.

We developed a revised reproductive life plan to include additional sections specific to counseling patients with diabetes, obesity, and/or hypertension. This was created using the reproductive life plan from the Preconception Health Council of California as a template. We

also developed an appendix to provide reference information to be used as a tool by resident physicians. It provides background information, primarily adapted from the work by Jack et al,<sup>13</sup> which highlights important aspects of general preconception care and care that is specific to women with chronic disease. This can be used for self-education and for preparation for a visit with a patient. A survey was developed to evaluate participants' knowledge and attitudes regarding the effects of chronic illness on pregnancy at baseline and after intervention. This survey was created with Likert-scale response options for ease of participant completion and to ensure data completeness and was modeled on the work done in Colorado around evaluation of a reproductive life plan.<sup>14</sup> The questions were reviewed by key informants for clarity and content.

### Procedures

Two resident physicians performed the reproductive life planning counseling. The clinic visits were initiated with written consent. Patients completed a 24-item survey that asked about their baseline knowledge and attitudes about their chronic disease and the effects on a potential pregnancy (see Appendix: Chronic Disease and Pregnancy Survey at: [www.thepermanentjournal.org/files/Spring2014/Survey.pdf](http://www.thepermanentjournal.org/files/Spring2014/Survey.pdf)). The physicians then reviewed the reproductive life plan with each patient, focusing particularly on the chronic disease or diseases affecting that patient. They loosely followed a framework suggested by the US Centers for Disease Control and Prevention for reproductive life planning.<sup>15</sup> These visits were timed to evaluate the use of this strategy in a busy clinic. Visits were performed in either English or Spanish, at the patient's preference; both physicians were fluent in both languages. After the reproductive life plan was completed, the physician readministered the survey to complete the pre-posttest design. Patients were given the reproductive life plan to take home with them, and a copy of the reproductive life plan was placed in the chart for the primary care clinician to have access to the discussion.

Characteristic	Responses, no.
Age, years, mean (SD)	31.64 (5.18)
Medical conditions	
Diabetes (%)	2 (7.4)
Obesity (%)	23 (85.2)
Hypertension (%)	8 (29.6)
Reproductive history and contraception status	
Ever been pregnant (%)	21 (77.8)
Any children (%)	18 (66.7)
Currently using contraception (%)	16 (59.3)

SD = standard deviation.

### Measures

Participants self-reported their age and disease status for diabetes, hypertension, and obesity (yes/no). Regarding *pregnancy and contraception*, participants reported whether they had any previous pregnancies (yes/no) or any children (yes/no), whether they were currently trying to get pregnant (yes/no/don't know), and whether they were currently using contraception (yes/no). For *risk understanding*, participating women were asked to rate their understanding of the risks of pregnancy for each of the 3 conditions (diabetes, hypertension, obesity) on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). In a *summary of understanding*, 4 additional items were used to capture women's overall understanding of their reproductive health plan options and choices. Those items were as follows: "I know what a reproductive health plan is," "I have enough support from others

to make choices about my own reproductive health," "I make choices about my reproductive health without pressure from others," and "I have enough advice to make choices about my reproductive health." All questions appeared on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). All items were administered before and after counseling using the reproductive life plan.

### Data Analysis

Descriptive statistical analyses were performed to examine the distribution of items. Dependent *t* tests compared women's pre- and postcounseling survey responses. Zero-order correlations and independent *t* tests were conducted to examine associations between patient demographics and both precounseling survey responses and the difference scores in change from pre- to postcounseling responses. Changes in women's pregnancy plans from pre- to postcontraception counseling were explored with a McNemar test.

### Results

The final sample consisted of 27 women, with an average age of 31 years (Table 1). Most of the women (85.2%) were obese, 29.6% had a diagnosis of hypertension, and 7.4% had a diagnosis of diabetes. Most women reported they had given birth (66.7%) and/or had been pregnant in the past (77.8%), and more than half reported currently using contraception (59.3%).

As seen in Table 2, in general, women's responses changed significantly between pre- and postcounseling surveys.

Significant increases were reported in understanding the risks of pregnancy associated with diabetes ( $p < 0.001$ ), hypertension ( $p < 0.001$ ), and obesity ( $p < 0.01$ ). After counseling, women also reported being more likely to know what a reproductive plan is ( $p < 0.001$ ), were more likely to report having support from others to make reproductive health choices ( $p = 0.001$ ), and felt they had enough information to make choices about their reproductive health ( $p < 0.01$ ). There was no significant change in women's responses for making choices about their reproductive health without pressure from others, although the reported change was in a positive direction. Because the surveys were completed immediately following the visit, we would not expect a significant change in ability to make choices without pressure from others.

Two patterns emerged. We observed that the largest improvements in postcounseling variables occurred in women with the lowest precounseling test scores and in women without children. The baseline precounseling level of each variable was associated with the degree of change from before to after counseling for each of the respective items ( $p < 0.05$ ). Women without children reported larger improvements in having support to make choices about their reproductive health ( $p = 0.05$ ) and marginally larger improvements in having enough information to make choices about reproductive health ( $p = 0.09$ ) than did women with children. These findings suggest that the patients who benefited the most from the intervention were the women who started with lower

Survey entry	Precounseling score, mean (SD)	Postcounseling score, mean (SD)	<i>t</i>	<i>p</i>
I understand the risks of pregnancy associated with diabetes	3.16 (1.14)	4.40 (0.96)	-4.65	<0.001
I understand the risks of pregnancy associated with hypertension	3.32 (1.07)	4.35 (0.94)	-4.47	<0.001
I understand the risks of pregnancy associated with obesity	3.59 (1.34)	4.37 (0.88)	-2.95	0.007
I know what a reproductive health plan is	3.19 (1.11)	4.41 (0.69)	-5.21	<0.001
I have enough support from others to make choices about my own reproductive health (pregnancy, contraception)	3.48 (1.05)	4.33 (0.83)	-3.91	0.001
I make choices about my reproductive health (pregnancy, contraception) without pressure from others	4.00 (1.00)	4.26 (0.86)	-1.57	0.13
I have enough advice to make choices about my reproductive health (pregnancy, contraception)	3.78 (.89)	4.33 (0.68)	-2.96	0.006

SD = standard deviation.

baseline knowledge about childbearing and/or their chronic diseases, and that women without previous children may particularly benefit from reproductive life planning. There were no significant associations between any of the patient demographics and baseline precounseling variables, suggesting that the women did not systematically differ in their precounseling reports on the basis of their age, specific chronic illness, previous pregnancy status, or use of contraception. Women's age, specific chronic illness, and use of contraception were also not associated with the degree of pre-posttest change in responses.

Regarding current pregnancy plans, 5 women (18.5%) reported in precounseling survey responses that they were either currently pregnant or trying to become pregnant, 18 women (66.7%) reported not trying to get pregnant, and 4 women (14.8%) reported "don't know." After counseling, 4 women (14.8%) reported trying to get pregnant or were currently pregnant, 19 women (70.4%) reported not trying to get pregnant, and 2 women (7.4%) reported "don't know." Two responses (7.4%) were missing from the postcounseling survey. One patient admitted to being pregnant after the intervention was done and was included in the data collection. Although it was not statistically significant, 2 of the 4 women who reported "don't know" before counseling regarding pregnancy plans changed their responses to "no." No women who reported trying to get pregnant or not trying to get pregnant before counseling changed their responses to "don't know" after counseling. We believe that this trend is consistent with the increase in information and understanding that was reported with the reproductive life plan.

The average time that the intervention took varied between 15 and 22 minutes, including obtaining consent and administering pre- and postcounseling surveys. This time is consistent with that of an average visit to a primary care clinician.<sup>16</sup>

## Discussion

Women's knowledge about reproductive health in the context of their chronic disease increased with the introduction

of a modified reproductive life plan. This finding suggests that this brief and cost-effective intervention is effective in opening a dialogue about reproductive health in this subset of women. Not surprisingly, women with the lower initial scores showed the most improvement. Preliminary findings also suggest that women who have never given birth had greater improvements, suggesting that this subgroup of women may derive further benefit from the intervention. Although not statistically significant in our small pilot sample, it is also interesting to note that, in the postcounseling survey, 50% of the women who were undecided about pregnancy moved toward a decision. This finding suggests that this type of counseling may influence ambivalence regarding pregnancy.

Primary care is at a crossroads today with the push to optimize care in patient-centered medical homes without a substantial increase in available resources. For this reason, strategies that can be employed to improve and to standardize care delivery are critical. This reproductive life plan was developed to enable busy clinicians to provide high-quality preconception and contraception counseling to women of childbearing age who have chronic disease. The importance of reduction of chronic disease burden in this population has been outlined in multiple studies.<sup>17</sup> This optimization needs to occur in the primary care setting before pregnancy to improve outcomes. Our study demonstrates that this customized reproductive life plan is an efficient and effective tool in the primary care setting.

Improved knowledge alone does not necessarily predict behavior change; the skills and confidence to make change are needed as well. Reproductive life plans build on the strength of the physician-patient relationship by providing a format to help the patient and her clinician partner around preconception health. In a resource-limited setting, this tool could be administered by a health coach or health educator. The clinician would then review the reproductive life plan and use it as a springboard for continued discussion with the patient.

There are several limitations to this study. The first was our small sample

size, and we will address this by continuing to use this tool in our practice and gathering more data on its use. In addition, no physiologic outcome measures (change in blood pressure, HbA<sub>1c</sub>, or body mass index) were used to evaluate change. It is imperative that the focus also be expanded to include physiologic markers to evaluate for improvement in outcomes with the intervention.

We recommend that the reproductive life plan be used in a primary care setting to strengthen and standardize the reproductive care of women with chronic disease. This tool can be used with special emphasis on nulliparous women to aid in reproductive planning, with the goal of improvement in maternal and fetal outcomes.

## Conclusion

On the basis of the results of this small pilot study, it appears that a reproductive life plan is an effective tool for counseling women with chronic disease about preconception and contraception in a busy clinical setting. Women felt empowered to make decisions about their reproductive future in the context of their chronic disease with the use of this educational tool and a discussion with the clinician. ♦

## Disclosure Statement

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## Health

You cannot have maternal health  
without reproductive health.

— Hillary Rodham Clinton, b 1947, former US Secretary  
of State, US Senator, and First Lady of the US