2020

Maternal demographic and psychosocial factors associated with low attendance of a CenteringPregnancy prenatal care program among a group of high-risk women from Kentucky.

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Capstone Project Paper

A paper submitted in partial fulfillment of the requirements for the degree of
Master of Public Health in the
University of Kentucky College of Public Health

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April 12, 2020

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Abstract

Aim: To identify maternal demographic and psychosocial risk factors associated with poor attendance of CenteringPregnancy group prenatal care, and whether past or current experience of intimate partner violence is related to poor attendance.

Methods: Data from the EMPOWR (Efforts to Maximize Perinatal Outcomes in Women at risk) were used in a cross-sectional study design. Self-reported data from 607 high-risk pregnant women from Kentucky was used. Poor-attendance or non-compliance was defined as attending less than 6 out of the 10 group prenatal care session. Multivariable logistic regression was performed to assess the association between risk factors and compliance with the program.

Results: In the fully adjusted regression model, women who had experienced physical abuse had 1.38 times the odds of being non-compliant with the program in comparison to those who had not (95% CI :0.89-2.14). Employment status showed a statistically significant difference in compliance with women who were unemployed, having 1.61 times the odds of non-compliance compared to those who were employed (95% CI:1.05-2.47). Women who had previously had a preterm delivery had 2.25 times the odds of non-compliance compared to those who did not (95% CI:1.24-4.08). Women for whom this pregnancy was unplanned had 1.33 times the odds of non-compliance compared to those who had intended for the pregnancy (95 % CI 0.88-2.01).

Conclusion: Compliance with group prenatal care sessions is affected by maternal demographic, behavioral, and psychosocial risk factors, notable, unemployment, unintentional pregnancy, and history with physical abuse. History of preterm delivery was also strongly associated with low compliance. While further research is needed, these findings indicate that maternal risk factors are important to consider when planning GPC, in order to ensure that women adequately use the program.

Introduction

One of the leading causes of infant morbidity and mortality is preterm births [1]. Preterm birth, which is defined as birth that occurs before 37 weeks gestation, can lead to a multitude of negative health outcomes such as neurodevelopmental and respiratory problems, deafness, blindness, and increased risk of death during the first five years of life[1]. In 2015, the rate of preterm births in the United States was 9.6%[2]. Additionally, significant racial disparities exist, with Black women having a preterm birth rate of 13.4%[2]. Various public health efforts have attempted to improve birth outcomes. In the last couple of decades, the most popular method has been prenatal care. Traditional prenatal care involves one-on-one interactions between patient and care provider[3]. The recommended schedule for these visits, as stated by the American College of Obstetricians and Gynecologists, is once every four weeks until 28 weeks of pregnancy, bi-weekly until 36 weeks of pregnancy and then every week until delivery [3]. These patient-provider appointments last about 10 minutes, for a combined time of 2 hours for the entire pregnancy. While access to prenatal care has been expanded in the last 20 years, this has not resulted in a meaningful reduction in preterm birth rates [2].

The lack of improvement with individual prenatal care alone indicates that a new program model is necessary. In recent years, Group Prenatal care programs have risen in popularity. Group Prenatal Care (GPC), is a model of prenatal care that delivers prenatal care and education in a group setting[4, 5]. There are several different models of Group Prenatal Care; however, the most popular one is the CenteringPregnancy model. In this model, which is divided into three main components, assessment, education, and support, a group of 8-12 women of similar gestation age meets for 10 sessions throughout the pregnancy. Each session lasts 1.5- 2 hour and are scheduled every 2-4 weeks. Sessions involve an obstetrics provider and co-

facilitator and focus on empowering women through education and awareness about their health and social support [5, 6].

Many studies have been conducted to assess the effectiveness of GPC in comparison to TPC. While there have been several RCTs that have shown a significant decrease in preterm birth rates among women who attended GPC compared to TPC, other studies show no difference [6]. Studies have also shown that GPC improved other birth outcomes such a reduction in low birth weight babies, increased breastfeeding, and reduced C-section deliveries for women who went through GPC compared to TPC [6].

Currently, there isn't a lot known about the minimum number of sessions that must be attended before the program has any effect. Some studies have shown that attending at least half of the 10 sessions was associated with positive birth outcomes and suggested that there may be a minimum level of adherence to the program that is required before the benefit is observed[7, 8]. There is also a lack of research on why women do not attend most or all of the sessions or end up dropping out. While some studies have looked at the barriers that prevent women from adhering to prenatal care (not GPC specifically), in my literature review, I found only one study that looked specifically at what the cause of low attendance could be and tried to identify the association between low-attendance of GPC and maternal characteristics among medically low-risk women[7].

Several studies have shown that intimate partner violence is associated with women's likelihood to utilize prenatal care and other types of maternal health services. Although these studies did not look at group prenatal care, in particular, it is reasonable to hypothesize that IPV could play a role in low-attendance of group prenatal care.

Research question/objective: The focus of my research is going to be to identify maternal demographic and psychosocial factors associated with low-attendance (low-compliance) of the CenteringPregnancy program among a group of high-risk pregnant women in Kentucky, and to determine if intimate partner violence, in particular, is associated with low attendance.

This is an important question to consider because it can better help us understand what is lacking in the way in which the programs are currently offered and how they can be improved to ensure that women at higher risk for preterm births who are enrolled in GPC, stay in the program and receive the maximum benefits.

Literature Review Narrative

Group prenatal care and CenteringPregnancy

Originating in 1994 as a new strategy of delivering prenatal care, Group prenatal care has been shown to improve maternal and birth outcomes in various ways[5]. There are several different models of GPC, but the most popular one is CenteringPregnancy. They all follow a similar format. In GPC, women of similar gestational age are put into groups of 8-12, and they attend 10 sessions over a period of 6 months [5]. It has recently gained popularity as a more effective strategy of improving birth outcomes than traditional one-on-one prenatal care. A 2007 randomized control trial by Ickovics et al. showed that women who went through GPC had a 33% reduced risk of preterm births compared to those who went through TPC [9]. This study also found that African American women had a 41 % reduction in preterm births. Similar results were observed in more recent studies that showed that low-income women who participated in

CenteringPregnancy showed reduced rates of preterm births as compared to women who did traditional prenatal care.

A 2011 randomized controlled trial by Ickovics et al. indicated that GPC shows promise in reducing psychosocial stress factors among young pregnant women[10]. Group prenatal care was also shown to have an effect on breastfeeding outcomes among a cohort of women in Tennessee[11]. The study determined that women who attended GPC were more likely to partake in breastfeeding initially after birth; however, this was not consistent for postpartum follow-up. Among a group of Latina women, CenteringPregnancy was shown to increase their odds of healthcare utilization and having a vaginal delivery [12].

Attendance/participation

While these studies indicate the effectiveness of GPC in improving birth outcomes, they do not provide much information about how many of the 10 sessions the study participants attended. A descriptive study by Francis et al. looked at the extent of participation of a group of medically low-risk women in GPC and tried to determine the causes for low participation. They found that on average, women only attended about half of the prescribes 10 sessions, and the reasons were scheduling barriers, not liking the program and perceived lack of family support [7]. The importance of attendance was also highlighted in a retrospective cohort study that looked at the effect of GPC on birth outcomes in Medicaid eligible women[8]. This study found that the risk of preterm births, low birth weight, and NICU admissions was lower among women who attended more than 5 group sessions. This indicates that attendance is significant in receiving the full benefit of GPC, and the reasons for why women have low participation should be further studied.

Intimate partner violence

One reason that could be a factor in women having low attendance for GPC is intimate partner violence. It is known from current literature that women who are or have gone through domestic violence and abuse are less likely to utilize healthcare services, particularly maternal health services during pregnancy. Women who are exposed to IPV in the year before or during pregnancy are at greater risk for a multitude of poor maternal and birth outcomes such as high blood pressure, preterm births, low birth weight, and NICU admission[13, 14]. A study done in Spain found that IPV during pregnancy is related to poor prenatal care utilization [15].IPV before or during pregnancy was associated with various negative health behaviors such as smoking during pregnancy, inadequate nutrition, and not starting prenatal care in the first trimester, in a study done on a group of women in rural Appalachia[16].

Methods

Study design and source of data:

This is a cross-sectional study using data from the EMPOWR study (Efforts to Maximize Perinatal Outcomes in Women at Risk), which addressed women at higher risk for preterm births in Central, Northern and Eastern Kentucky. The EMPOWR study supplemented the existing Centering Pregnancy model with a focus on preterm-risk reduction. Women were recruited through four mechanisms: self-referral, a referral from the local health department, referrals from OB/GYN family practice, or referral from MCO. After a screening visit, women were assigned to one of 5 specialized centering arms based on their risk assessment. These five arms were 1. Low risk 2. Tobacco use/substance abuse 3. Obesity,/Diabetes 4. International Hispanic 5. Obstetrics/medical risk factors. Regardless of which arm the participants were assigned to, all

women received the same basic CP program material and a core prematurity prevention session at 20-24 weeks gestation. The EMPOWR study was completed in 2016.

Inclusion criteria were women between the ages of 14-50 who were pregnant at less than 30 weeks gestation and who were Medicaid eligible. Women who had been diagnosed with mental illness were excluded. Women who did not have Medicaid were directed towards financial counseling and enrolled in an MCO. Women who had Medicaid or MCO coverage were then directed towards an initial screening.

An initial screening was conducted by a nurse. Prenatal history was taken, and routine lab work was carried out to get an obstetric and medical history. The initial screening also included administering preterm prevention screening tools, psychosocial assessment, routine laboratory evaluation, and the patient intake survey. This survey consisted of a wide range of questions about demographics, experience with intimate partner abuse, and other psychosocial factors. Intimate partner violence was categorized as either physical abuse or emotional abuse. The survey had 3 questions that asked yes or no questions about experiencing some form of physical violence by a spouse or partner. A yes to one or more of those questions was considered having experienced physical abuse. Women's experience with battering scale was used to determine if the woman had experienced emotional abuse. This was coded as either yes or no in the data.

If a participant met the inclusion criteria, she would have three options: 1.) To participate in the CenteringPregnancy Empowr program, 2.) Not participate in the program and instead go through traditional prenatal care, but agree to take the intake survey, provide urine for cotinine analysis, take the satisfaction survey and sign HIPPA to provide de-identified birth outcome data or 3.) Refuse the program and simply enroll in traditional prenatal care.

Covariates

Based on what is currently known from the literature, maternal demographic and psychosocial factors were considered as possible covariates. Demographic covariates include race/ethnicity, age, employment status, income level, education, and Medicaid status. These were self-reported on the intake questionnaire. Psychosocial factors were depression (measured using CESD at initial screening appointment), anxiety (measured at initial screening), and social factors that were barriers towards attending appointments such as lack of transportation and lack of childcare (self-reported). Physical abuse and Emotional/Psychological abuse were separate variables, also self-reported. All women enrolled in the program were tested for cotinine levels – non-smoker was defined as cotinine levels <99 ng/ml. Opioid abusers were referred to the program by MCOs.

Statistical analysis:

Descriptive statistics were used to compare women who were compliant with the program with women who were not compliant. The program consisted of 10 sessions. Each visit for each participant was recorded in the data as attended or not attended. Compliance was determined as having attended 6 or more sessions. The sum of all attended sessions for each participant was computed and compliance was determined to be, having attended a total of 6 or more sessions. Attending less then 6 sessions was considered not compliant.

For categorical variables, Chi-square test was used to compare the two groups and frequencies and percentages were shown. T-test was used for continuous variables and mean and SD were shown.

Multivariable logistic regression analysis was used to explore association between maternal psychosocial characteristics and low attendance of the program. Covariates that were added to the final model maternal age, education, employment status, planned/unplanned pregnancy, number of children, history of preterm delivery, having been physically abused, and emotional/psychological abuse.

Results

Data were collected from 683 Kentucky women through medical records and surveys. After missing data were removed, bivariate analysis and multivariable analysis was conducted on 607 participants. A total of 410 participants were compliant with the CenteringPregnancy program and 197 were non-Compliant.

Participant characteristics

Participant characteristics are presented in Table 1. The majority of participants were white (74.1%), non-Hispanic (74.1%), had at least a high school education (65.6%), and were unemployed (66.7%). The mean age was 25 years. The current pregnancies were unplanned for the majority of women (61%); however, most were either married and/or living with a partner (n=395, 65.1%). Most were not on Medicaid (57.3%) and had no health insurance (79.5%). Most were non-smokers (53.0%) and had no previous preterm births (84.8%). In terms of the psychosocial risk factors that were assessed, 25.9% had previously been physically abused by a partner (n=157), and 2.9% of those (for whom data was available) had been emotionally/psychologically abused by a partner (n=16). Over one third (34.2%) of the participants had depression (n=199)

Bivariate analysis

Results for the bivariate analysis are presented in Table 2. The odds of non-Compliance of women who had less than a high school education were 1.38 times the odds of those who had a high school diploma or GED (95% CI: 0.93-2.04).The odds of women who were unemployed were 1.49 times that of employed women (95% CI: 1.02-2.17). Women who had previous history of preterm births had 2.11 times the odds of non-compliance compared to those who did not have a history of preterm births (95% CI: 1.22-3.65). Compared to women who considered this current pregnancy to be intentional/planned, women for whom this pregnancy was unplanned had 1.51 times the odds of non-compliance (95% CI: 1.05-2.18). Compared to women who had no children, women who had children had greater odds of non-compliance: 1-2 children compared to no children (OR=1.29 95% CI: 0.89-1.88) and 3-4 children compared to no children (OR = 1.33 95% CI:0.74-2.41). Women who experienced physical abuse by a partner or spouse had 1.27 times the odds of non-compliance compared to women who did not (95% CI: 0.87-1.86). There was very little difference in compliance among women who had experienced emotional/psychological abuse from a partner or spouse (OR=0.95, 95% CI:0.33-2.77).

Multivariable Analysis

Results of the multivariable logistic regression analysis are presented in Table 3, with adjusted odds ratios and 95% confidence intervals. The following covariates were added to the final model: age, education, employment, number of children, preterm birth history, planned/unplanned pregnancy, physical abuse, and emotional/psychological abuse. When all other covariates were held constant, women who had experienced physical abuse had 1.38 times the odds of being non-compliant with the program compared to those who had not (95% CI: 0.89-2.14). When all other covariates were held constant women, who had experienced emotional or psychological abuse by a partner/spouse, had 0.78 times the odds of non-

compliance compared to those who had not (95% CI: 0.25-2.45). Employment status showed a statistically significant difference in compliance with women who were unemployed, having 1.61 times the odds of non-compliance compared to those who were employed (95% CI: 1.05-2.47). Women who had previously had a preterm delivery had 2.25 times the odds of non-compliance compared to those who did not (95% CI: 1.24-4.08). Women for whom this pregnancy was unplanned had 1.33 times the odds of non-compliance compared to those who had intended for the pregnancy (95 % CI: 0.88-2.01).

Discussion

This study examined the associations of maternal demographic and psychosocial risk factors with poor attendance of CenteringPregnancy group prenatal care. This study further examined whether intimate partner violence, both physical and emotional/psychological, were risk factors for poor compliance with the program. While intimate partner violence has been associate with women under-utilizing maternal health care services such as traditional prenatal care, this has not been studied for group prenatal care specifically.

Notably, it was found that women who had previously had a preterm delivery were more likely to be non-compliant with the program. Additionally, unemployed women were also more likely to be non-compliant compared to women who were employed. Women for whom the pregnancy was unintentional were also more likely to be non-compliant. It was also found that women who had experienced physical abuse had 38% greater odds of being non-compliant; however, these results were not statistically significant.

The association between physical abuse and non-compliance supports what was hypothesized about the effect that intimate partner violence could have on compliance with

group prenatal care. This is supported in the literature. Many studies have found that women who have experienced violence or abuse in past or current relationships are less likely to seek out healthcare and are more likely to under-utilize maternal health services[15, 16]. This study observed poor compliance of prenatal care in 9.8% of the study participants and found a significant association between physical abuse and poor compliance. While the results were not statistically significant, the effect size was large enough, and the confidence interval was close enough to significance (0.89-2.14) for it to be mentioned as a notable finding of this study. Further studies should be conducted to better examine this association. The association between non-compliance and unemployment (61% greater odds of being non-complaint among women who were unemployed) aligned with what was expected. Women whose pregnancy was unintentional had 33% greater odds of non-compliance, which also aligned with what was expected. Previous studies have shown that socioeconomic factors such as unemployment, as well as unplanned pregnancies, are associated with women not attending or inadequately utilizing prenatal care services [17-19].

Having a history of delivering preterm was found to have a significant effect on non-compliance. Women who had previously had a preterm birth were more than twice as likely to be non-complaint with the program. A significant association between spontaneous preterm birth and history of previous preterm term delivery has been found in previous studies. For instance, a study by Iams et al. found that women who had previously had a preterm delivery had a 14-15% risk of subsequent preterm delivery compared to a 3% risk for women with no preterm birth history[20]. Studies have also found that lack of or inadequate prenatal care increases the risk for preterm delivery. Attending group prenatal care, in particular, has been found to show substantial promise in reducing preterm birth rates [9]. Preterm delivery has a wide host of risk factors in

addition to previous preterm delivery and lack of prenatal care. Women who have had preterm deliveries likely have various other risk factors such as low SES and substance abuse.

The strong association between history of preterm birth and poor attendance with the program found in this study indicates that women at higher risk for preterm birth are failing to adequately utilize GPC. The EMPOWR study enhanced the CenteringPregnancy model with additional prematurity risk reduction tools because the main focus of EMPOWR was to reduce preterm birth rates. If women who have a significant risk for preterm birth are not attending the program, it means that the program is not having as much of an impact as it could have. Further research is needed to examine why women with a history of preterm delivery are less likely to attend GPC, and if this association is causal.

Unexpected findings were the association between women who had experienced emotional abuse and compliance. It was found that women who had experienced emotional or psychological abuse by a partner were more likely to be complaint compared to those who had not, although the effect size was small. This conflicts with previous research which has shown that women who have experienced abuse are less likely to seek maternal health care services such as prenatal care.

The study has some limitations. First, since this is a cross-sectional study, causality cannot be established. Secondly, the data are self-reported by the study subjects, which creates the possibility of recall bias. The women could have misreported certain things due to not remembering correctly or misunderstanding the question. Third, the study population was predominantly white (74%), who were already at a higher risk for preterm delivery. This limits the generalizability of this study.

Conclusion

While the benefits of group prenatal care have been established by many studies throughout the past decade, limited research is currently available on several important details. Currently, there is little research on how many sessions of group prenatal care must be attended before any benefit is gained. While several studies have noted that adherence to the program has been a challenge, with women dropping out before completing 10 sessions or missing sessions in between. To the author's knowledge, only one study has examined maternal factors that could be resulting in poor GPC attendance.

This study showed that maternal factors such as unemployment, unplanned pregnancies, and having experienced physical abuse are associated with a greater likelihood of inadequate utilization of CenteringPregnancy group prenatal care. We also found that women who had previously had preterm deliveries were significantly more likely to not attend the full 10 sessions. Knowing that proper group prenatal care has resulted in reduced rates of preterm births, increased efforts should be made to ensure that these women, in particular, better utilize this program.

Overall, this study provides valuable insights into several maternal demographic and psychosocial factors that correlate to the attendance of GPC. This is significant because group prenatal care is only effective if women utilize it adequately by attending all sessions. Understanding the reasons why some women are not attending all sessions may allow for the program to be made more accessible to the women who need it most.

Table 1 – Demographic characteristics for pregnant women in Kentucky participating in EMPOWR study, 2013-2016.

Characteristic	Frequency	Percent
Non-compliant	197	32.5
Compliant	410	67.6
Race		
White	450	74.1
Black	76	12.5
Other	81	13.4
Ethnicity	405	66.7
Non-Hispanic	46	7.58
Hispanic	156	25.7
Missing		
Age (mean, SD)	25.4	5.93
Education		
No Highschool	150	24.7
High school or GED	398	65.6
Missing	59	9.72
Employment	405	67.4
Unemployed	196	32.6
Employed		
Income	399	65.7
19,999 or less	100	16.5
20,000-39,999	30	4.94
40,000 or more	78	12.9
Missing		
Living with a partner	206	34.3
No	395	65.7
Yes		
Children	229	38.8
0	295	50.0
1-2	62	10.5
3-4	4	0.68
5+		
Medicaid	348	58.4
No	248	41.6
Yes		

Table 2 – Bivariate analysis of maternal risk factors and the odds of non-compliance with the CenteringPregnancy program for pregnant women in Kentucky, 2013-2016.

	Non-compliant		Compliant			
	N	%	N	%	OR	CI
Race						
White (ref)	146	32.4	304	67.6	-	-
Black	25	32.9	51	67.1	1.02	0.61 - 1.71
Other	26	32.1	55	67.9	0.98	0.59 - 1.63
Ethnicity						
Non-Hispanic (ref)	142	35.1	263	64.9	0.58	0.28 - 1.18
Hispanic	11	23.9	35	76.1		
Missing	44	28.2	112	71.8		
Age (mean, SD, mean diff, Cl)	25.9	5.83	24.3	6.03	1.56	0.54-2.58
Education						
Highschool (ref)	125	31.4	273	68.6		
No Highschool	58	38.7	92	61.3	1.38	0.93 - 2.04
Missing	14	23.7	45	76.3		
Employment						
Employed (ref)	53	27.0	143	73.0	1.49	1.02 -2.17
Unemployed	144	35.6	261	64.4		
Missing (6)						
Income						
40,000 or more (ref)	8	26.7	22	73.3	1.00	0.74 - 4.52
20,000 –39,999	40	40.0	60	60.0	1.83	0.56-2.99
19,999 or less	128	32.1	271	67.9	1.29	
Missing	21	26.9	57	73.1		
Living with a partner						
Yes (ref)	121	30.6	274	69.4	1.27	0.89– 1.81
No	74	35.9	132	64.1		
Missing (6)						
Children						
0 (ref)	67	29.3	162	70.7		
1-2	103	34.9	192	65.1	1.29	0.89 - 1.88
3-4	22	35.5	40	64.5	1.33	0.73 - 2.41
5+	1	25.0	3	75.0	0.81	0.08 - 7.89
Missing (17)						

Medicaid	87	35.1	161	64.9	0.82	0.58 – 1.16
Yes (ref)	107	30.8	241	69.3		
No						
Missing (11)						
Smoker						
No (ref)	59	18.3	263	81.6	1.42	0.86-2.34
Yes	30	24.2	94	75.8		
Missing	108	67.2	53	32.9		
Preterm birth history						
No (ref)	147	28.5	368	71.5	2.11	1.22 - 3.65
Yes	27	45.8	32	54.2		
Missing (33)						
Intended to get pregnant					1.51	1.05 – 2.18
Yes (ref)	59	26.5	163	73.4		
No	131	35.4	239	64.6		
Missing (15)						
Depression						
Not depressed (ref)	125	32.6	258	67.4	0.98	0.68 – 1.41
Depression	64	32.2	135	67.8		
Missing (25)						
Emotional/ Psychological abuse						
No (ref)	172	32.4	359	67.6	0.95	0.33 – 2.77
Yes	5	31.3	11	68.8		
Missing	20	33.3	40	66.7		
Physical Abuse						
No (ref)	138	31.0	307	69.0	1.27	0.87 - 1.86
Yes	57	36.3	100	63.7		
Missing (5)						
Perceived stress score (mean, SD, mean diff, Cl)	5.36	3.27	5.44	3.05	0.08	-0.47- 0.62
Generalized Anxiety Score (mean, SD, mean diff, Cl)	5.15	5.04	4.73	4.84	0.41	-1.26 - 0.43

Table 3 – Results of multivariable logistic regression analysis of the association of maternal risk factors with non-compliance with the CenteringPregnancy program among pregnant women in Kentucky, 2013-2016.

Variable	Adjusted OR	95 % CI
Age (ref <20)		
20-29	1.13	0.67 - 1.91
30-39	0.61	0.31 - 1.18
40-50	1.65	0.29 - 9.39
No Highschool education (ref=HS)	1.20	0.77 - 1.87
Unemployed (ref = Employed)	1.61	1.05 - 2.47
Number of Children (ref=0)		
1-2	1.42	0.94 - 2.16
3-4	1.67	0.87 - 3.23
5+	0.85	0.08 - 8.76
History of Preterm birth (ref=no)	2.25	1.24 - 4.08
Unintentional pregnancy (ref=planned)	1.33	0.88 - 2.01
Physical abuse (ref =no)	1.38	0.89 - 2.14
Emotional abuse (ref=no)	0.78	0.25 - 2.45

* All variables in the model are adjusted for simultaneously.

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