

The use of the partograph in labor monitoring: a cross-sectional study among obstetric caregivers in General Hospital, Calabar, Cross River State, Nigeria

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Background: Prolonged and obstructed labor is a significant cause of maternal morbidity and mortality in Nigeria, one of the six countries contributing significantly to the global maternal mortality crisis. The use of the partograph would engender a remarkable reduction in the number of these deaths since abnormal markers in the progress of labor would be identified early on.

Objective: This study aimed to evaluate the non-physician obstetric caregivers' (OCGs) knowledge of partograph use, assess the extent of its use, determine the factors that impede its usage, and unravel the relationship between years of experience and partograph use among the respondents (OCGs) in General Hospital, Calabar, Nigeria.

Methodology: Using a self-administered semi-structured questionnaire, a cross-sectional descriptive study was conducted among 130 purposely selected and consenting OCGs working in the General Hospital, Calabar, Nigeria.

Results: The majority of the respondents (70.8%) had good general knowledge of the partograph but lacked detailed and in-depth knowledge of the component parts of the partograph. Knowledge of partograph ($\chi^2=12.05$, $P=0.0001$) and partograph availability ($\chi^2=56.5$, $P=0.0001$) had a significant relationship with its utilization. Previous training ($\chi^2=9.43$, $P=0.002$) was significantly related to knowledge of partograph. Factors affecting utilization were: little or no knowledge of the partograph (85.4%), nonavailability (70%), shortage of staff (61.5%), and the fact that it is time-consuming to use (30%).

Conclusion: Lack of detailed knowledge of the partograph, nonavailability of the partograph, poor staff numbers, and inadequate training are factors that work against the effective utilization of the partograph in the study facility. Usage of this tool for labor monitoring can be enhanced by periodic training, making partographs available in labor wards, provision of reasonable staff numbers, and mandatory institutional policy.

Keywords: knowledge, utilization, partograph, obstetric caregivers, labor monitoring, Nigeria

Introduction

The partograph is a very useful graphical record of the course of labor that yields optimum results when employed in labor management by obstetric caregivers (OCGs). As an obstetric tool, its usefulness and efficiency cut across resource-poor and developed nations. Evidence abounds that the acquisition of knowledge of its use and ensuring proper application of that knowledge would culminate in a remarkable reduction in the incidence and outcomes of prolonged and obstructed labor, which are reported to be associated with 8%–10% of maternal deaths.^{1,2} Aside from the

contributions of traditional birth attendants (TBAs), who also give primary obstetric care, this service is rendered in Nigeria and most developing countries by general duty doctors, nurses, and midwives, and community health workers of diverse training, including the community health extension workers (CHEWs). Having knowledge and making use of this simple tool by these OCGs, will be an important step for designing appropriate intervention strategies that would encompass: training, retraining, and continuous professional educational programs to further empower them in safe motherhood practices.

This study aimed to evaluate the OCGs' knowledge of partograph use, assess the extent of its use, determine the factors that impede its usage, and unravel the relationship, if any, between years of experience and partograph use among the respondents in this research.

The results of this study, in addition to encouraging the design of continuing professional education programs for all OCGs, will enhance the formulation of policies that will improve maternal and child health care delivery and identify areas for development and sustenance of improved midwifery practice that will lead to job satisfaction and delivering of high-quality care by all OCGs in General Hospital, Calabar, Nigeria. This study would also form the basis for further research and will contribute to knowledge on intervention programs for maternal and child health in Nigeria and other similar sub-Saharan African countries whose roadmap to achieving the Millennium Development Goal 5 (MDG 5) in 2015 is still a difficult task ahead. The long-term objective and impact that this study would achieve shall be the continuous and effective use of the partograph in labor monitoring in General Hospital, Calabar.

Background

Prolonged and obstructed labor accounts for 8%–10% of maternal deaths^{1,2} and mechanical obstruction in the second stage is a possible complication in about 1%–2% of labors.³ The World Health Organization (WHO) estimated annual global obstructed labor-related maternal mortality at 50,000.⁴ This does not include cases of prolonged labor, which leads to life-long morbidities to both mother and child. One significant and unfortunate complication of both prolonged and obstructed labor is vesicovaginal fistula (VVF). The United Nations Population Fund estimates that there are about 2 million women living with VVF, most of them in sub-Saharan Africa.⁵

Obstructed labor is therefore a significant cause of maternal morbidity and mortality in Nigeria and many other

resource-poor areas of the world. The use of the partograph would engender gross reduction in the number of these deaths since abnormal markers in the progress of labor would be identified earlier.^{1,2,6} Additionally, it has been reported that partograph use in obstructed labor management enhances maternal and neonatal well-being.⁶ This simple tool for the management of labor was formally introduced in the General Hospital, Calabar on November 15, 2012. This coincided with the period that a high-profile patient was lost to prolonged and obstructed labor in the study facility. In an earlier study, the enormity of maternal wastage in labor, especially in rural areas of Cross River State (CRS), was reported.⁷ Although the partograph has found use in many centers, inconsistency in utilization remains a problem in these centers. This was the driving force in the Yenogoa study⁸ and also for the current study in Calabar, another capital city in the same geo-political zone of the country.

A review of literature shows that the southwestern geo-political zone of Nigeria has witnessed remarkable research on partograph use. This is equally true of the southeastern geo-political zone.^{9–13} Ultimately, maternal health indices are more favorable in those two zones than the one studied. This unhealthy trend is also evident in the northern geo-political zones of the country.¹⁴ The current study is a pioneering research in the CRS and the second in the south-south geo-political zone of Nigeria.

The genesis of universal partograph use

The adoption of the partograph by the WHO was borne out of the Safe Motherhood Conference in Nairobi, Kenya in 1987, which set out to address the worrisome statistics of maternal and infant mortalities worldwide. When used effectively, the partograph will prevent prolonged or obstructed labor, which accounts for about 8%–10% of maternal deaths.^{1,2}

Its use also aids continuity of care and helps the early recognition of abnormalities of labor.^{1,2} Philpott indicated that the partograph serves as an “early warning system” and assists in early decision in the transfer, augmentation, and termination of labor.⁶ It is also important to update standards and protocol for service delivery, management and supervision, monitoring, and evaluation of the quality of services, along with feedback from the client and health providers. The partograph is being widely used in a number of countries, especially in developing countries. In Nigeria, it is mostly used in teaching hospitals and rarely in general and cottage hospitals. The type of partograph in use involves a uniform spread of both the WHO type and plain composite partograph.¹⁵

Factors affecting the utilization of the partograph

The use of the partograph is hindered by poor knowledge,^{9-11,15} lack of the charts in the labor wards,^{10,11} shortage of health care personnel,¹⁰ time-consuming tasks for the low numbers of staff,¹⁶ and poor appreciation of its advantages in preventing obstructed labor.¹¹ A notable fact in developing countries is that knowledge of the use of the partograph for labor management is very low among nurses, midwives, and doctors working in the primary and secondary health care levels and private health care centers when compared to tertiary level care.^{9,10,12} Additionally, the general inability of the peripheral hospitals to produce benchmarks on the use of this chart in labor,¹⁰ poor managerial support regarding the procurement of necessary supplies,^{17,18} and lack of motivation of the health workers,¹⁶ constitute major obstacles in the use of the partograph.

Materials and methods

Study setting

General Hospital, Calabar is a 100-bed secondary health care facility located in Calabar, the capital city of CRS. The hospital was completed and commissioned on November 7, 1991. The maternity unit has three delivery beds and 24 hospital beds. The hospital records showed that there were 2,370 deliveries and 588 cesarean sections (CS) between January 2010 and December 2012 (3-year period). The indications for CS were: prolonged labor (25.3%), previous CS (27.4%), postdate (11.2%), fetal distress (7.3%), obstructed labor (9%), preeclampsia (6.6%), cephalopelvic disproportion (3.1%), placenta previa (2.9%), multiple pregnancy (2.6%), malpresentation (2.2%), bad obstetric history (1.9%), and failed induction (1%). There were 14 maternal deaths recorded within this period, giving a maternal mortality ratio of 590 deaths per 100,000 live births. The direct causes of maternal deaths were: ruptured ectopic pregnancy, septic abortion, eclampsia, and prolonged obstructed labor. The commonest indirect cause was HIV disease and pulmonary tuberculosis. In response to the high maternal and under-five morbidity and mortality rates in CRS, the government through the Ministry of Health introduced a free treatment program in the year 2012 to cover all pregnant women and children less than 5 years of age.

Study population

The study included all the 180 OCGs working in General Hospital, Calabar who consented to participate in the study.

Study design

Cross-sectional descriptive study.

Instrument for data collection

A semi-structured, self-administered questionnaire was used. The pilot and reliability testing of this questionnaire was conducted in a previous study.⁸

Procedure

A four-part questionnaire was used to study the knowledge and utilization of the partograph by all non-physician OCGs working in General Hospital, Calabar. A similar study was done among midwives in the Federal Medical Center and the University Teaching Hospital in Bayelsa State, also in the south-south geo-political zone of Nigeria and the findings have been published.⁸ Purposive sampling techniques were used, ie, all practicing and designated OCGs in the study facility were recruited into the study. OCGs' knowledge scores on the use of the partograph were assessed with 24 composite questions. If an OCG scored less than 12 (<50%), this indicated paucity of knowledge, while scores ranging from 12 and above (>50%) showed a proper knowledge on the use of the tool (partograph). This study obtained ethical approval from the Research Ethical Committee of the CRS Ministry of Health, Calabar. Each OCG signed the informed consent form before participation in this study.

Data analysis

The data entry and analysis was performed using SPSS for Windows (v19.0; IBM Corporation, Armonk, NY, USA). Descriptive and inferential statistics were employed. Descriptive statistics included: frequency, and means and standard deviations to summarize variables, while inferential statistics (chi-square) were used to test the significance of association between two categorical variables. The level of significance was set at $P < 0.05$.

Results

One hundred and eighty questionnaires were administered to all non-physician OCGs in General Hospital, Calabar. Out of these, 130 properly completed questionnaires were analyzed. The non-physician respondents were: nurse/midwife 102 (78%), CHEW eight (6.2%), nurse aid eight (6.2%), and others, eg, junior CHEW (JCHEW) 12 (9.2%). Therefore, the majority of the OCGs were nurses/midwives (78%). The mean age of the respondents was 42.45±7.53 years. Most of the respondents (66, 50.8%) had practiced for over

20 years (Table 1). Seventy percent of the respondents indicated that only two OCGs are placed on duty in a shift most of the time in their maternity wards.

On the use of the partograph, only 86 (66.2%) of the respondents had used the instrument before and only 47 (36.2%) of them were very confident in using the instrument. Only sixty percent of the respondents had training on the use of partographs in midwifery school. Sixty-six point two percent, 74.6%, 46.2%, and 73.1% agreed that the partograph can be used to reduce maternal morbidity, maternal mortality, child morbidity, and newborn mortality, respectively. Overall, this study shows that 70.8% (92) of the respondents were aware and had good general knowledge of the partograph. However, detailed assessment of their knowledge of the component parts of the partograph and monitoring during normal labor showed poor knowledge, whereas about 86 (66%) did not know the location of the action line and 96 (73.8%) had no idea of the normal labor graph/plotting on a partograph, using the alert and action lines as yardsticks. Many of the respondents (43.8%) did not know the number of uterine contractions in every 10 minutes, 51.5% did not know the minimum duration of a strong uterine contraction, and 50.8% did not know the minimum time required to assess uterine contractions during normal labor.

Table 1 Frequency distribution of the sociodemographic characteristics of the study participants (n=130)

Characteristics	Frequency	Percentage (%)	Mean ± SD
Age group (years)			
<29	9	6.9	42.45±7.53
30–39	28	21.5	
40–49	71	54.7	
≥50	22	16.9	
Total	130	100	
Sex			
Male	3	2.3	
Female	127	97.7	
Total	130	100	
Length of time in practice			
1–5	12	29.2	
6–10	8	6.2	
11–15	18	13.8	
16–20	26	20.0	
>20	66	50.8	
Total	130	100	
Health worker group			
Nurse/midwife	102	8.5	
CHEW	8	6.2	
Nurse aid	8	6.2	
Others	12	9.2	
Total	130	100	

Abbreviations: CHEW, community health extension worker; SD, standard deviation.

Knowledge of OCGs on the assessment of labor with the partograph (Table 2) showed that most of the respondents indicated that the partograph can be used for detecting prolonged labor (73.1%), obstructed labor (64.6%), poor progress of labor (80.8%), inefficient uterine contraction (68.5%), fetal distress (68.5%), identifying abnormal fetal heart rate (66.9%), identifying satisfactory progress of labor (68.5%), detecting need for augmentation of labor (65.4%), and detecting need for CS (63.8%). The respondents were not too sure whether the partograph could be used in identifying dehydration in the mother; 52.3% indicated “yes” while 47.7% did not.

Factors affecting utilization of the partograph in labor monitoring (Figure 1) were: little or no knowledge (85.4%), nonavailability of the partograph (70%), shortage of staff (61.5%), and the fact that it is time-consuming (30%). The availability of the partograph among OCGs showed that only 78 (60%) agreed that the instrument was available in the labor ward while 52 (40%) disagreed.

Table 2 Knowledge of OCGs about assessment of labor using the partograph (n=130)

Characteristics	Frequency (%)
Prolonged labor	
Yes	95 (73.1)
No	35 (26.9)
Obstructed labor	
Yes	84 (64.6)
No	42 (35.4)
Poor progress of labor	
Yes	105 (80.8)
No	25 (19.2)
Inefficient uterine contraction	
Yes	89 (68.5)
No	41 (31.5)
Suspected fetal distress	
Yes	89 (68.5)
No	41 (31.5)
Abnormal FHR	
Yes	87 (66.9)
No	43 (33.1)
Satisfactory progress of labor	
Yes	89 (68.5)
No	41 (31.5)
Need for labor augmentation	
Yes	85 (65.4)
No	45 (34.6)
Need for cesarean section	
Yes	83 (63.8)
No	47 (36.2)
Dehydration in mother	
Yes	68 (52.3)
No	62 (47.7)

Abbreviations: OCGs, obstetric caregivers; FHR, fetal heart rate.

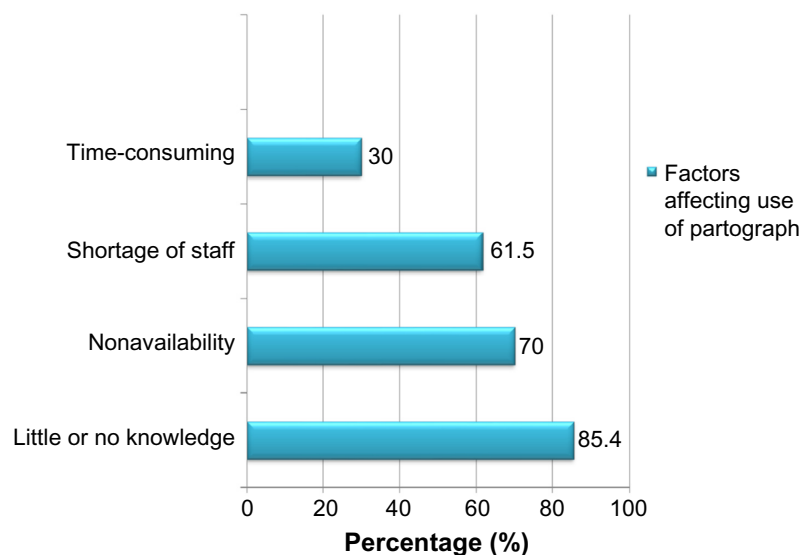


Figure 1 Factors affecting use of partograph.

Also, 65 (50%) admitted that partographs were employed in the management of labor in the facility whereas 65 (50%) disagreed. Among the 65 (50%) who agreed to the use of the partograph for labor monitoring in the study facility, 50 (76.9%) said they use it routinely, while nine (13.8%) and six (9.2%) said they use it rarely and occasionally, respectively.

The relationship between knowledge of partograph, years of experience, partograph availability, and utilization is represented in Table 3. Knowledge of partograph ($\chi^2=12.05$, $P=0.0001$) and partograph availability ($\chi^2=56.5$, $P=0.0001$) had a significant relationship with its utilization. The relationship between years of experience ($\chi^2=0.0$, $P=1.000$) and partograph utilization was not statistically significant. Table 4 showed that nurses/midwives ($\chi^2=7.44$, $P=0.006$)

Table 3 Relationship between knowledge, years of experience, partograph availability, and partograph utilization

Characteristics	Frequency (%)		χ^2	P-value
	Yes (%)	No (%)		
Knowledge of partograph				
Good	55 (59.8)	37 (40.2)	12.05	<0.0001
Poor	10 (26.3)	28 (73.7)		
Years of experience				
<15	10 (50.0)	10 (50.0)	0.00	1.000
≥15	55 (50.0)	55 (50.0)		
Partograph availability				
No	47 (90.4)	5 (9.6)	56.5	<0.0001
Yes	18 (23.1)	60 (76.9)		
Utilization of partograph	N=130	N=65	N=65	N=50

were more knowledgeable on the use of partograph when compared to CHEWs, nurse aids, and JCHEWs. Also, previous training ($\chi^2=9.43$, $P=0.002$) was significantly related to knowledge of partograph. Sex (Fisher's exact test: $P=1.0$), years of practice ($\chi^2=2.84$, $P=0.09$), and years of experience

Table 4 Relationship between sex, health worker group, years in practice, previous training, and years of experience

Characteristics	Frequency (%)		χ^2	P-value
	Good (%)	Poor (%)		
Sex**				
Female	90 (70.9)	37 (29.1)	1.00	
Male	2 (66.7)	1 (33.3)		
Total	92 (70.8)	38 (29.2)		
Health worker group				
Nurse/midwife	78 (76.5)	24 (23.5)	7.44	0.006
Other HCW	14 (50.0)	14 (50.0)		
Total	92 (70.8)	38 (29.2)		
Age (years)				
≤35	81 (73.6)	29 (26.4)	2.84	0.09
>35	92 (70.8)	38 (29.2)		
Total	92 (70.8)	38 (29.2)		
Previous training				
No	29 (58.3)	23 (44.2)	9.43	0.002
Yes	63 (80.8)	15 (19.2)		
Total	92 (70.8)	38 (29.2)		
Years of experience**				
≤5 years	8 (66.7)	4 (33.3)	0.75	
>5 years	84 (71.2)	34 (28.8)		
Total	92 (70.8)	38 (29.2)		
Knowledge of partograph	N=130	N=65	N=65	N=50

Note: **Fisher's exact test.

Abbreviation: HCW, health care worker.

(Fisher's exact test: $P=0.75$) showed no statistically significant association.

Discussion

The present study is focused on OCGs in General Hospital, Calabar, an urban secondary hospital in CRS. It is a first step toward a larger study that will cover all primary and secondary health facilities. Nigeria has a very high maternal mortality ratio^{19,20} and since nurses and midwives and health professionals form the bulk of skilled birth attendants, it is important that these workers be knowledgeable in partographic labor monitoring.

The majority of the respondents (70.8%) were well aware and had good general knowledge of the partograph. However, the respondents lacked detailed knowledge of the component parts of the partograph. For instance, almost two-thirds (66%) of the study respondents could not locate the action line, 73.8% could not locate the alert line, and 51.5% did not know about the minimum duration of strong uterine contraction. The finding in this study is comparable with studies done in Enugu in Nigeria¹¹ and Addis Ababa in Ethiopia,²¹ which also showed lack of depth of knowledge. This finding shows that OCGs' knowledge on the partograph is far below expectation, and therefore many of them will not be maximally utilized in public health hospitals and primary health care centers. This therefore informs the need for urgent steps to improve the partographic knowledge of OCGs through continuous training programs in order to increase its use.

This study also revealed that knowledge of the partograph and its availability had a significant relationship with its utilization. This finding is similar to a study conducted in Ogun state, southwestern Nigeria, among OCGs in peripheral maternity centers, which showed low levels of utilization due to poor knowledge of the partograph.¹⁰ Also, analysis drawn from recent studies within the maternity units of the two tertiary health care delivery centers in Yenagoa, Bayelsa state, Nigeria, indicated a statistically significant relationship between the availability and use of this tool in labor.⁸ Prolonged and obstructed labor contribute significantly to maternal morbidity and mortality in Nigeria and many other resource-limited areas of the world; therefore, early detection with the use of this simple, cost-effective, and affordable tool could reduce maternal morbidity and mortality and improve neonatal outcomes.^{1,2,6}

A significant relationship was also observed between shortage of staff and partograph utilization. According to Oladapo et al,¹⁰ the lack of health care staff is strongly implicated as a factor affecting utilization of the partograph as a

labor-monitoring instrument. Other researchers have opined that some midwives consider the time spent in completing the partograph to be unduly wasted as they do not appreciate its contribution in helping the woman in labor.¹⁶ By implication, when the number of staff on shift duty is favorable, the higher would be the propensity of them completing the partograph during labor monitoring. The few providers on duty are overwhelmed with work such that little or no attention is paid to some important and routine professional details. The present free health care provided to pregnant women and children under the age of 5 years may further compound this issue.

Furthermore, it was also observed in this study that previous training had a positive correlation with knowledge of the partograph. Even though many of the participants lacked detailed knowledge of the partograph, the nurses/midwives who had received better formal training were more knowledgeable in the use of the partograph than the CHEW, nurse aid/orderlies, and JCHEW. Fawole et al¹³ confirmed the significance of formal training as a solution for increasing knowledge of the partograph. Unfortunately, the use of the partograph in the primary and secondary health care delivery facilities is still an insurmountable problem. This situation also holds true in private maternity centers, which are perpetually facing a shortage of trained staff.^{10,17} Evidence has shown that knowledge of partograph use for labor management is very low among nurses, midwives, and generalist doctors working in the primary and secondary health care levels and private health care centers when compared to tertiary level care.^{9,10,13} This brings to the fore the need to introduce hands-on training for all factions of OCGs who practice at the secondary and primary levels of care and encourage them to be engaged in continued professional educational development.

There was no statistically significant relationship between sex, years of practice, and years of experience with partograph knowledge in this study. This observation is in accordance with that of Engida et al in Ethiopia.²¹ Contrary to this observation, Opiah et al⁸ in their study in Yenagoa, Bayelsa State in the Niger Delta Region of Nigeria, reported that there was a significant relationship between years of experience of midwives and the use of the partograph. The disparity in their study could be accounted for by differences in setting, since theirs was conducted among midwives at the tertiary level and at an academic medical center. Midwives in tertiary institutions have more regular training, including regular updates compared to their colleagues at secondary health care facilities.

Obviously, the findings from these studies imply that all OCGs should get periodic on-job refresher training on the use of this important tool. The federal and state Ministries of Health should consider the enforcement of the use of this life-saving tool in hospitals and primary care centers to stem the tide of maternal morbidity and mortality and fetal wastage during labor.

Study limitations

The timing of this study coincided with the period that the hospital lost a high-profile patient from ruptured uterus due to prolonged and obstructed labor. Before referral to the General Hospital, the index patient was managed in a peripheral health facility where partographs are not used for labor monitoring. Additionally, in the General Hospital where this unfortunate maternal death occurred, the use of the partograph was not a mandatory hospital policy. This officially prompted the adoption and use of the partograph by OCGs in General Hospital, Calabar with effect from November 2012. This development could have influenced the outcome of this study since the partograph was introduced 2 months before the study was conducted.

This study was not conducted with an epidemiological representative sample; rather, it was confined to OCGs based at the General Hospital, Calabar. This may introduce some bias. A comparative analysis of primary, secondary, and tertiary institutions would have been ideal. But nevertheless, the findings from this study may be a starting point to begin to address the inadequacy in midwifery practice within this study area.

Distortions can sometimes result from the use of a self-administered questionnaire. These may occur from the tendency of some respondents to give responses they consider as socially desirable or use such defense mechanisms as denial. As such, the generalizability of the findings should be used with caution.

Conclusion and recommendations

This study implies a lack of detailed knowledge of the partograph by OCGs, nonavailability of the partograph, and poor staff numbers as underlying factors working against optimal utilization of this invaluable labor-monitoring tool in the study facility. The authors therefore recommend that all OCGs should have intensive training on partographic labor monitoring. The knowledge and inclination to use this instrument should be reinforced through periodic continuous medical education by way of unit presentations, seminars, and workshops. These cost-effective labor-monitoring charts should be made available

by the hospital management for use at all times in the labor room in line with WHO recommendations and safe motherhood initiative. The nagging problem of staff shortages needs to be prioritized and addressed. The hospital should develop policies and make them mandatory for the partograph to be used for all patients admitted into the labor ward. It is hoped that this study will form the basis for further research and also provoke commitment in the developing world regarding the need to introduce this tested tool in intervention programs for issues concerning reproductive health.

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Disclosure

The authors report no conflicts of interest in this work.

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