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The effect of hypnosis on perceived stress in women with preeclampsia

Sedighe Vahdat, Mahdi Fathi¹, Zhaleh Feyzi², Mohammad Taghi Shakeri³, Mahin Tafazoli⁴

Abstract:

BACKGROUND: Perceived stress is one of the causes of preeclampsia; one of the ways to manage mental stress is hypnosis. The aim of this study was to determine the effect of hypnosis on perceived stress in women with preeclampsia.

MATERIALS AND METHODS: This randomized clinical trial was performed on 80 (40 people in each group) pregnant women 28–32 weeks with preeclampsia and hospitalized in two public hospitals in Mashhad in 2020. The Cohen Perceived Stress Questionnaire was first completed in two groups. Then, in the intervention group, three half-hour sessions of hypnosis were performed with an interval of 3 days (hypnosis consists of three sessions: each session is held for three consecutive nights). After each session, the intervention package, which included recording the dialogs of each session for posthypnotic suggestion, was delivered to the mothers on a CD to listen to every night before bed. The control group received routine care. Then, 2 weeks after the intervention, the Perceived Stress Questionnaire was completed by both groups. The results were analyzed by independent *t*-test, paired *t*-test, Mann–Whitney, Chi-square, Friedman and covariance tests, and by SPSS 16.

RESULTS: At the beginning of the study, there was no statistically significant difference between demographic characteristics and the perceived stress score before the intervention between the two groups ($P > 0.05$). However, after the intervention, the mean perceived stress score was a statistically significant difference between the intervention and control groups ($P = 0.005$). Perceived stress after the intervention was significantly reduced in the intervention group, which was significant between the two groups.

CONCLUSION: Perceived stress in mothers with preeclampsia is reduced by hypnosis.

Keywords:

Hypnosis, perceived stress, preeclampsia

Introduction

Bleeding, infection, and hypertensive disorders are the most important causes of maternal mortality during pregnancy.^[1] Among the types of hypertensive disorders, preeclampsia syndrome is the most dangerous condition, either alone or in addition to chronic hypertension. Nonsevere preeclampsia is diagnosed if the following occurs: diastolic blood pressure <110 and systolic blood pressure <160 , proteinuria (lack to positive), lack of headache, visual disturbances,

upper abdominal pain, oliguria, seizures, thrombocytopenia, fetal growth restriction, pulmonary edema, and normal serum creatinine.^[2] Hypotheses for the cause of preeclampsia include oxidative stress, vascular endothelial cell dysfunction, inflammation, and angiogenesis. Furthermore, factors such as lifestyle, psychological stress, high hemoglobin, and sleep disorders may play a role in causing preeclampsia.^[3] Stress is experiencing events that are considered dangerous to a person's physical or mental well-being. Perceived stress is one of the factors that can play a role in many diseases and disorders or alleviate the conditions for diseases and disorders.

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Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran, ¹Department of Anaesthesiology, Imam Reza Hospital, Mashhad University of Medical Sciences, Mashhad, Iran, ²Department of Health Psychology, Mashhad University of Medical Sciences, Mashhad, Iran, ³Department of Epidemiology and Biostatistics, School of Health, Sinus and Surgical Endoscopic Research Center, Mashhad University of Medical Sciences, Mashhad, Iran, ⁴Department of Midwifery, Evidence-Based Care Research Center, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

Address for correspondence:

Dr. Mahin Tafazoli, Department of Midwifery, Evidence-Based Care Research Center, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran. E-mail: tafazolim@mums.ac.ir

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Perceived stress refers to a person's belief that stress is serious.^[4] The concept of perceived stress, derived from the theory of Lazarus and Folkman, is about the role of evaluation in the stress process. In this hypothesis, perceived stress is defined by the interpretation of an event that imposes pressure on the individual.^[5] Different people perceive and interpret the same stressors in different ways. Various factors can play a role in the formation of perceived stress and interpretation of stress levels. As mentioned, 75% of physical illnesses are related to stress.^[6] Leeners *et al.* found that there is a significant relationship between stress and hypertension during pregnancy.^[7] Kamali *et al.* in their study stated that women with preeclampsia are prone to perceived stress.^[8] Perceived stress is the body's response to a change that requires adaptation or a physical, mental, or emotional response that can be triggered by any stressful factor or stimulus.^[9,10] Studies have also been performed to reduce stress in patients with preeclampsia.^[11] One of the ways to manage mental stress is hypnosis. Hypnosis is a state of focused attention with a decrease in environmental awareness in which the mind of the critic is temporarily suspended and the person tends to accept the expressions and suggestions given by the hypnotist. One of the characteristics of this technique is the feeling of involuntary movements and sensations.^[12] In creating hypnotic phenomena, self-hypnosis factors can play an important role in strengthening therapeutic goals.^[13] In fact, magnetic sleep makes it easier to access the subconscious mind. In general, the human mind and psyche consists of two parts: the conscious conscience and the unconscious conscience. (1) The conscious conscience is responsible for controlling the senses and guides human beings when they are conscious and has only 10% of their actions under control. (2) The subconscious mind is responsible for involuntary actions such as heart rate, breathing, and involuntary thoughts and feelings. Human memories from childhood to any age are archived in this section and form 90% of human actions and personality. A very important feature of the subconscious mind is its intense indoctrination.^[12] Hypnosis causes changes in the body's physiological system and extensive changes in the function of the voluntary muscles, organs, glands, five senses, immune system, cardiovascular system, respiratory system, parts of the brain, blood flow, and brain waves.^[14] Furthermore, activating the parasympathetic system before hypnosis by performing relaxation exercises makes it easier for the person to accept the therapist's instructions and speed up the healing process.^[15] In hypnosis, certain areas of the brain are involved.^[12] In this regard, the study of Heidaran *et al.* showed that hypnosis can reduce perceived blood pressure and stress in patients with primary hypertension.^[9] On the other hand, a study by Karnasih *et al.* showed that hypnotherapy can reduce the symptoms of preeclampsia

and the use of hypnosis and drug management compared to drug management alone has a positive effect on the symptoms of preeclampsia.^[16] A research by Kiecolt-Glaser *et al.* also showed that the immune system may be affected by psychological interventions such as hypnosis. Increasing the subconscious mind that the baby in the womb is part of the mother's body can prevent the antigen-antibody response, which is one of the mechanisms of preeclampsia.^[17] In hypnotherapy, positive affirmations are given when the body is at rest or in the state of an alpha brain rhythm. Repeatedly implanting positive affirmations can bring the body functioning as expected.^[18] A pregnant woman who is in a state of hypnosis receives the waves of her mind into the alpha wave, as a result of which the natural substance endorphin is produced and a feeling of pleasure and comfort is created.^[16] Given the importance of preeclampsia during pregnancy and its important effects on maternal and fetal health, and effects the stress of pregnant women with preeclampsia on the health of the fetus, and given that hypnosis is a way to reduce stress and reduce symptoms of preeclampsia, the researcher decided to conduct a study to determine the effect of hypnosis on perceived stress in women with preeclampsia.

Materials and Methods

Study design and setting

The present study is a randomized controlled clinical trial. In this study, 80 pregnant women with a gestational age of 28–32 weeks and with severe preeclampsia participated. This study was performed on patients referred to two public hospitals affiliated to Mashhad University of Medical Sciences (Ghaem Hospital and Omolbanin Hospital) in 2020. The sample size was estimated according to the study of Heidaran *et al.*,^[9] and based on the following formula, considering the power of 80% and 95% confidence interval, the sample size in each group was estimated to be 35 people. Estimating the 10% probability of sample loss, the sample size in each group was estimated to be 38 people.

In total, a sample size of 76 people was considered.

$$n = \frac{(S_{\gamma}^2 + S_{\gamma}^2) \left(Z_{\frac{\alpha}{\gamma}} + Z_{\gamma-\beta} \right)^2}{(\bar{X}_{\gamma} - \bar{X}_{\gamma})^2}$$

Study participants and sampling

The researcher, after obtaining the code of ethics (IR.MUMS.REC.1399.066) from the Vice Chancellor of Mashhad University of Medical Sciences, For sampling, referred to Ghaem and Omolbanin Hospitals

in Mashhad city. Then, after explaining the method and objectives of the research for pregnant mothers with inclusion criteria, sampling was performed by available methods. Written informed consent was completed by the research units. Finally, the samples were randomly assigned to intervention and control groups. In order to randomly assign the control and intervention groups, the researcher selected two bags. Two envelopes were placed in each bag. Then, in the first bag, the names of Omolbanin Hospital and Ghaem Hospital were written on the envelopes. In the second bag, the name of the intervention and control groups was written on the envelopes. Then, one envelope was randomly removed from the first bag and one envelope was randomly removed from the second bag. Thus, it was determined which hospital was in the intervention group and which hospital was in the control group. Inclusion criteria were nonsevere preeclampsia (diastolic blood pressure <110 and systolic blood pressure <160, proteinuria [lack to positive], lack of headache, visual disturbances, upper abdominal pain, oliguria, seizures, thrombocytopenia, fetal growth restriction, pulmonary edema, and normal serum creatinine); single pregnancy and live fetus; gestational age 32–28 weeks (based on the 1st day of the last menstrual period or with ultrasound); Iranian citizenship and residence in Mashhad; literacy for reading and writing; written informed consent to participate in the study; and having a contact number. Exclusion criteria at the beginning of the study were having medical diseases; existence of obstetric problems except preeclampsia; use of hookah, tobacco, and drugs; attempting suicide or thinking about suicide over the past year; history of mental illness or use of psychiatric drugs; history of infertility and pregnancy with assisted reproductive techniques; and history of two miscarriages and more, absence from one of the hypnosis sessions in the intervention group, reluctance to cooperate, and lack of participation in posttest.

Data collection tool and technique

Data collection tools were demographic and fertility questionnaire and Perceived Stress Questionnaire.

Demographic and fertility questionnaire includes 15 questions (including age, female occupation, female education, age of spouse, occupation of spouse, level of education of the spouse, family income status, residence status, sex of fetus, number of children, number of deliveries, number of pregnancies, number of abortions, type of delivery, history of problems and diseases of pregnancy, and delivery in previous pregnancy). This questionnaire did not need to determine its validity and reliability due to its multiple uses in various studies. The Perceived Stress Questionnaire was developed in 1983 by Cohen *et al.* This questionnaire has three versions with 4, 10, and 14 questions that are used to assess the general

stress perceived in the past month. This questionnaire measures thoughts and feelings about stressful events, control, overcoming, coping with stress, and experienced stress.^[19] This scale also examines the risk factors for behavioral disorders and shows the process of stressful relationships. A higher score indicates more perceived stress. The scale used in the present study has 14 items. Each item is answered based on a five-point Likert scale (none = 0, low = 1, medium = 2, high = 3, and very high = 4). The minimum score on this scale is 0 and the maximum score is 56. The Perceived Stress Scale measures two subscales: (A) Negative Perception of Stress subscale: questions 1, 2, 3, 4, 11, 12, and 14 and (B) Positive Perception of Stress subscale: questions 5, 6, 7, 8, 9, 10, and 13, which are scored in reverse. The Perceived Stress Scale is used to determine the degree of stress of a person's life situations from his own perspective. Cohen *et al.* confirmed the validity of this questionnaire and its correlation coefficient with semiotic sizes was between 0.52 and 0.76.^[19] Furthermore, Cronbach's alpha coefficient in the study of Heidaran *et al.* was 0.726.^[9] In this study, reliability was confirmed by retest and alpha test of 0.812.

Intervention

Prior to the intervention, both intervention and control groups completed the Reproductive and Personal Characteristics Questionnaire and the Cohen Perceived Stress Questionnaire. In the intervention group, hypnosis sessions were performed in 28–32 weeks of pregnancy for three half-hour sessions with an interval of 3 days (hypnosis consists of three sessions: each session is held for three consecutive nights). After each session, an intervention package (including recording the dialogs of each session) was provided to pregnant mothers in the intervention group for posthypnotic suggestion. The intervention package was provided on CD or through virtual and social networks to the mothers participating in the intervention to listen to each night before bed. It should be noted that hypnosis sessions were performed in a secluded room away from the stress of the hospital after coordination with the hospital and the relevant ward. The intervention group, under the supervision of a hypnotherapist, learned hypnosis through progressive muscle relaxation with a naturalistic approach. During self-hypnosis training, people learned how to focus at the beginning of the induction and be aware of the mind and awareness of thoughts, emotions, feelings, and bodily sensations in the moment. During hypnosis, pregnant women were taught the following: acceptance or lack of aversion and attachment to life issues and release from entering the vicious cycle of problems. It should be noted that after self-hypnosis training, patients repeated the exercises at home every night before bed. The exercises were repeated using an audio CD recorded by the researcher. In these dialogs, muscle relaxation

and change of blood direction from the center of the body to the body environment were performed along with dilation and relaxation of the vessels of the four limbs (arms and legs).

Summary of hypnosis therapy sessions

- Session 1: Introduction, evaluation, expression of treatment logic, and implementation of progressive muscle relaxation technique
- Session 2: Progressive muscle relaxation to reduce stress and provide suggestions for vasodilation and lower blood pressure
- Session 3: Inducing indoctrination related to the treatment of traumatic memories through relaxation, planning, reconstruction, age regression, further personality rehabilitation, and rehabilitation follow-up of the intervention group was done through telephone calls and checklists related to hypnosis. Thus, at 9.8 pm, the researcher first contacted the intervention group and noted that hypnosis was performed. Then, the next morning, a phone call was made about hypnosis and the checklist was completed. It should be noted that performing hypnosis did not cause any problems for people and was not dangerous.

The control group did not receive any intervention and both groups received routine pregnancy care. Two weeks after the start of the study and the interventions, the Cohen Perceived Stress Questionnaire was completed by both groups. After sampling and data collection, the questionnaires were coded and entered into SPSS software version 16 (IBM, SPSS Inc., Chicago, Illinois, USA) At the beginning of the data analysis, the normality of the quantitative variables was determined by the Kolmogorov–Smirnov test. Independent *t*-test, paired *t*-test, Chi-square, Mann–Whitney, and covariance tests were used. In the tests performed, 95% confidence interval and $\alpha = 0.05$ significance level were considered.

Ethical considerations

In this study, in order to observe the ethical considerations of the study, conscious consent was obtained from all study participants to participate in the study. Study participants were assured that their information would be kept confidential. The subjects in the control group did not receive any intervention until the end of the posttest, but after the posttest, hypnosis sessions were held for them.

Results

Data analysis was performed on 80 pregnant women (40 pregnant women in the intervention group and 40 pregnant women in the control group). Initially, the

results showed that the two groups were homogeneous in terms of demographic and fertility variables. The demographic and fertility characteristics of research units are listed in Table 1.

According to the results of independent *t*-test, the mean of perceived stress score before the intervention was not statistically significant between the intervention and control groups ($P = 0.377$). However, after the intervention by independent *t*-test, the mean score of perceived stress had a statistically significant difference between the intervention and control groups ($P = 0.005$). Paired *t*-test in the intervention group, before and after the intervention, showed a statistically significant difference ($P = 0.001$). In the control group, before and after the intervention, this difference was statistically significant ($P = 0.028$). Perceived stress was reduced in the intervention group but was higher in the control group [Table 2].

Although the difference in the mean scores of perceived stress was significant between the control and intervention groups, the covariance test was used to increase the accuracy of the study, which was significant with $F = 5.351$ and $P = 0.024$.

Based on the qualitative classification based on five-choice Likert, the result of Mann–Whitney test showed that the perceived stress scores before the intervention in the intervention and control groups were not statistically significant ($P = 0.113$) and the two groups were homogeneous. However, after the intervention, the result of Mann–Whitney test showed that the perceived stress score in the intervention and control groups was statistically significant ($P = 0.002$) and the perceived stress in the intervention group was significantly reduced. Intragroup comparison with Friedman test in the intervention group showed a statistically significant difference before and after the intervention ($P = 0.001$). According to the results, the perceived stress scores were lower in the intervention group. Intragroup comparison with Friedman test in the control group showed a statistically significant difference before and after the study ($P = 0.018$). According to the results, the perceived stress scores were higher in the control group [Table 3].

Discussion

The aim of this study was to determine the effect of hypnosis on perceived stress in women with preeclampsia. Prior to the intervention, the amount of perceived stress before the intervention in the two groups of intervention and control was 30%. In the study of Kamali *et al.*, women with preeclampsia were prone to perceived stress.^[8] Psychological stress during pregnancy is an important phenomenon that

Table 1: Demographic and fertility characteristics in the intervention and control groups

Variable	Intervention (n=40)	Control (n=40)	P
Age of pregnant woman (year), mean±SD	30.37±5.20	31.10±0.032	0.335*
Spouse age (years), mean±SD	34.27±5.51	35.30±4.99	0.407**
Number of pregnancies, mean±SD	1.15±1.16	1.07±0.99	0.932*
Spouse job, n (%)			
Freelance	25 (62.5)	23 (57.5)	0.708***
Administrative job	5 (12.5)	7 (17.5)	
Unemployed	3 (7.5)	0	
Other	2 (5.0)	10 (25.0)	
Total	40 (100.0)	40 (100.0)	
The economic situation, n (%)			
Good	7 (17.5)	4 (10.0)	0.276*
medium	29 (72.5)	33 (82.5)	
Bad	4 (10.0)	3 (7.5)	
Total	40 (100.0)	40 (100.0)	
Education level of a pregnant woman, n (%)			
Literacy for reading and writing	0	0	0.391*
Primary school	4 (10.0)	0	
Junior high school	2 (5.0)	4 (10.0)	
Diploma	16 (40.0)	15 (37.5)	
Above the diploma	18 (45.0)	21 (52.5)	
Total	40 (100.0)	40 (100.0)	
Pregnant woman's job, n (%)			
Homemaker	25 (62.5)	23 (57.5)	0.132***
Administrative job	5 (12.5)	7 (17.5)	
Freelance	2 (5.0)	10 (25.0)	
Student	3 (7.5)	0	
Other	5 (12.5)	0	
Total	40 (100.0)	40 (100.0)	

*Mann-Whitney test, **Independent t-test, ***Chi-square test. SD=Standard deviation

Table 2: Determining and comparing the perceived stress score in the intervention and control groups

Variable	Mean±SD		Intergroup test result (df, t, P)
	Intervention	Control	
Mean score of perceived stress before the intervention	30.08±8.55	31.88±0.92	66, 0.889, 0.377**
Mean score of perceived stress after the intervention	27.50±8.71	35.79±14.21	66, -2.090, 0.005**
Intragroup test result (t, df, P)	3.932, 33, 0.001****	-2.296, 33, 0.028****	

Independent t-test, **Paired t-test. SD=Standard deviation

Table 3: Determining and comparing the number and percentage of research units according to the perceived stress score in the intervention and control groups

Variable	Never, n (%)	Almost never, n (%)	Sometimes, n (%)	Often, n (%)	Most of the time, n (%)	Intergroup test result
Before the intervention						
Intervention	7 (17.5)	5 (12.5)	12 (30)	5 (12.5)	11 (27.5)	0.113*
Control	6 (15)	4 (10)	13 (32.5)	7 (17.5)	10 (25)	
After the intervention						
Intervention	13 (32.5)	10 (25)	11 (27.5)	4 (10)	2 (5)	0.002*
Control	5 (12.5)	5 (12.5)	8 (20)	12 (30)	10 (25)	
Intragroup test						
Intervention				0.001****		
Control				0.018****		

*Mann-Whitney test, ****Friedman test

unfortunately is not measured in routine care during pregnancy; as a result, its rate during pregnancy and its effect on maternal health has been unclear.^[20] Stress during pregnancy may indirectly or directly lead to

an increase in pregnancy complications. Evidence suggests that there is a relationship between maternal stress during pregnancy and the consequences and complications of pregnancy. Furthermore, maternal

stress is associated with an increase in unhealthy behaviors during pregnancy, developmental, social, and cognitive impairments. Maternal anxiety also predicts delivery problems and complications.^[21] Levels of proinflammatory cytokines “interleukin-6” and “tumor necrosis factor-alpha” are higher in women who experience more stress during pregnancy. On the other hand, serum level 10 IL (Interleukin) - placenta, which plays an important role in normal pregnancy, decreases in women with preeclampsia.^[22] Increased levels of the hormone that stimulates corticotropin secretion and increased sympathetic activity, which are stress-induced changes, have also been observed in women with preeclampsia.^[23] These findings suggest a link between stress and the incidence of preeclampsia. Studies have also reported that stress scores are higher in mothers with preeclampsia than in mothers without preeclampsia.^[11]

This study also showed that after the intervention (hypnosis), in the intervention group, the mean perceived stress score in pregnant women with mild preeclampsia decreased positively and significantly.

A quasi-experimental study by Heidaran *et al.*, which was performed on 30 people with primary hypertension in Mashhad, showed that therapeutic hypnosis reduced perceived stress and blood pressure in patients with primary hypertension ($P = 0.001$) it has also been reported that hypnotherapy can be used to reduce perceived stress and blood pressure in patients with primary hypertension.^[9] A study by Karnasih *et al.* aimed at determining the effect of hypnosis on the progression of preeclampsia showed that therapeutic hypnosis can reduce the symptoms of preeclampsia (lower systolic and diastolic blood pressure, reduce edema, and reduce urinary protein). They also reported that prescribing hypnosis and drug management would be more effective in advancing preeclampsia than drug management alone.^[16] Moghtader *et al.* conducted a study to determine the effectiveness of cognitive-behavioral therapy and cognitive hypnotherapy on anxiety and depression in women with premenstrual syndrome (PMS). The results of this study showed that cognitive-behavioral therapy and hypnosis are effective in reducing anxiety and depression in PMS. As a result, cognitive-behavioral therapies and cognitive hypnosis have both significantly reduced depression and anxiety in the intervention group. However, there was no significant difference between the two treatments in reducing depression and anxiety.^[24] Sarmasti *et al.* conducted a study comparing perceived social support and perceived stress on 100 women with and without preeclampsia. The results of this study showed that compared to healthy women, women with preeclampsia felt more stress and had less social support.^[25] All these studies confirm the results of the present study. In reviewing the results of these

studies, perceived stress was higher in women with preeclampsia than in women without preeclampsia. Hypnosis, on the other hand, reduces perceived stress and blood pressure in people with primary hypertension. Hypnosis can also improve the symptoms of preeclampsia. In justifying the reported results, it should be noted that in hypnosis, the instructions of each patient are made according to his needs. As a result, all these instincts have been done with the aim of improving and controlling blood pressure and restoring physical and mental balance. In its physiological explanation, it can be said that hypnosis stimulates parasympathetic nerves. Parasympathetic stimulation affects the smooth wall of blood vessels. The smooth wall of the arteries is made up of smooth muscle and increases in diameter with parasympathetic stimulation. Therefore, blood flow increases and eventually reduces blood pressure and reduces perceived stress. The present study also showed that hypnosis can be effective in reducing perceived stress in pregnant women with preeclampsia.

Limitation and recommendation

This study was associated with limitations, including the following: this study was performed only on a small sample of patients with severe preeclampsia in Mashhad, so the generalization of results should be done with caution. In addition, due to time constraints, no follow-up test was performed to evaluate the stability of the treatment effect and the effect of hypnosis therapy was not compared with any other treatment simultaneously. Finally, it is suggested that in future research, hypnosis therapy be performed specifically to treat stress in patients with mild preeclampsia at the same time as other treatment programs. Based on the results, since hypnosis therapy is a psychotherapeutic approach, it is recommended that gynecologists, internal medicine and cardiology specialists, and medical centers for patients with severe preeclampsia provide specific training in the field of physical health and related areas. It is also suggested that medical centers and hospitals pay more attention to the role of psychological variables such as stress in the treatment of these patients and consider psychological treatments along with drug therapies.

Conclusion

The aim of this study was to determine the effect of hypnosis on perceived stress in women with preeclampsia in two public hospitals of Omolbanin (AS) and Ghaem (AS) in Mashhad. The present research results showed that hypnosis reduced the perceived stress score. The change in the mean score of perceived stress caused the people in the intervention group to show significant differences in their mental state after participating in hypnosis sessions by reducing the average level of perceived stress score compared to

the control group. Therefore, it can be said that the use of hypnosis as an effective, simple, and cost-effective intervention can reduce perceived stress in women with preeclampsia.

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Conflicts of interest

There are no conflicts of interest.

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