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Research Article

Implementation of ERACS to Optimize High-Demand Delivery Services at a Secondary Public Hospital in The Jakarta Region

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Abstract
The Enhanced Recovery After Cesarean Section (ERACS) method aims to improve the quality of cesarean delivery service through standardization of perioperative management, supported by evidence-based medicine. This study assessed its impact on hospital service quality, focusing on patient recovery time and satisfaction, as well as the moderating influence of patients' age and educational background. A prospective cross-sectional study was conducted with 75 ERACS patients using a consecutive sampling based on the inclusion criteria. The perception of service quality and satisfaction were assessed using a structured questionnaire after surgery before discharge. The Structured Equation Modeling was performed to test the hypotheses. The results indicated that the ERACS method significantly improved patient satisfaction (β= 0.9, $p < 0.05$) and reduced hospital stay length (β= - 0.29, $p < 0.01$). Age and educational background did not moderate patient satisfaction (β= 0.001, $p > 0.05$ and β= 0.01, $p > 0.05$, respectively), but age moderated the effect on hospital stay length (β= 0.31, $p < 0.05$). Implementing ERACS in a level two public hospital is feasible. It improved service quality, reduced hospital stays, and increased patient satisfaction. Younger patients were found to be good candidates for the accelerated recovery time protocol of ERACS.

Keywords: cesarean, enhanced recovery, patient satisfaction, perioperative care, public hospital, service quality.

Implementasi ERACS untuk Mengoptimalisasi Kebutuhan Layanan Persalinan yang Tinggi pada Rumah Sakit Pemerintah Tingkat Sekunder di Wilayah Jakarta

Abstrak
Metode Enhanced Recovery After Cesarean Section (ERACS) bertujuan untuk meningkatkan kualitas pelayanan persalinan sesar melalui standarisasi manajemen perioperatif yang didukung dengan pengobatan berbasis bukti. Penelitian ini mengukur dampak implementasi metode tersebut pada kualitas layanan rumah sakit, dengan berfokus pada waktu pemulihan dan kepuasan pasien. Penelitian ini juga mengukur pengaruh umur dan latar belakang pendidikan dalam memengaruhi kualitas pelayanan. Sebuah studi prospektif cross-sectional dilakukan dengan menggunakan metode consecutive sampling pada 75 pasien yang menjalani ERACS dan dipilih sesuai dengan kriteria inklusi. Dokumentasi persepsi pasien terhadap kualitas dan kepuasan layanan ditinjau pasca operasi sebelum dipulangkan. Uji hipotesis menunjukkan bahwa ERACS secara signifikan berpengaruh positif terhadap kepuasan pasien (β= 0.9, p= <0.05), dan secara signifikan berpengaruh negatif terhadap lama rawat inap (β= -0.29, p= <0.01). Usia dan latar belakang pendidikan tidak memengaruhi ERACS terhadap kepuasan pasien (β= 0,001, p= >0,05 dan β= 0,01, p= >0,05). Faktor pendidikan juga tidak memengaruhi ERACS terhadap lama rawat inap di rumah sakit (β= 0.01, p= >0.05). Sebaliknya, faktor usia memengaruhi ERACS terhadap lama rawat inap di rumah sakit (β= 0,31, p= <0,05). Metode ERACS layak dilakukan pada rumah sakit umum tingkat dua dengan luaran dan kepuasan pasien yang baik. Kelompok pasien berusia muda adalah kandidat yang baik untuk protokol percepatan waktu pemulihan ERACS.

Kata kunci: kepuasan pasien, kualitas layanan, operasi caesar, peningkatan pemulihan, perawatan perioperatif, rumah sakit umum.

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Introduction

T Cesarean Section (CS) is a surgical procedure for delivering a baby through the mother's abdominal wall and uterus incision.[1,2] CS can be done in an emergency or planned situation depending on clinical indications and has been reported to reduce the Maternal Mortality Rate (MMR) to less than 1:1000 births. Furthermore, this procedure provided as an alternative delivery method besides spontaneous delivery.[1] However, the decision to undergo CS delivery instead of spontaneous delivery should always consider the magnitude of risk compared to the safety and health of both mother and fetus.[3]

The increased preference of patients for CS delivery causes more pressure on maternity health services.[4] In response, the Enhanced Recovery After Cesarean Section (ERACS) method was introduced. This method standardizes patient care to speed up recovery through high-quality medical services based on recommendations from the Society for Obstetric Anesthesia and Perinatology (SOAP) and the Early Recovery After Surgery/ERAS Society. Skilled obstetric and anesthesiology specialists assess the patient's health status according to these recommendations, the patient and their family are educated about the protocols for consent throughout the procedure.[5] This method has been widely used in America and Europe.[6,7] Various literature reported that ERACS increases the effectiveness and efficiency of CS delivery in hospitals. It has been reported to accelerate patient recovery time, thus shortening patient hospital stay.[8-12] The ERACS method also reported improved multidisciplinary collaboration of all units inside the hospitals.[13]

Despite its good clinical practice in developed countries, ERACS method has not gained popularity in developing countries such as Indonesia.[6,7] Implementing ERACS in developing countries has encountered challenges, such as resource and facility limitations and high medical costs for delivering high-quality health services, especially for underprivileged patients with inadequate health insurance.[14] According to Baluku et al. 2020, ERACS is feasible in a low-resource setting, however, its successful implementation was performed in a tertiary hospital setting in Uganda.9 Norcross et al. 2019 reported the successful implementation of enhanced recovery after surgery in a community hospital for urologic surgery, also performed in a tertiary hospital in North Carolina.[14] During the 2020 COVID-19 pandemic in Indonesia, hospitals started using the ERACS method to improve patient turnover, reduce in-hospital COVID-19 infections, and manage limited bed availability. Initially, there were few studies on its implementation in Indonesia, but reports of its success increased during the pandemic in some tertiary hospitals.[15-17] However, its implementation in secondary hospitals needs further evaluation for benefits, safety, and affordability, especially for patients with national health coverage who are often treated in public hospitals.[16]

Tamansari District General Hospital is a secondary public hospital in Jakarta, Indonesia, with high demand for delivery services and limited maternity care beds. Since 2020, this hospital has implemented the ERACS method to accelerate patient recovery consistently and utilize beds in the delivery room efficiently. This study aimed mainly to prove that the ERACS method is achievable at secondary public hospitals with good patient outcomes measured by length of hospital stay and satisfaction. The secondary outcome was to prove patient's age and educational background positively moderated the effect of primary outcomes.

Methods

A cross-sectional study was conducted on mothers who underwent ERACS at Tamansari District General Hospital in Jakarta from February to August 2022. The protocol was based on SOAP and ERAS protocol, with modifications to align with hospital resources and local population characteristics.[5,18,19] ERACS patients (elective or emergency) were screened and assessed by the obstetric and anesthesiologist specialists for their health status before surgery. Eligible patients signed informed consent after receiving information.

According to Zarei et al. 2012, patient perceptions toward health services were influenced by gender, educational level, previous experience treated in the same hospital, health insurance ownership, and length of hospital stay.[13] Gender and patient repeat visits were not included as study variables because all respondents in this study were women and limited study time. Thus, five variables were established for the study, comprising two dependent variables (patient satisfaction and length of hospital stay) and three independent variables (ERACS delivery quality, patient age, and educational background).

The sample size for the structural equation model was calculated using analytics calculators. The expected size was 0.33, with patient satisfaction and service quality as latent variables and length of stay (LOS), educational background, and age as observed variables. A significance level of p=0.05 and a statistical power of 0.8 were used. The calculation recommended 71 respondents, rounded up to 75 to account for potential dropouts.[20]

Patients' perception of ERACS service quality was measured using SERVQUAL indicators survey as a valid assessment instrument to measure the gap between patient expectations and experience on hospital service quality. It comprised five dimensions of indicators of tangibles, empathy, responsiveness, reliability, and assurance.[21] Each indicator consists of three-item questions using a five-point Likert scale, wherein the higher the point, the better the service experienced. Six-item questions on a five-point Likert scale were also used to

Table 1. Distribution of Patient's Characteristics

Characteristics	Descriptions
Age 25 to 35 years old	44 (58.7)
No comorbidity	72 (96.0)
High school graduate	40 (53.3)
NIH participant	72 (96)
Length of hospital stay	2 (1-4)
Service quality score:	
Tangibles	14 (11-15)
Empathy	14 (11-15)
Reliability	14 (12-15)
Responsiveness	15 (11-15)
Assurance	14 (12-15)
Patient satisfaction score	28 (21-30)

The results were presented in the form of n (%) or median (minimum-maximum)
Source: IBM SPSS output statistics 24

Table 2 R-Square Value

Variable	R-square
Length of hospital stays	0.19
Patients' satisfaction	0.83

Source: WarpPLS output (2022)

measure overall patient satisfaction.[13]

Patient hospital stay is the number of days starting from the day of admission until discharge from the hospital. Age is the length of life from the year and month of birth to the year and month of hospital admission. Patient education background is the last level of education completed when the patient is admitted to the hospital. Basic demographic data were collected from medical records, including the patient's comorbidity and payment method. Comorbidity includes previous chronic diseases or diseases discovered by the pregnancy. The payment method is the financial settlement to pay hospital bills before discharge.

The variable of ERACS service quality, patients' satisfaction, and length of hospital stay was presented in ratio data. In contrast, patients' age, educational background, and other basic demographic data were presented in categorical data. All descriptive data were processed using IBM SPSS Statistics 24 and presented in percentages, mean + standard deviation, or median (minimum-maximum).

Six hypotheses were developed (Figure 1) including ERACS had a negative effect on patient length of hospital stay, ERACS had a positive effect on patient satisfaction, patient age and educational background positively moderated the effect of ERACS on patient satisfaction and length of hospital stay. Hypothesis testing was performed using WarpPLS 8.0 consisting of outer model analysis, inner model analysis, and testing the influence of moderating variables. The manuscript editing followed SQUIRE guidelines.[22] Ethical clearance from the appointed University and hospital was available before data collection with

Table 3 Patient Satisfaction Question Items

Question code	Question item	Score*
K16	The hospital has a building that looks beautiful, clean, and comfortable	5 (3-5)
K17	Medical and hospital staff are patient and attentive in responding to patient needs	5 (3-5)
K18	The services provided by medical personnel and hospital staff are as promised	4 (3-5)
K19	Medical personnel are skilled in caring for mothers and babies while in the hospital	5 (4-5)
K20	The information regarding the steps, risks, and benefits of the ERACS procedure provided by the medical personnel was clear	4 (2-5)
K21	Overall, satisfied with the services provided by the hospital and considering the same delivery method in the future if ever needed	5 (3-5)

*The results were presented in the form of median (minimum-maximum)
Source: IBM SPSS output statistics 24

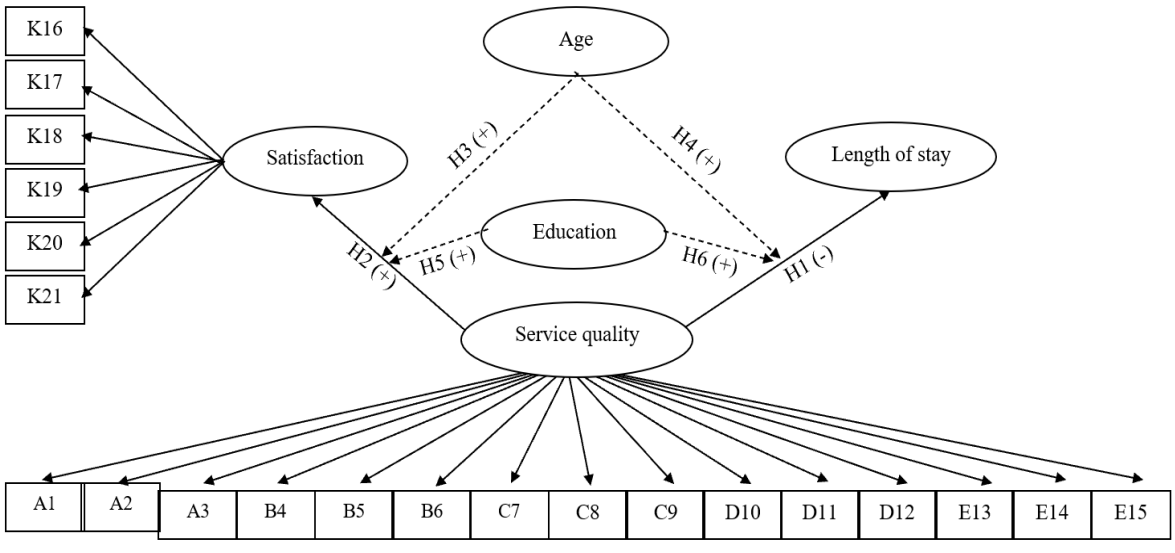
reference number 1217/SLKE-IM/UKKW/FKIK/KE/II/2022.

Results

Most patients in this study were pregnant women in the young age group (25-35 years old, 58.7%), had no history of comorbidity (96%), and were relatively educated (53.3% were high school graduates). Most of them paid their hospital bills using NHI coverage (96%). Patient outcomes measurement showed a median of 2 days (1 to 4 days) of patient length of hospital stay, and none returned to the hospital for early or late onset post-surgical complications. The SERVQUAL five dimensions' evaluation of ERACS service showed health workers' responsiveness attitude obtained a perfect score (15/15). Meanwhile, the other four dimensions revealed an almost perfect score (14/15). The evaluation of patient satisfaction also revealed an almost perfect score (28/30) (Table 1).

The questionnaire validity test showed a loading factor of >0.7 for all indicators, an average variance extracted of >0.5 for each construct, and a discriminant validity result that met the requirements for all indicators. Furthermore, the composite reliability and Cronbach's alpha tests have shown values of >0.7 in all research constructs. Thus, it is concluded that in the outer model analysis, all indicators of this study have fulfilled the validity and reliability principles.

The inner model was analyzed using the coefficient of determination test (R-square) with two research models. Firstly, the R-square test for the effect of ERACS service quality, educational background, and patient age on the patient length of hospital stays showed a result of 0.190. Thus, all exogenous constructs in the research model only affected the patient length of hospital stays by 19% and



H : Hypothesis

A-E : Service quality question items

K : Patient satisfaction question items

Figure 1 Research Model

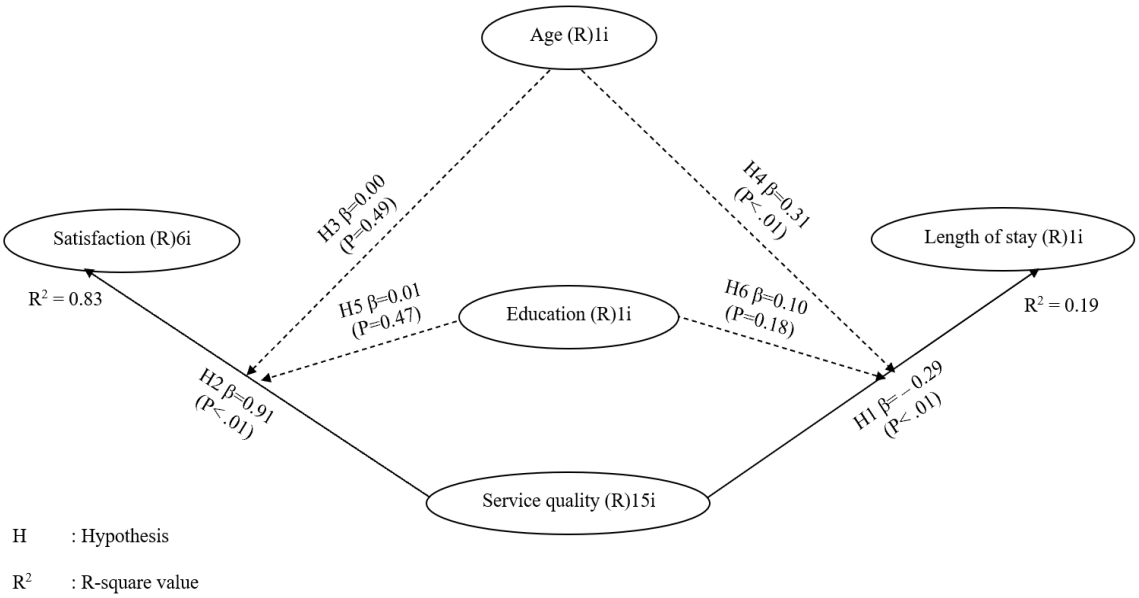


Figure 2 The Construct Model and the Influence Value between Variable

other factors outside the study influenced the remaining 81.0%. Since the R-square result is below 0.67, the influence of all exogenous constructs on patient length of hospital stay is weak. Secondly, the R-square test for the effect of ERACS service quality, educational background, and patient age on patient satisfaction obtained a value of 0.830. Thus, all exogenous constructs in the research model influenced patient satisfaction by 83.0%, and the remaining 17.0% were influenced by other factors outside the study. The R-square value is above 0.67, so the influence of all exogenous constructs on patient satisfaction is strong enough (Table 2).

The hypotheses testing was performed using t-statistical values by analyzing the direct and moderating effects of study variables (Figure 2). A significant probability value (P value) of <0.05 (5%) or t-statistic value of > t-table (which is 1.96) will accept the hypothesis. Three hypotheses were accepted, including ERACS service has a significant negative effect on patient length of hospital stay (β= -0.29, P <0.01), it also has a significant positive effect on patient satisfaction (β= 0.91, P <0.01), and there is sufficient evidence that the age factor moderates the effect of ERACS services on patient length of hospital stay (β= 0.31, P <0.01). The three rejected hypotheses include there was not enough evidence that patient age and educational background moderated the effect of ERACS service on patient satisfaction (β= 0.001, P= 0.49, and β= 0.01, P= 0.47 respectively), and there is not enough evidence that patient education moderates the effect of ERACS service on patient length of hospital stay (β= 0.01 and P> 0.05).

Discussion

The study included mostly low-risk mothers aged 25-35 with no history of health issues.[23] A 2020 MOH survey found that women in this age group seek obstetrics and gynecological services most frequently.[24] These characteristics of patients have the potential for faster recovery post-surgically and are eligible to undergo the ERACS method.

In this study, most patients were well-

educated (high school graduates) and almost all were NHI participants. The MOH's 2020 report indicates that a mother's education and socio-economic status influence their awareness of safe delivery.[25] Educated mothers are more attentive to health and safety, and the NHI program ensures fair access to healthcare services for Indonesian mothers.[24,26,27] This study shows that NHI-covered patients have access to high-quality Cesarean section deliveries through the ERACS method.

The health workers' responsiveness attitude survey revealed a perfect score (15/15). According to Deniau et al. 2016, the performance of health workers after ERACS implementation significantly increased the quality of patient care and collaboration among units with various disciplines in the hospital.[28] Therefore, the ERACS practices improve overall patient safety attitudes in the hospital.

The tangibles, empathy, reliability, and assurance survey showed an almost perfect score (14/15). Thus, improvement still needs to be done in these areas. According to Zarei et al. 2012, the tangibles dimension should become the priority of hospital improvement compared to others. An attractive and comfortable environment is the main reason patients choose the facility where they want to get treated.[13] Based on the theory, in early 2023, the hospital commenced its physical repairs from appearance to facility.

The patient satisfaction survey revealed an almost perfect score (28/30), but there is still room for improvement. Among the six-item questions (Table 3), a gap was mainly in the clarity of information provided by the medical personnel regarding the ERACS procedure before the delivery process (K20). It also refers to the other item question (K18) in which patients expressed less accuracy between the services received and promised. Thus, it is recommended for the hospital to make sure that the medical personnel involved in the service provide enough time for discussing the ERACS steps with the patient and her family. As follow-ups, the hospital comes up with an ERACS book for written documentation regarding the explained procedure for patients to take home.

The overall survey regarding ERACS service satisfaction showed a median score of 5, and patients considered using the same delivery method in the future (K21). Guswaman et al. 2020 mentioned that service quality positively affects patient repeat visits.[29] However, the data also showed a minimum score of 3 given by the patients for overall ERACS performance. Thus, follow-up studies should be considered on patient repeat visits using the same delivery method for further evaluation.

Patients' hospital stay showed a median duration of two days and no report of postoperative complications. These were in line with other previous studies, which stated faster recovery times and no incidence of complications after ERACS.[8–12] In this study, patients who stayed more than two days underwent a labor induction first upon admission. Only when it fails, such as changes in the mother or fetus's condition, is it considered to terminate by CS. Upon clinical assessment, the doctors decide whether the patient is fit for ERACS delivery. Therefore, Fay et al. 2019 recommended that ERACS studies that do not differentiate between elective and emergency cases should only measure the recovery time in the postoperative period (time from the patient finishes the operation until discharged from the hospital).[10]

This study found sufficient evidence that service quality negatively affects patient hospital stays. Thus, improvement in CS delivery service with the ERACS method significantly reduces patient care time, as mentioned by previous studies.[8–12,30] Baluku

et al. 2020 reported that elective or emergency CS delivery could be performed safely with the ERACS method.[9] Therefore, this study did not distinguish elective or emergency ERACS because patient screening was performed prior to surgery.

The ERACS method revealed a positive influence on patient satisfaction. Laronche et al. 2017 and Cusack et al. 2020 reported that mothers in the ERACS group showed higher satisfaction than those in the standard CS group. Satisfied mothers expressed that they felt more confident going through the delivery because of the accompaniment of health workers throughout the process, and they were happy they could go home sooner and felt more support from the family after surgery.[31,32] Thus, the attitude of health workers and early patient discharge protocol could be considered ERACS service appeal in the hospital.

More evidence was needed to prove that patient age moderates the effect of ERACS service quality on patient satisfaction. Arifin et al. 2019 and Guswaman et al. 2020 mentioned that young patients are more demanding and have high expectations for the health services experience. They tend to be more aggressive in seeking information and often compare the experiences they receive.[29,33] In line with the theory, majority of young adult patients in this study did not moderate the effect of ERACS on patient satisfaction.

The patient's educational background also did not show enough proof to moderate the effect of ERACS service quality on patient satisfaction. According to Guswaman et al. 2020, the higher the patient's level of education, the more expectations are being met to achieve their satisfaction. They were increasingly critical of the service experience and became difficult to satisfy.[29] Majority of patients in this study have a good level of education, and therefore they did not moderate the effect of ERACS on patient satisfaction.

Meanwhile, this study showed sufficient evidence that the age factor moderates the effect of ERACS service quality on the length of patient hospital stay. At the age of <20 years, the biological and psychological conditions of the mother are not mature enough. At the age of >35, the mother's immune system and the function of the organs tend to decrease, and diseases start to appear. Mothers of 25 to 35 years old are in their healthy and safe reproductive phase.[23] Majority of the patients in this study were young adults, and theoretically, they were in the low-risk gestational age group. Furthermore, they had no history of comorbidities that could become risk factors for complications during or after delivery. Therefore, young patients with no comorbidities will be good candidates for the accelerated recovery program of ERACS method. The three patients with comorbidity in this study were patients with HIV and controlled asthma, but they underwent ERACS delivery uneventfully.

There was not enough evidence to prove that patient educational background moderated the effect of ERACS service quality on patient length of hospital stay. The result differed from previously reported studies which mentioned that well-educated mothers tend to be more aware of delivery service quality and prefer to give birth with the help of competent health workers.[23] In this study, most mothers were NHI participants, which applies the tiered health system referral, where the participant follows the arrangements of any appointed hospital for their medical needs or will be excluded from their health coverage.[34] Thus, ERACS delivery service was not their priority of choice upon admission to the hospital. Apart from that, the ERACS protocol itself also has guidelines and targets for patient recovery time. No matter how well-educated the mothers were, they will be home 24 hours

after surgery.

The results of this study support the use of the ERACS method in secondary-level public hospitals. The method has been shown to accelerate patient recovery, reduce hospitalization times, enhance patient safety practices, and increase patient satisfaction, similar to previous findings in tertiary hospitals.[15-17] The study also recommends incorporating the method into national health coverage services to help reduce maternal mortality rates in Indonesia. Improvement should be made for future research with a comparative study (ERACS vs standard CS) assessing patients' clinical outcomes and healthcare cost-effectiveness

Conclusions

The ERACS method was feasible to carry out in a secondary hospital with good patient outcomes and satisfaction like other research conducted in higher-level hospitals. It can streamline the high demand for CS service by accelerating patient recovery and shortening patient length of hospital stay. It is feasible to perform for all health insurance patients, including the NHI participants. It will not become the service of choice for NHI patients despite their age group and educational background. Still, young patients with no comorbidity will be good candidates for the accelerated recovery program of the ERACS method. However, further study is needed to assess its effectiveness on patients' clinical outcomes and healthcare costs.

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Conflict of Interest

The study has no conflicts of interest to declare.

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