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Knowledge and self-care behavior among heart failure patients in South India

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Abstract:

BACKGROUND: Heart failure (HF) is a chronic condition with significant public health concerns. HF necessitates adequate knowledge and adherence to self-care for enhanced quality of life and decreased rehospitalization. This study aimed to explore knowledge and self-care behavior in patients with HF.

MATERIAL AND METHODS: The study was conducted in cardiology wards of a tertiary care hospital and the design was a randomized controlled trial. The baseline data (before the intervention) from 160 HF patients enrolled in a randomized controlled trial were analyzed. Knowledge and self-care behavior were measured using the Dutch HF Knowledge Questionnaire (score ranging from 0 to 15) and European HF Self-care Behavior Scale-9 (score ranging from 0 to 100). Higher scores indicated better self-care behavior and knowledge. Descriptive statistics such as frequency, percentage, mean, and standard deviation and inferential statistics such as independent sample *t*-test and ANOVA were performed.

RESULTS: The majority (75.0%) were men with a mean age of 56.1 ± 7.9 years. A significant proportion had hypertension (65%), diabetes (58.7%), or both comorbidities (40.6%). Most exhibited a left ventricular ejection fraction $<30\%$ (60.6%) and New York Heart Association class II (43.1%). The mean knowledge and self-care behavior scores were 7.1 ± 2.0 and 45.0 ± 12.4 , respectively. Over half of the participants had inadequate self-care behavior (51.2%), and 88.3% lacked sufficient knowledge about HF. Medication adherence was high (87.0%) among the participants, while only 3.1% reported regular weight monitoring and 32.3% exercised regularly.

CONCLUSIONS: There was a lack of HF-related knowledge and inadequate self-care behavior for HF management. Effective interventions to improve disease-related knowledge may lead to better self-care behavior and improve clinical outcomes.

Keywords:

Adherence, determinants, health promotion, heart diseases, self-management

Introduction

Heart failure (HF) is a complex chronic condition most prevalent globally, with an age-standardized prevalence of 706.43 per 100,000 persons in the Eastern Mediterranean region.^[1] Due to the chronic nature of the disease, in addition to pharmacological therapy, self-care is necessary for managing the condition effectively.^[2,3] Patients who

engage in efficient self-care will experience better clinical outcomes.^[4]

Self-care behavior in HF patients can vary significantly due to diverse sociodemographic characteristics and knowledge of HF. There is limited research from India that explores the self-care practices and knowledge of this population. The study aimed to assess the self-care behavior and knowledge of HF patients.

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Material and Methods

Study design and setting

This paper is based on the analysis of baseline data (before intervention) from the participants enrolled in a randomized controlled trial (RCT) designed to study the effect of self-care educational intervention on self-care behavior and clinical outcomes. Further details of the trial design are discussed in the protocol published elsewhere.^[5] The study was conducted between April 2021 and March 2023 among cardiology patients admitted to a private tertiary care hospital in Karnataka located in southern India.

Study participants and sampling

The study included 160 patients between 36 and 70 years, diagnosed with HF with reduced ejection fraction with New York Heart Association (NYHA) class II–IV admitted to the cardiology ward. Patients with no formal education and those with comorbidities such as chronic obstructive pulmonary disease, asthma, cancer, stroke, chronic kidney disease, and cognitive impairment were excluded from the study. The sample size was estimated for the RCT design, and 160 patients were enrolled in the trial.^[5] This paper presents the analysis of the baseline findings on self-care behavior and knowledge on HF of those study participants.

Data collection tools and techniques

Sociodemographic characteristics such as age, gender, marital status, education, living alone or with family, smoking status, alcohol use, health insurance coverage, and socioeconomic status (SES) based on the revised Kuppaswamy scale were obtained. The revised Kuppaswamy scale categorizes SES into five classes: upper, upper middle, lower middle, upper lower, and lower, considering the education, occupation, and monthly family income in Indian rupees. In this study, we classified SES into three categories: upper, middle (upper middle and lower middle class), and lower (upper lower and lower class).^[6] We documented the patient's clinical characteristics, including comorbidities, etiology of HF, left ventricular ejection fraction (LVEF), NYHA class, duration of illness, and the number of hospitalizations in the past.

Knowledge of HF was assessed using the Dutch Heart Failure Knowledge Questionnaire (DHFKQ), a standardized tool. This consists of a total of 15 items with three domains: knowledge of HF in general (4 items), knowledge of HF treatment (6 items), and knowledge of HF symptoms and recognition of symptoms (5 items). The multiple-choice items with a single best response carried one mark for the correct answer and zero for the wrong answer.^[7] Participants who scored ten or above were considered to have good knowledge, while those who scored less than ten were classified as having poor knowledge.^[8]

We utilized the European Heart Failure Self-Care Behavior Scale (EHFScBS-9) to measure self-care behavior. This scale consists of nine items, including daily weight recording, fluid and salt restriction, adherence to medication, regular exercise, and contact with a doctor or a nurse for symptoms such as shortness of breath, leg swelling, sudden weight gain of 2 kg or more within a week and increased fatigue. The items in the scale were categorized into three domains: autonomy-based adherence (3 items), consulting behaviors (4 items), and provider-directed adherence (2 items). Each item was rated on a Likert scale of 1 to 5, where 1 indicates complete agreement, and 5 indicates complete disagreement. As per the scoring guidelines of the questionnaire, the scores were reversed as 1 = 5 and 5 = 1, and the total scores ranged from 9 to 45. To make an inference of the obtained scores, they were rescaled as 0 to 100, implying that if a participant obtains a score of 9, then they will attain a rescaled score of zero and 45 as 100. Higher scores indicate better self-care behavior.^[9] In this study, respondents with standardized scores greater than the mean scores (45.0) were considered to have good self-care behavior in HF, and those below the mean scores had poor self-care behavior.

The EHFScI-9 is a standardized, valid, and reliable instrument with an established Cronbach's alpha value of 0.80.^[9] The DHFKQ was also tested for face validity, content, and construct validity among HF patients and obtained a Cronbach's alpha of 0.62.^[7] Permission from the authors of these instruments was obtained to use them in the present study. The DHFKQ and EHFScBS-9 instruments were translated to the local language, Kannada, by a language expert and then back-translated to English with permission from the authors of these instruments. The reliability of the Kannada version of the instrument was established by administering it to 20 patients with HF and computing the reliability with the split-half method for the DHFKQ ($r = 0.74$) and Cronbach's alpha for the EHFScBS ($r = 0.85$).

Ethical considerations

Approval from the Institutional Ethics Committee was obtained (IEC No. 535/2019). The study protocol was registered in the Clinical Trial Registry of India (CTRI/2019/10/021724). Administrative permission was obtained from the hospital where the study participants were recruited. Participants were informed about the study using a participant information sheet and informed written consent was obtained.

Statistics

The data pertaining to demographic and clinical characteristics, HF knowledge, and self-care behavior were expressed as the frequency, percentage, mean, and standard deviation. To further explore what

determines patients' self-care behavior, Pearson's correlation coefficient was computed to determine the relationship between knowledge and self-care behavior. An independent sample *t*-test and one-way ANOVA were calculated to determine the association between HF knowledge, self-care behavior scores, and sociodemographic and clinical characteristics.

Results

Sociodemographic characteristics

Table 1 shows the sociodemographic characteristics of the 160 study participants. The study sample was predominantly men (75%), with a mean age of 56.1 ± 7.9 years. A large percentage of participants were married (88%) and living with their families (85.6%). Furthermore, most of them belonged to the lower SES group (67.1%).

Clinical characteristics

Table 2 shows the clinical characteristics of the participants. The study found that 43.1% of the participants were categorized as NYHA class II. Hypertension was the most prevalent comorbidity, affecting 65.0% of the participants, followed by 58.7% with diabetes. More than half of the participants (60.6%) had severe left ventricular systolic dysfunction, with an LVEF of less than 30%. The study also found that 95% of them were treated with diuretics.

Heart failure knowledge

The mean HF knowledge score of the study participants was 7.1 ± 2.0 . The frequency and percentage of participants who responded correctly to the items of the HF knowledge questionnaire are presented in Table 3. The mean and standard deviation of the domain scores are described in Table 4. The categorical scores show that most of the participants (88.3%) had poor knowledge about HF [Figure 1].

Self-care behavior

The mean HF self-care behavior score measured using the EHFSBS-9 was 45.0 ± 12.4 . The percentage distribution of scores for each item is presented in Figure 2, which shows that most of the participants did not follow the recommended self-care practices. Only a minimum percentage of participants (3.1%) were monitoring their weight daily, and a moderate percentage (32.3%) of them were engaged in regular exercise and adhered to limited fluid intake (29.8%). However, a larger number of participants reported taking regular medications (87.0%).

Table 5 presents the mean and standard deviation of domain scores for HF self-care, including autonomy-based adherence, consulting behavior, and provider-directed

Table 1: Frequency and Percentage of Sociodemographic Characteristics of Study Participants N=160

| Variables | Category | Frequency | Percentage |
|---------------------------|------------------------|-----------|------------|
| Age in years | <60 | 100 | 62.5 |
| | ≥60 | 60 | 37.5 |
| Gender | Men | 120 | 75.0 |
| | Women | 40 | 25.0 |
| Marital status | Married | 141 | 88.0 |
| | Widowed | 12 | 7.5 |
| | Divorced | 3 | 2.0 |
| | Single | 4 | 2.5 |
| Education | Primary school | 104 | 65.2 |
| | Secondary school | 25 | 15.5 |
| | Above secondary school | 31 | 19.3 |
| Socioeconomic status | Upper | 1 | 0.6 |
| | Middle | 51 | 31.9 |
| | Lower | 108 | 67.5 |
| Health insurance coverage | Yes | 82 | 50.9 |
| | No | 78 | 49.1 |
| Living condition | Alone/couple only | 23 | 14.4 |
| | With family | 137 | 85.6 |
| Smoking status | Never smoked | 111 | 69.4 |
| | Quit smoking | 33 | 20.6 |
| | Currently smoking | 16 | 10 |
| Alcohol use | Never used | 95 | 59.4 |
| | Quit | 34 | 21.3 |
| | Currently drinking | 31 | 19.3 |

Table 2: Frequency and Percentage of Clinical characteristics of the study participants n=160

| Variables | Category | Frequency | Percentage |
|------------------------------------|-----------------------------|-----------|------------|
| Comorbidities | Hypertension only | 104 | 65.0 |
| | Diabetes only | 94 | 58.7 |
| | Hypertension and diabetes | 65 | 40.6 |
| | Prior myocardial infarction | 34 | 21.2 |
| | Anemia | 71 | 44.3 |
| Etiology | Ischemic | 105 | 65.6 |
| | Nonischemic | 55 | 34.4 |
| Duration of HF | ≤ 6 months | 118 | 73.8 |
| | >6 months | 42 | 26.2 |
| NYHA class | Class II | 69 | 43.1 |
| | Class III | 52 | 32.5 |
| | Class IV | 39 | 24.4 |
| Number of past hospitalizations | Nil | 78 | 48.8 |
| | One time | 47 | 29.3 |
| | Two times | 21 | 13.1 |
| Left ventricular ejection fraction | 31-45% | 63 | 39.4 |
| | <30% | 97 | 60.6 |
| | Medication | Diuretics | 152 |
| | Sacubitril/valsartan | 62 | 28.0 |

adherence. Patients with overall self-care scores above the mean value (45.0) were considered to have good self-care behavior, and those with scores below the mean were considered to have poor self-care behavior.

Table 3: Frequency and Percentage of Itemwise Distribution of HF Patient Correct Responses to Dutch Heart Failure Knowledge Questionnaire n=160

| Items | Frequency | Percentage |
|--|-----------|------------|
| HF knowledge in general | | |
| What is the function of the heart? | 81 | 50.3 |
| What does heart failure mean? | 78 | 48.4 |
| What are the main causes of heart failure? | 59 | 36.6 |
| What can cause a rapid worsening of heart failure symptoms? | 27 | 16.9 |
| Knowledge of HF treatment | | |
| How much fluid is allowed each day in someone with heart failure? | 80 | 49.7 |
| Why should someone with heart failure follow a low-salt diet? | 55 | 34.2 |
| Which of the statement is true (follow up with recommended medications)? | 134 | 83.2 |
| Which statement about exercise for people with heart failure is true? | 78 | 48.4 |
| Why are water pills prescribed to someone with heart failure? | 105 | 65.2 |
| What is the best thing to do when someone with HF is thirsty? | 66 | 41.0 |
| HF symptoms and recognition | | |
| How often should patients with severe heart failure weigh themselves? | 16 | 9.9 |
| Why is it important that patients with heart failure weigh themselves regularly? | 77 | 47.8 |
| What is the best thing to do in case of increased shortness of breath or swollen legs? | 130 | 80.7 |
| Why can the legs swell up when you have heart failure? | 84 | 52.2 |
| Which statement about weight increase and heart failure is true? | 89 | 55.3 |

Table 4: Mean and Standard deviation of Domain Scores of Heart Failure Knowledge n=160

| Domains of heart failure knowledge scores | Mean | SD |
|--|------|------|
| HF knowledge in general (0 – 4) | 1.38 | 1.0 |
| Knowledge of HF treatment (0 – 6) | 3.23 | 1.2 |
| Knowledge of HF symptoms and symptom recognition (0 – 5) | 2.47 | 1.14 |
| Overall Knowledge on heart failure (0 – 15) | 7.10 | 2.0 |

The present study findings show that 48.8% had good self-care and 51.2% had poor self-care behavior.

Relationship between self-care behavior and HF knowledge

The baseline findings from this study showed inadequate knowledge regarding HF and poor self-care behavior in patients with HF. Thus, further analysis was performed to identify the influence of knowledge on self-care behavior. Pearson’s correlation coefficient test showed that self-care behavior was not dependent on knowledge in HF (r = 0.08; P = 0.30).

Factors associated with HF knowledge and self-care behavior

Knowledge of HF was independent of the participants’ educational status (P = 0.2), age (P = 0.6), gender (P = 0.7), and SES (P = 0.8). Sociodemographic factors such as age (P = 0.4), gender (P = 0.6), education (P = 0.1), SES (P = 0.5), and living status (P = 0.4) were not associated with self-care behavior. There was no association between clinical characteristics such as comorbidities (P = 0.1), duration of illness (P = 0.2), NYHA class (P = 0.2), LVEF (P = 0.5), and self-care behavior score, which is presented in Table 6.

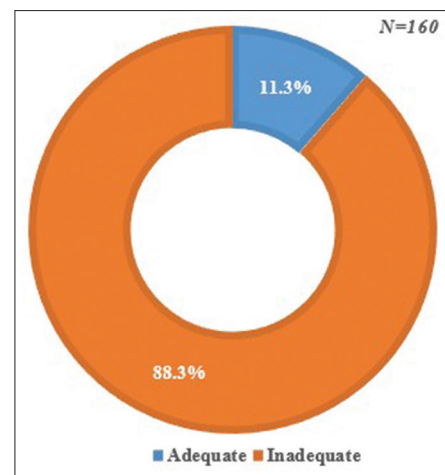


Figure 1: Percentage Distribution of Knowledge Scores

Discussion

This study determines baseline HF knowledge and self-care behavior in patients with HF in India. The study involved 160 participants with HF, with a mean age of 56.1 ± 7.9 years. Predominantly, the patients were men, married, and living with their families. Most of them were from lower SES (67.1%). Most of the participants had hypertension (65.0%) and diabetes (58.7%). Most of the participants (60.6%) had severe left ventricular dysfunction, with an LVEF of less than 30%, and 95.0% of these individuals were treated with diuretics. The study found that 56.5% of the participants were in NYHA class III–IV. The mean score for HF knowledge was 7.1 ± 2.0, and that for HF self-care behavior was 45.0 ± 12.4. The study found no association between the participants’

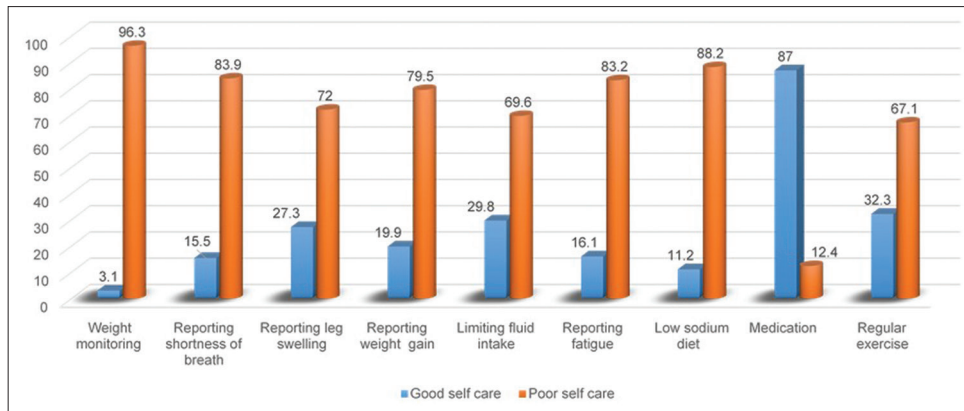


Figure 2: Item-wise Percentage Distribution of the Self-care Behavior

sociodemographic or clinical variables with HF knowledge and HF self-care behavior.

Our study evaluated the participants’ knowledge of HF, including their understanding of diet, fluid restriction, and symptom recognition. The mean score for HF knowledge was 7.1 ± 2.0 , and 88.3% of the participants scored less than 10, indicating poor knowledge regarding HF. The present study findings are supported by previous studies that showed poor knowledge of HF.^[10-16] In the management of HF, more focus is given to pharmacological treatment. In contrast, nonpharmacological measures, such as providing disease-related information to the patient, teaching them the importance of knowing HF symptoms, monitoring their symptoms, and determining what needs to be performed if the symptoms are present, are given the least priority. When patients do not receive this specific information, they lack knowledge, leading to poor self-care behavior.^[17] Educational interventions focused on enhancing patient knowledge and self-management skills have improved clinical outcomes such as adherence to self-care behavior and reduced hospital readmissions.^[18]

In the present study, among the domains of HF knowledge scores, knowledge of treatment had higher scores than that of HF knowledge in general, HF symptoms and symptom recognition. The items in the knowledge questionnaire that scored less were awareness of causes of HF and worsening of symptoms, the reason for consuming a low-salt diet, fluid restriction, and frequency of weight monitoring. This finding was supported by the study findings of Baymot *et al.*, (2022)^[19] conducted among 294 HF patients. However, Zeng *et al.*^[20] reported higher scores in knowledge of HF in general. This shows that patients are well informed about their treatment. In contrast, information about the disease and symptom recognition is lacking among this population.

Improving self-care behavior is a major focus in the management of HF.^[21] The present study found that the

Table 5: Mean and Standard deviation of Self-care Behavior Domain Scores $n=160$

| Self-care behavior Domains | Mean±SD |
|--|-----------|
| 1. Autonomy-based adherence | 7.5±2.3 |
| 2. Consulting behavior | 10.8±2.7 |
| 3. Provider-directed adherence | 6.7±1.5 |
| Overall Classic score of self-care behavior (9–45) | 25.2±4.4 |
| Overall standardized scores (0–100) | 45.0±12.4 |

Table 6: Factors Associated with Self-care Behavior in Patients with HF $n=160$

| Sample Characteristics | Mean | SD | t-test/F-test | df | P |
|------------------------|------|------|---------------|-----|-----|
| Age | | | | | |
| 36-59 | 44.4 | 12.3 | | | |
| 60-70 | 46.1 | 12.5 | -0.8 | 158 | 0.4 |
| Gender | | | | | |
| Male | 45.3 | 12.5 | | | |
| Female | 44.3 | 12.0 | 0.4 | 158 | 0.6 |
| Education | | | | | |
| Primary school | 45.9 | 12.5 | | | |
| Secondary school | 46.2 | 10.1 | 1.8 | 157 | 0.1 |
| Above secondary school | 41.2 | 13.2 | | | |
| Socioeconomic class | | | | | |
| Upper | 49.9 | 0 | | | |
| Middle | 43.6 | 10.1 | 0.5 | 157 | 0.5 |
| Lower | 45.7 | 13.4 | | | |
| Living condition | | | | | |
| Alone/couple only | 43.2 | 11.0 | | | |
| With family | 45.3 | 12.6 | -0.7 | 158 | 0.4 |
| Comorbidities | | | | | |
| With comorbidities | 45.6 | 13.2 | -1.3 | 158 | 0.1 |
| Without comorbidities | 43.6 | 9.9 | | | |
| Duration of illness | | | | | |
| ≤6 months | 44.3 | 12.0 | -1.1 | 158 | 0.2 |
| >6 months | 47.0 | 13.3 | | | |
| NYHA Class | | | | | |
| Class II | 46.4 | 10.4 | | | |
| Class III | 42.7 | 14.6 | 1.3 | 157 | 0.2 |
| Class IV | 45.0 | 12.4 | | | |
| LVEF | | | | | |
| Moderate (31-45%) | 45.8 | 12.3 | | | |
| Severe (<30%) | 44.6 | 12.4 | 0.5 | 158 | 0.5 |

average standardized score for self-care behavior was 45.0 out of 100. This is similar to a study performed in Poland on male patients under the age of 65 years, who had an average self-care behavior score of 50.3, and elderly adults, who scored an average score of 50.3.^[22,23] In the present study, 51.2% demonstrated poor self-care behavior. This finding is comparable to the studies that found that 42% - 63% of people had poor self-care levels.^[24-27] However, Seid *et al.* (22.3%), Tegegn *et al.* (28%), and Sewagegn *et al.* (17.4%) reported a small percentage of participants with good self-care behavior.^[14,16,28] A systematic review of self-care practices of Ethiopian HF patients revealed a 35.2% adherence rate.^[29] This indicates that although self-care is essential in HF management, patients fail to adhere to recommended self-care behaviors.

The current study showed that self-care behaviors varied among study participants. Although HF patients adhered to their prescribed medication, there was low engagement in self-care activities such as daily weight monitoring, limiting fluid intake, exercising, and consuming a low-salt diet. These findings align with earlier studies that revealed that most patients follow their medication regimen and have difficulty adhering to exercise and weight monitoring.^[10,14,15,19,28,30-33] Our study findings are consistent with a study performed in a cardiac center in Ethiopia with medication adherence (93.2%) as prescribed.^[28] Our research shows a higher medication adherence rate compared to a similar study in Ethiopia, where 64.86% of participants followed their prescribed medication, 34% followed daily weighing, and 55.9% followed salt restriction.^[25] This indicates that focusing on just one aspect of self-care may not be enough. Awareness of all recommended behaviors and their importance in maintaining overall health is essential. Encouraging patients to adopt a comprehensive approach to self-care can help them achieve better health outcomes.

Several studies have explored the role of demographic factors in self-care practice.^[19,24,26,34] The results of the present study show that self-care behavior was independent of age, gender, education, SES, living situation, clinical characteristics, and HF knowledge. This finding is comparable to earlier studies that examined the relationship between HF self-care and characteristics such as gender, education, and NYHA class, which were statistically nonsignificant.^[13,16,35,36] However, studies also show a significant association between comorbidities and HF knowledge.^[28] A systematic review of studies on self-care behavior in HF patients found insufficient evidence to determine the relationship between self-care behavior and factors such as age, gender, education, and LVEF.^[37] However, a systematic review found that factors such as HF knowledge, higher education levels, advanced NYHA class, absence of comorbidities, and

duration of HF symptoms were predictors of good self-care behavior among HF patients in Ethiopia.^[38]

Limitations and recommendation

This study has a few limitations. First, this is a baseline data analysis from an RCT; hence, the sample size was estimated for the RCT and not for the cross-sectional study. Second, the study was conducted in a single center. Third, we did not consider the duration of illness for study inclusion, which may affect the study findings.

The present study reveals that inadequate self-care behavior and knowledge among HF patients carries significant implications for healthcare management in the region. This includes empowering patients through self-care educational programs to manage their condition effectively, improving patients' confidence in monitoring HF symptoms, utilizing community resources to help disseminate knowledge, and offering peer support to people with HF. The study underscores the need for further research to identify the specific barriers to self-care in India. Understanding these barriers can guide the development of targeted interventions to address them effectively.

Conclusion

HF is a chronic condition that requires patient education and self-care as a part of disease management apart from guideline-directed medical therapy. The results of this study indicated that patients with HF have poor knowledge and inadequate self-care behavior that is needed to manage HF effectively in the long run. However, we found no relation between knowledge and self-care behavior. To improve self-care behavior, patients need to be informed about the recommended self-care and provide adequate knowledge about the disease to change their self-care behavior.

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Conflicts of interest

There are no conflicts of interest.

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