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# Association between Standard of Living and Sickness Absenteeism among Hypertensive Patients in South Chennai: A Cross-Sectional Study

Vijayalakshmi Sridharan, Rehana Syed, Jasmine Maruthappapandian, B.N. Surya, Divya I*, Vigneshsamy Muthuchamy

*Department of Community Medicine, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam, 603103, Tamil Nadu, India*

***Abstract***

*Introduction: Hypertension is one disease that has the highest prevalence worldwide. Low Socioeconomic status is considered a non-modifiable risk factor for the disease. The objective of this study was to estimate the prevalence of sickness absenteeism among hypertensives and find the association between the Standard of living and sickness absenteeism among hypertensive patients in South Chennai. Methods: This Cross-sectional study included 354 hypertensive patients selected from NCD registers of six PHCs in Chengalpattu district during the period September 2023 to March 2024 through telephonic interview. A pre-tested semi-structured questionnaire was used to retrieve necessary information. Sickness absenteeism was assessed by the Bradford factor. A score of more than 50 represented the presence of sickness absenteeism. The strength of the association between SLI and Sickness absenteeism was estimated by multivariate logistic regression analysis (P <0.05 was considered significant) using Statistical Package for Social Sciences version 21. Results: The prevalence of sickness absenteeism was found to be 44%. Factors such as cooking using charcoal [AOR - 6.219 (2.964 – 13.047)], not having electricity facility [AOR – 0.032 (0.005 – 0.203)], living in kutcha house [AOR – 5.469 (2.849 – 10.498)] and not possessing a bank or post office account [AOR – 3.681 (2.119 – 6.395)] were found to be significantly associated with sickness absenteeism. Conclusion: The association between the standard of living and sickness absenteeism was evident in hypertensives. Improving the standard of living in hypertensive populations will not only enhance well-being but also reduce absenteeism from work, increasing workplace productivity.*

***Keywords****: Cardiovascular Disease, Living Standard, Sick Leave, Social Class.*

## Introduction

Health is a "state of complete physical, psychological and social well-being and not merely the absence of disease or infirmity" - World Health Organization (WHO). Ill health is otherwise called disease or sickness. The latter denotes the public dimension of the disease and points to the link between society and illness [1]. Low Socioeconomic status is considered to be a non-modifiable risk factor for disease, thus income and living standards influence health and vice versa [2],[3]. In addition, the environment is closely related to health and disruption of the same contributes to disease and work absenteeism [4]. Hence Standard of living, disease and sickness absenteeism form a vicious cycle.

The epidemiological transition led to a sturdy rise in non-communicable diseases (NCD) worldwide, contributing to the highest number of deaths. Of the non-communicable diseases, hypertension is one disease with the highest prevalence worldwide. It also forms one of the three important risk factors of cardiovascular diseases and is also a major risk factor for stroke which is a disabling disease.

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****Corresponding Author: div.ilan12@gmail.com***

This in turn compromises the quality of life and causes disability and ultimately death contributing to economic burden [5],[6],[7].

In India, only one-tenth of the rural hypertensive population has their blood pressure under control [8],[9]. A study on workplace productivity among hypertensive populations revealed that workers with uncontrolled hypertension contributed to lost productive time when compared to normotensive workers [10]. India is a country with the world's largest democracy facing issues related to NCD [11]. Poor standard of living has largely been related to communicable diseases in the past. Due to the epidemiological transition, it is necessary to study the standards of living in the NCD population and subsequent absenteeism from work due to sickness. The objective of the current study was to find the association between the Standard of living and sickness absenteeism among hypertensive patients in South Chennai.

## Methods

A Cross-sectional study was conducted among hypertensive patients who visited Primary Health Centres in South Chennai, Tamil Nadu, India. The study included patients above 30 years, known to have hypertension for a minimum of two years, employed in any occupation for more than a year, and who provided informed consent. Patients with disabilities and psychological illnesses were excluded. The sample size was calculated based on a 66.9% prevalence of sickness absence from a study by Manjunatha et al., with 80% power, 95% confidence interval, and 5% allowable error, the sample size was determined to be 340, With an additional Non-response rate of 10%, the final sample size came out to be 374 [12].

Among the 8 blocks in Chengalpattu district, 4 blocks were randomly selected using the lottery method. A list of primary health centres (PHCs) in each selected block was obtained from the district database, totalling 12 PHCs. Six PHCs were randomly chosen using the coin toss method. The population covered by each PHC ranged from 35,000 to 40,000. Details of hypertensives fulfilling inclusion criteria in the selected PHCs were extracted from the NCD registers. A Microsoft Excel spreadsheet was used for data management, and random numbers were generated to select study participants proportionate to the size of each PHC. Consequently, 64 to 66 participants were selected from each PHC.

Data collection was done through telephonic interviews after obtaining informed consent from the participants. Detailed socio-demographic profiles, history of hypertension and other comorbidities were recorded using a pre-tested semi-structured questionnaire. Socioeconomic status and housing standards were assessed using the Standard of Living Index (SLI) whereas sickness absenteeism was assessed by using the Bradford factor.

The Bradford Factor score is a tool used by organizations to quantify and manage the impact of employee absenteeism. It emphasizes the disruptive effect of frequent, short-term absences by calculating a score based on the formula $B= S^2 \times D$, where S is the number of instances of absence and D is the total number of days absent over a set period. The Bradford Factor score is used to measure and manage sickness absenteeism, highlighting the disruptive impact of frequent short-term absences. Low scores (0-49) indicate minimal disruption (considered acceptable), moderate scores (50-149) suggest some concern, high scores (150-499) indicate significant disruption and very high scores (500 and above) reflect severe disruption, requiring immediate intervention [13]. For statistical analysis, participants in moderate, high and very high categories were considered to have sickness absenteeism. The low category (0-49) was classified as having nil absence.

Procured data were entered in a Microsoft Excel spreadsheet and then statistical analysis was performed using Statistical Package for

Social Sciences software version 21. Categorical variables were expressed in frequencies and percentages. Test of significance for categorical variables was done using the Chi-square test and p-value <0.05 was considered statistically significant. Bivariate logistic regression was done to obtain an unadjusted odds ratio and those variables with a p-value <0.05 were added to the multivariate model to obtain an adjusted odds ratio and 95% CI was constructed to gauge the estimate.

## Results

About 354 participants responded to the phone call and provided informed consent to participate in the study (response rate 94.6%). The mean (SD) age of the study participants was 49.14 (11.2) years. Among them nearly 85% aged above 40 years with male female ratio 1:1. Only 36 (10.2%) participants were graduates and 103 (29%) of them lacked even school education. Out of the 354 participants, 105 (29.7%) were unskilled workers but only 26 (7.3%) were professionals. About 93% (N=329) of them were employed in any occupation for more than 10 years. The majority of the study participants (N=121, 34.2%) belonged to the upper middle class following which 29% (N=103) were middle class. Over 65% of them were from rural localities, Table 1.

**Table 1**. Sociodemographic Characteristics of the Study Population (n = 354)

| S. No | Characteristics | Frequency (n) | Percentage (%) |
|---|---|---|---|
| **1.** | **Age** | | |
| | <40 years | 56 | 15.8 |
| | ≥40 years | 298 | 84.2 |
| **2.** | **Education** | | |
| | Illiterate | 103 | 29.1 |
| | Primary school | 84 | 23.7 |
| | Middle school | 57 | 16.1 |
| | High school | 68 | 19.2 |
| | Diploma | 6 | 1.7 |
| | Graduate | 36 | 10.2 |
| **3.** | **Occupation** | | |
| | Unskilled worker | 105 | 29.7 |
| | Semiskilled worker | 74 | 21 |
| | Skilled worker | 55 | 15.5 |
| | Clerical/shop/farm | 89 | 25.1 |
| | Semiprofessional | 5 | 1.4 |
| | Professional | 26 | 7.3 |
| **4.** | **Socioeconomic status** | | |
| | Lower class | 14 | 4 |
| | Lower middle class | 85 | 24 |
| | Middle class | 103 | 29 |
| | Upper middle class | 121 | 34.2 |
| | Upper class | 31 | 8.8 |

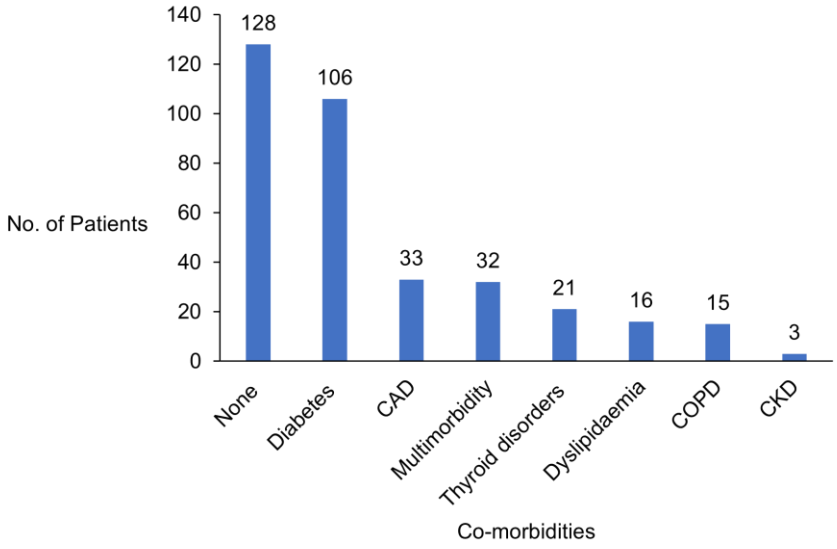


**Figure 1**. Distribution of Co-morbidities among the Study Population (n=354)

The distribution of various co-morbidities among the study population is depicted in Figure 1. Over 50% of the study participants (N=185) were diagnosed with hypertension for more than 10 years. Anti-hypertensive namely Calcium Channel Blockers (CCB) and Angiotensin Converting Enzyme (ACE) inhibitors were used by the majority of them (53%, N=188 and 30.2%, N=107 respectively). Poor compliance with antihypertensives was observed in 11.6% (N=41) of them, Table 2.

**Table 2**. History Concerning Hypertension and Other Comorbidities among the Study Population (n = 354)

| S. No | Characteristics | Frequency (n) | Percentage (%) |
|---|---|---|---|
| **1.** | **Duration of hypertension** | | |
| | <10 years | 169 | 47.7 |
| | >10 years | 185 | 52.3 |
| **2.** | **Anti-hypertensive drug*** | | |
| | CCB | 188 | 53.1 |
| | ACE inhibitors | 107 | 30.2 |
| | BB | 37 | 10.5 |
| | ARBs | 10 | 2.8 |
| | Diuretics | 6 | 1.7 |
| | ARB+CCB | 6 | 1.7 |
| **3.** | **Compliance to anti-hypertensives** | | |
| | Good | 313 | 88.4 |
| | Poor | 41 | 11.6 |

*ACE = Angiotensin Converting Enzyme; ARB = Angiotensin Receptor blocker; BB = Beta Blocker; CCB = Calcium Channel Blocker

About 16.1% of the study participants were using charcoal as a fuel for cooking, 15.8% (N=56) of them reported that there was no facility for sanitary latrines and 11.9% (N=42) of them did not have access to improved drinking water. 34.5% (N=122) of them were living in the kutcha type of house, 18.1% (N=91) weren't using any durable goods and 28.5% (N=101) of them did not possess a bank or a post office account. About 1.7% (N=6) of

the study participants admitted that they live without electricity. All six participants who struggled without electricity were above 60 years of age, earning daily, widowed, living in a kutcha type of house and lacking facilities like sanitary latrines and improved drinking water as other family members neglected them, Table 3. The prevalence of sickness absenteeism was found to be 44%. In about 84 of the participants (24%), sickness absenteeism was moderate, 68 participants (19%) were high and 4 participants (1%) were very high. In about 56% of the participants, the score was very low, figure 2.

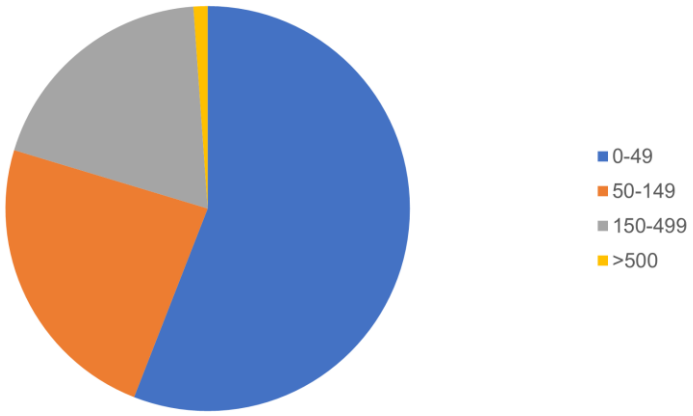


**Figure 2.** Classification of Study Participants Based on the Sickness Absenteeism (n = 354)

**Table 3**. Standard of Living Index among the Study Population (n = 354)

| S. No | Characteristics | Total | |
|---|---|---|---|
| | | Yes (%) | No (%) |
| 1. | The fuel used for cooking is charcoal | 57 (16.1) | 297 (83.9) |
| 2. | No facility for sanitary latrine | 56 (15.8) | 298 (84.2) |
| 3. | No access to improved drinking water | 42 (11.9) | 312 (88.1) |
| 4. | No electricity | 6 (1.7) | 348 (98.3) |
| 5. | House is of Kutcha-type | 122 (34.5) | 232 (65.5) |
| 6. | Ownership of durable goods | 290 (81.9) | 64 (18.1) |
| 7. | No bank/post office account | 101 (28.5) | 253 (71.5) |

Table 4 shows the association between components in the standard of living index and sickness absenteeism. Among the study participants, those who used charcoal as a fuel for cooking were at 4 times higher odds of sickness absenteeism (P < 0.001, 95% CI: 2.175 – 7.562), those participants who did not have an electricity facility had 0.1 times lesser odds of sickness absence (P < 0.001, 95% CI: 0.038 – 0.763) when compared to those who had an electricity facility. Those living in a kutcha type of house were at 3.5 times higher odds of sickness absenteeism (P < 0.001, 95% CI: 2.212 – 5.539) and those not possessing a bank or a post office account were at 3.4 times higher odds of sickness absenteeism (P < 0.001, 95% CI: 2.105 – 5.541). None of the factors like facility for sanitary latrines, access to improved drinking water or ownership of durable goods showed an association.

**Table 4**. Association between Standard of Living Index and Sickness Absenteeism (n = 354)

| S. No | Components of SLI | | Sickness absenteeism | | Crude OR | P value | 95% CI | |
|---|---|---|---|---|---|---|---|---|
| | | | Present, n=156(%) | Absent, n=198(%) | | | Lower limit | Upper limit |
| 1. | The fuel used for cooking is charcoal | Yes | 41 (26.3) | 16 (8.1) | 4.055 | <0.001* | 2.175 | 7.562 |
| | | No | 115 (73.7) | 182 (91.9) | | | | |
| 2. | No facility for sanitary latrine | Yes | 30 (19.2) | 26 (13.1) | 1.575 | 0.120 | 0.888 | 2.794 |
| | | No | 126 (80.8) | 172 (86.9) | | | | |
| 3. | No access to improved drinking water | Yes | 17 (10.9) | 25 (12.6) | 0.846 | 0.618 | 0.439 | 1.630 |
| | | No | 139 (89.1) | 173 (87.4) | | | | |
| 4. | No electricity | Yes | 2 (1.3) | 4 (2) | 0.171 | 0.021* | 0.038 | 0.763 |
| | | No | 154 (98.7) | 194 (98) | | | | |
| 5. | Kutcha-type of house | Yes | 78 (50) | 44 (22.2) | 3.500 | <0.001* | 2.212 | 5.539 |
| | | No | 78 (50) | 154 (77.8) | | | | |
| 6. | Ownership of durable goods | No | 29 (18.6) | 35 (17.7) | 0.940 | 0.825 | 0.546 | 1.620 |
| | | Yes | 127 (81.4) | 163 (82.3) | | | | |
| 7. | No bank or post office account | Yes | 66 (42.3) | 35 (17.7) | 3.415 | <0.001* | 2.105 | 5.541 |
| | | No | 90 (57.7) | 163 (82.3) | | | | |

*P value <0.05 is significant

SLI – Standard of living; CI – Confidence interval; OR – Odd's Ratio

On bivariate analysis, variables that were found to have a statistically significant association with sickness absenteeism were analysed using binary logistic regression analysis to eliminate the confounders. Multivariate logistic regression analysis revealed people who used charcoal for cooking had 6.2 times higher odds of sickness absenteeism (P < 0.001, 95% CI: 2.964 – 13.047). Those participants with no electricity in their houses were found to have 0.03 times lesser odds of sickness absence (P < 0.001, 95% CI: 0.005 – 0.203). Those living in a kutcha type of house were at 5.4 times higher odds of sickness absenteeism (P < 0.001, 95%CI: 2.849 – 10.498). Participants not owning a bank or post office account had 3.7 times higher odds of sickness absenteeism (P < 0.001, 95% CI: 2.119 – 6.395), Table 5.

**Table 5**. Binary Logistic Regression between Standard of Living Index and Sickness Absenteeism (n = 354)

| S. No | Components of SLI | AOR | P value | 95% Confidence interval | |
|---|---|---|---|---|---|
| | | | | Lower limit | Upper limit |
| 1. | The fuel used for cooking is charcoal | 6.219 | <0.001* | 2.964 | 13.047 |
| 2. | No electricity | 0.032 | <0.001* | 0.005 | 0.203 |
| 3. | House is of Kutcha-type | 5.469 | <0.001* | 2.849 | 10.498 |
| 4. | No bank/post office account | 3.681 | <0.001* | 2.119 | 6.395 |

**The "**Enter method" was used for binomial logistic regression.

*P value <0.05 is significant, OR – Odd's Ratio, AOR – Adjusted Odd's Ratio

## Discussion

The prevalence of sickness absenteeism in our study was found to be 44%. The prevalence estimated by Yaacob et al in the general population was 63% and Manjunatha et al was 66.9% in occupational workers. The study by Yaacob et al. focused on the general population, which might include a broader range of health statuses and occupational exposures compared to our study, which specifically targeted hypertensive patients. Hypertensive patients often have regular medical follow-ups and may receive better health management, potentially leading to reduced absenteeism. The lower prevalence of sickness absenteeism in our study (44%) compared to the estimates by Yaacob et al. (63%) and Manjunatha et al. (66.9%) can be attributed to differences in study populations, improved health management and access to healthcare for hypertensive patients, and variations in socioeconomic and occupational factors [14],[12].

The standard of living is described by the level of income, necessities, luxury, and other goods and services that are generally available to a designated population [15]. The Standard of living of our country falls below the world average (**India**: 36.2, health 26; **World average**: 48.59, health 58.02) [16]. A Low standard of living takes deal of nutrition, sanitation, access to medical care, mental well-being, and good housing standards apart from the quality of education and societal bonds [17]. Sen et al demonstrated that high living standards were associated with an elevated risk of diabetes and hypertension or both compared to those with low living standards [18].

According to a study by Singh S et al, low socioeconomic status in India was strongly associated with higher rates of malnutrition and lower access to healthcare services, which shows the challenges faced due to a low standard of living [19]. Additionally, Asaria M et al found that lower-income households in India had significantly higher incidences of preventable diseases and lower life expectancy compared to higher-income groups [20]. Comparing these study results, it appears that while a low standard of living directly affects overall health and access to care, a higher standard of living may introduce lifestyle-related health risks. This indicates that both extremes of the socioeconomic spectrum require targeted public health strategies: improving access and quality of basic needs for those with a low standard of living and promoting healthy lifestyles for those with higher living standards [21].

The findings of our study revealed that solid fuel was used for cooking in 16.1% of the households studied which may be one of the causes of the increase in the prevalence of respiratory diseases. A study by Faizan et al [22] found that households using solid fuels had a higher prevalence of respiratory illnesses compared to those using cleaner fuels, indicating the critical health benefits of transitioning to cleaner cooking methods. James et al in their study found that 67.2% of rural households in Southern India used both solid fuel and LPG for cooking while 5% of the households used biomass as the sole source of cooking energy [23]. The lower prevalence of solid fuel usage in our study compared to other studies might be due to regional variations or improved access to cleaner fuels over time. The LASI (Longitudinal Ageing Study in India) found a strong association between IAP (Indoor Air Pollution) and cognitive impairment among women in rural households with IAP [24]. According to the 76th round of NSSO (National Sample Survey Office) only 48% of rural Indian households had an LPG (Liquid Petroleum Gas) connection [25].

Water being a basic human need, must be safe to sustain good health [26]. In 2022, 73% of the global population had access to safely managed drinking water [27]. India's flagship Jal Jeevan Mission under the Ministry of Jal Shakti aims to provide safe and adequate drinking water through tap water supplied to

every household [28],[29]. As of December 2023, 71.51% of households in India reported having a tap water supply in their homes [30]. In Tamil Nadu, 62.76% of the rural households had a tap water supply [31]. We found that 88% of our study participants had a continuous tap water supply which is higher than the global data showing the success of the programmes directed to improve sanitation in our country. However, access to improved drinking water did not show any association with sickness absenteeism in our study. This suggests that while access to safe drinking water is crucial for overall health, other factors might be more directly influencing sickness absenteeism. For instance, socioeconomic conditions, occupational hazards, and chronic health issues could play more significant roles in determining absenteeism rates.

The construction and utilization of sanitary latrines have substantially increased in rural India in the last two decades through Swachh Bharat Mission Gramin (SBM-G). Despite such efforts, open defecation is practised in many rural areas of the country. M et al conducted a study in two rural villages in India and found that 64% of study participants used household latrines out of which more than 50% of them were engaged in open defecation. Most people who lived in pucca houses had household latrines compared to those in kutcha and semi-pucca houses [32]. Kant et al conducted a study in rural Northern India and estimated that 84.8% of the households had sanitary latrines. Non-availability of such facilities was reported in socially disadvantaged groups [33]. About 34.5% of our study participants lived in kutcha houses, of which 15.8% them did not have access to sanitary latrines which is less than the findings of other studies. This discrepancy could be attributed to increased health education measures and a rise in literacy rates, which may have promoted better sanitation practices and reduced open defecation in our study area.

In 2020, the India Residential Energy Consumption Survey (IRES) found that 2.43% of households were unelectrified. In 2021, access to electricity was estimated to be present in 99.3% of the households in rural India and 99.6% in urban India [34]. The findings of our study show that six of them sustained without electricity. All of them were aged above 60 years and were single. With the increase in access to mobile phones and other digital technologies, 77% of the population in our country has access to usage of bank accounts [11],[35]. In our study, 28.5% of them did not possess bank or post office accounts which was found to be significantly associated with sickness absenteeism. This lack of financial inclusion was significantly associated with sickness absenteeism, emphasising the importance of ensuring financial accessibility to mitigate health-related absenteeism.

The fifth round of the National Family Health Survey (NFHS-5) showed that there was an increase in the use of clean cooking fuel (44% to 59%) compared to round four. The provision of improved sanitation facilities has increased from 49% to 70% and that of improved drinking water has increased from 94% to 96%. Households with electricity have also increased from 88% to 97% between the survey years 2015-16 and 2019-21 respectively [36].

A labour force survey carried out in the UK unveiled that the presence of chronic diseases was associated with a higher probability of sickness absence (2.6%) [37]. A literature review by MacLeod et al concluded that hypertension was associated with productivity loss due to absenteeism from work [38]. Unmuessig et al estimated lost productive time due to absenteeism and presenteeism among hypertensives and normotensives in the United States. A significant association was found to be present between hypertensives and average hours of lost productive time due to absenteeism compared to normotensives [10].

Research studies show isolated evidence of the association of hypertension with the standard of living and hypertension with sickness absenteeism. We found that components of the standard of living index like fuel used for cooking, living without electricity, living in a kutcha type of house, ownership of a bank or post office account and sickness absenteeism are interrelated among hypertensives. Though our study was multicentric, data on sickness absence was calculated based on history. Hence, it could be subject to recall bias.

## Conclusion

The prevalence of sickness absenteeism was found to be 44%. The association between the standard of living and sickness absenteeism was evident in individuals with hypertension. Improving the standard of living in hypertensive populations will not only enhance well-being but also reduce absenteeism from work, increasing workplace productivity.

## Ethical Consideration

Institutional Human Ethical Committee approval was obtained following which we commenced data collection with informed written consent from each study participant. Participant's privacy was maintained throughout the study. Participants were given all the right to express their unwillingness to participate in the study at any time.


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Nil


## Conflicts of Interest

No conflicts of interest


## Acknowledgements

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