



## Knowledge, Prevalence and Risk factors of Carpal Tunnel Syndrome in Young, Adult and Middle-Aged information Technology Professionals

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### ABSTRACT

Carpal tunnel syndrome (CTS) is one of the most commonly reported nerve entrapment syndromes. There are almost 10 million cases present in India alone. It was also found women were more commonly affected compared to men. Higher prevalence rates of CTS can be found in certain occupational groups, for example, the construction workers. The present study was a cross-sectional study conducted among IT professionals (primarily females). The questionnaire consisted of 7-10 questions and was given to IT professionals. Different populations can be covered online. The sample size of this survey was 100. People seem to have a sufficient amount of knowledge on CTS. However, there is more on CTS that they should be made aware. 70% of people are aware of the carpal tunnel syndrome, but only around 50 % are aware of more information on CTS. Thus more research and studies must be further continued on this topic as it is a prevalent problem and millions of people are affected by it, and many might still be unaware of the problem in the world.



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### INTRODUCTION

Carpal tunnel syndrome (CTS) is a kind of numbness or tingling sensation in the hand/arm which is caused due to a pinched nerve in the wrist. There are many underlying health conditions which are associated with carpal tunnel syndrome. CTS is mainly caused due to a compression in the median nerve present in the wrist (Atroshi *et al.*, 1999; Johnson

*et al.*, 2020). CTS is very much prevalent in the general population (Sekar *et al.*, 2019). Carpal tunnel syndrome is one of the significant occupational upper extremity disorders. It is associated with considerable health care costs, etc. (Seppan *et al.*, 2018; Feuerstein *et al.*, 1998). One of the main reasons considered to cause carpal tunnel syndrome is a constant repetition of pressure, a force on the wrist. It is considered as a significant risk factor caused due to occupation (Abbas *et al.*, 1998; Krishna and Babu, 2016). It was also observed that a high rate of CTS symptoms could be found in both dominant and non-dominant hands of experimental dental practitioners (Borhanhaghghi *et al.*, 2013; Nandhini *et al.*, 2018).

CTS associated vital symptoms such as wrist pain, numbness, weakness, can cause impairment in daily activities (Raman *et al.*, 2012; Subashri and Thenmozhi, 2016). Another study has proved that men complain of less wrist discomfort compared to women (Padua *et al.*, 1999; Thejeswar and Then-

mozhi, 2015). CTS patients are also more likely to be overweight, and not all risk factors are known factors to people (Lam and Thurston, 1998; Sriram et al., 2015). In a recent study in Saudi Arabia, awareness of CTS was sufficient among adult populations. An approximate 30% of the community believed pain in the wrist as the main symptom of CTS (Keerthana and Thenmozhi, 2016).

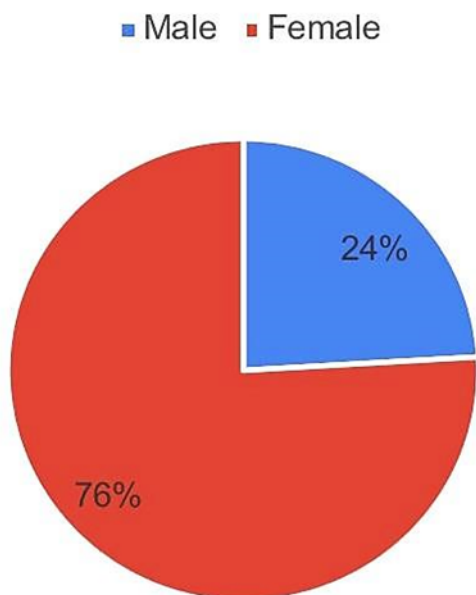


Figure 1: Pie chart represents the distribution of study participants based on gender.

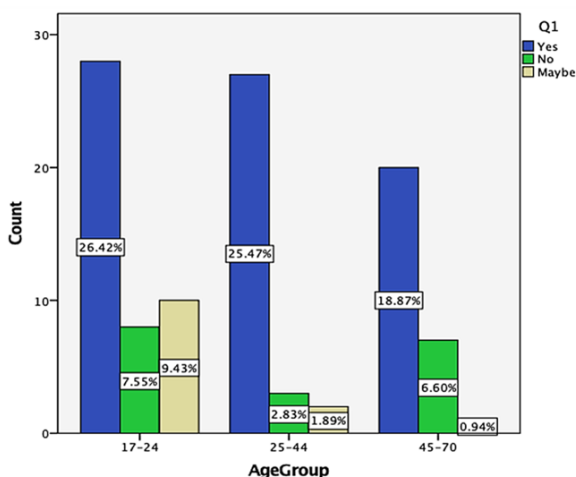


Figure 2: Bar chart representing the association between age group and awareness of carpal tunnel syndrome.

There are two types of CTS: acute and chronic. Acute is very uncommon. The chronic form is more common, and symptoms can be seen for many months and years (Aroori and Spence, 2008). Carpal tunnel syndrome is mainly seen in pregnant women as well (Keerthana and Thenmozhi, 2016; Pratha and

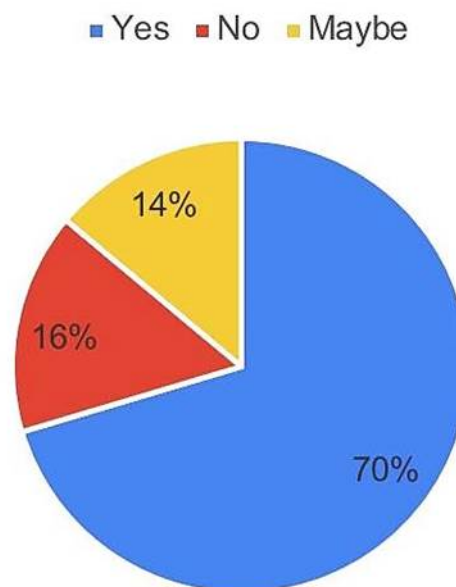


Figure 3: Pie chart shows the percentage distribution of responses on the awareness of carpal tunnel syndrome.

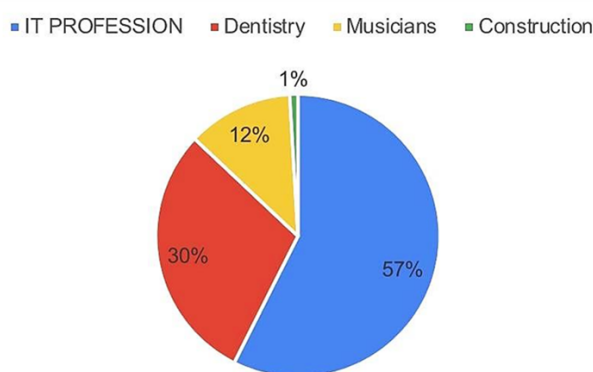


Figure 4: Pie chart shows the percentage distribution of the responses to the question 'what kind of profession in which CTS is most likely seen'.

Thenmozhi, 2016). A high repetitive job involves constant wrist movements for at least 50% of work times. Studies have shown a high prevalence of CTS in workers involved in high pressure and repetitive work (Silverstein et al., 1987; Menon and Thenmozhi, 2016). The repetitiveness is considered to be a higher risk factor compared to pressure and force (Silverstein et al., 1987; Hansen et al., 2004). However, in another study done by Chiang et al. force was considered as a more influential factor when compared to repetitiveness (Chiang et al., 1990). CTS can occur in all age groups.

Diabetic patients (due to unhealthy lifestyle) also have higher chances of contracting CTS (Samuel and

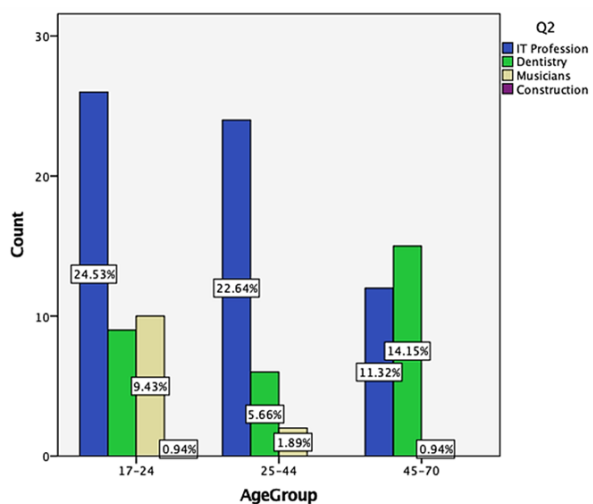


Figure 5: Bar chart representing the association between age group and the most affected profession due to CTS.

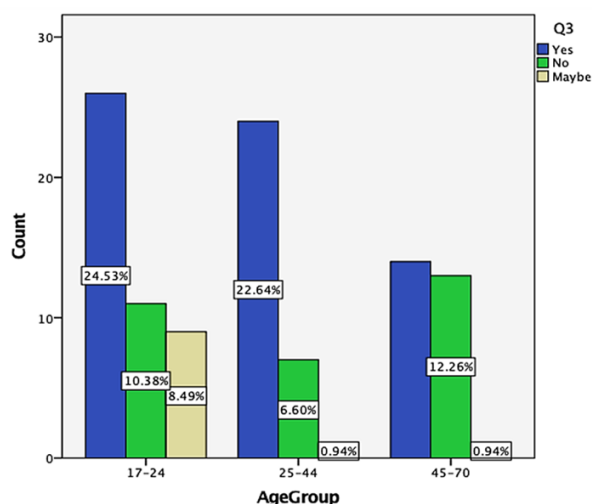


Figure 7: Bar chart representing the association between age group and awareness of region mostly affected due to CTS.

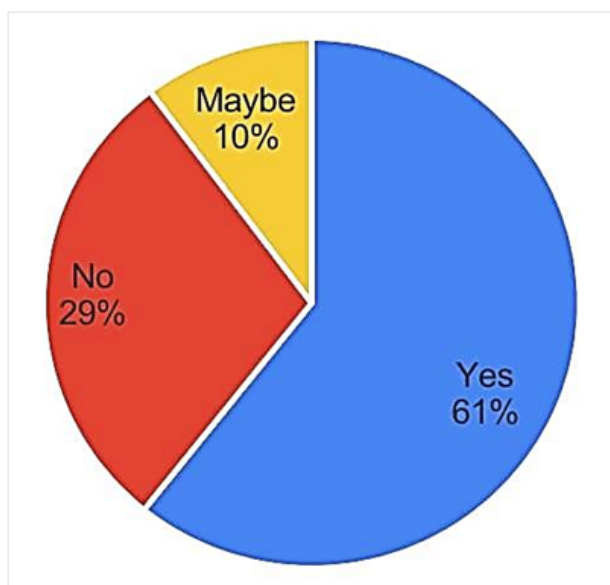


Figure 6: Pie chart shows the percentage distribution of the responses on the awareness of the region most affected by CTS.

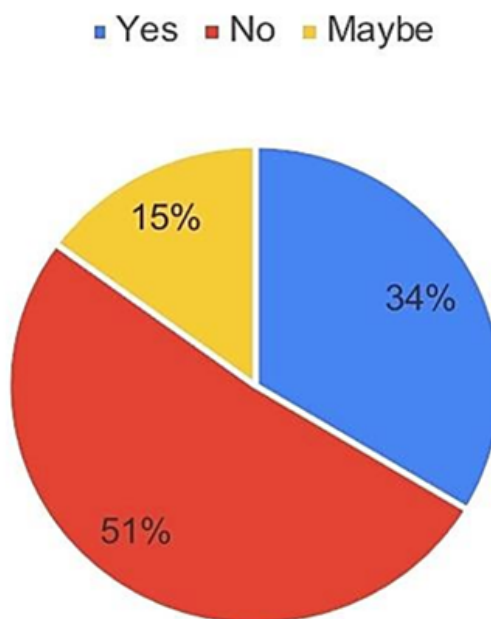


Figure 8: Pie chart shows the percentage distribution of responses on the awareness of different health-related disorders associated with CTS.

Thenmozhi, 2015; Becker et al., 2002). Patients have stated that shaking or flicking their wrists helps in relieving the symptoms (Choudhari and Thenmozhi, 2016; Hafeez and Thenmozhi, 2016). This phenomenon is also called 'flick sign' (Krendel et al., 1986; Kannan and Thenmozhi, 2016). However, it is said that the flick sign cannot be reliable in many cases (Hansen et al., 2004). It was Stevens et al., who found the mean age for diagnosis for men which was around 50 years of age, whereas in women it was around 51 (Stevens et al., 1988). Many studies also state that the occurrence of CTS is related to unhealthy habits and lifestyle (Becker et al., 2002). This was supported by a study which stated that CTS

could be caused due to body mass index, age, wrist depth, etc., (Gerr and Letz, 1992). Another study by Nathan et al., suggests that obesity is one of the significant risk factors (Nathan et al., 1992).

#### MATERIALS AND METHODS

The study was an online survey conducted among IT professionals. The study was based on carpal tunnel syndrome among the IT population. The Institutional Review Board approved the study. A self-

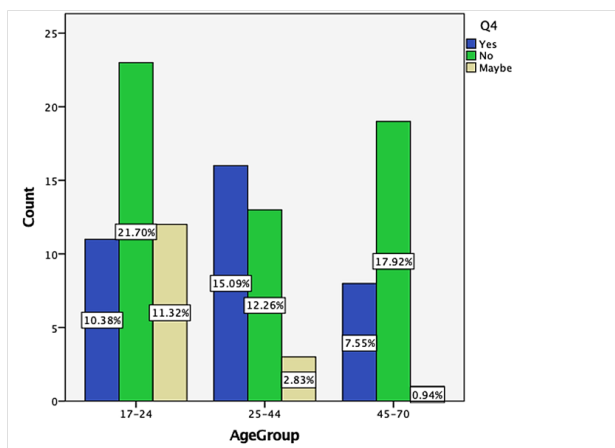


Figure 9: Bar chart representing the association between age group and awareness of health-related disorders due to CTS.

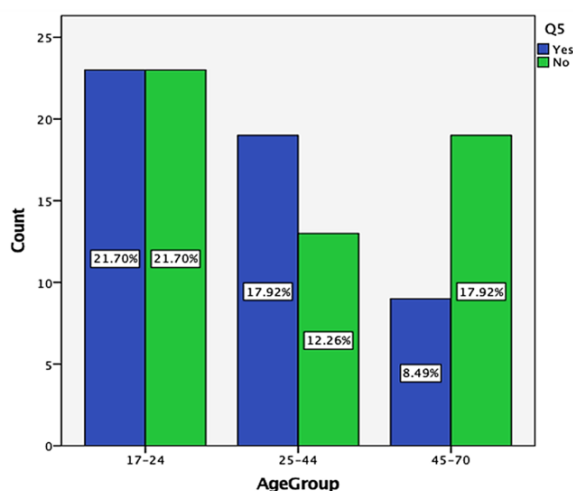


Figure 11: Bar chart representing the association between age group and awareness of the age group more prone to CTS.

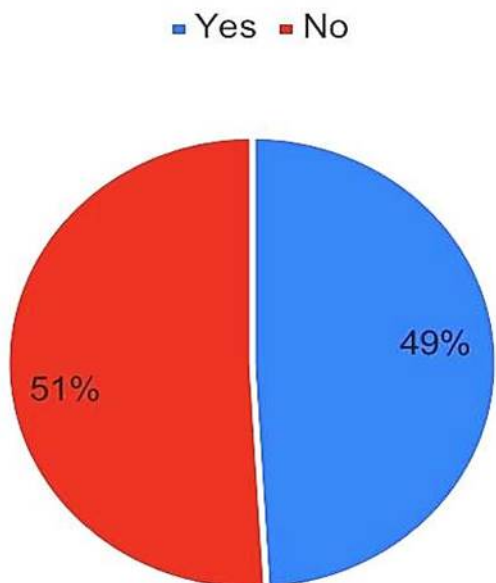


Figure 10: Pie chart shows the percentage distribution of awareness of the particular age group more prone to carpal tunnel syndrome.

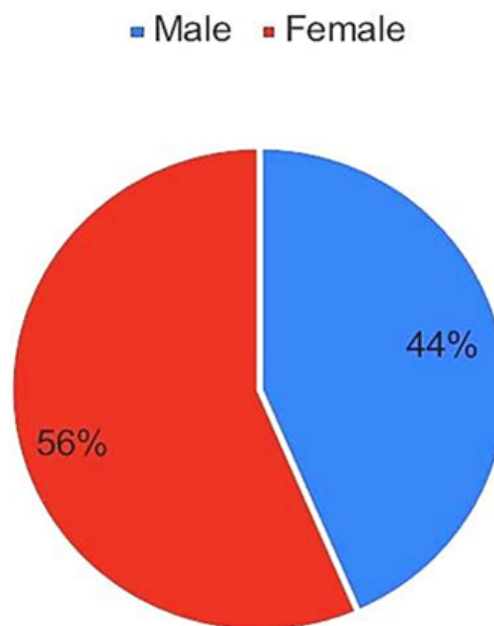


Figure 12: Pie chart shows the percentage distribution of gender more affected by CTS.

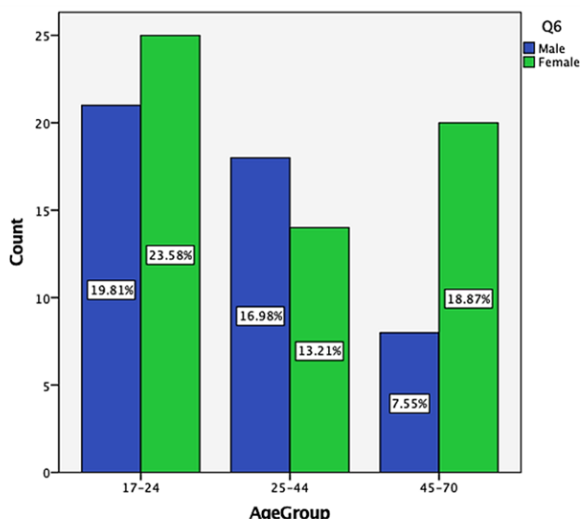
structured standard online questionnaire was prepared based on CTS, its prevalence, work-related risk factors, its severity of pain, etc., among the young and middle-aged IT professionals. The questionnaire was uploaded in the online survey portal, and the responses were collected. A total of 100 responses were obtained, and the data were evaluated statistically. Using SPSS, IBM version 23.0, the data were analyzed. The statistical method used is descriptive statistics represented in a frequency distribution. For correlation analysis, Chi-square test was done. The type of analysis used was the Chi-Square test. The dependent variable used for this study was age, occupation, gender. The independent

variables considered were location, food habits, and ethnicity. The obtained results were analyzed and represented graphically using pie charts and bar charts.

### RESULTS AND DISCUSSION

In the survey study, the percentage of male participants was 24%, and female participants were 76% (Figure 1). In this present study, 76% were female, and the rest 24% were male.

The association between age group and awareness



**Figure 13: Bar chart representing the association between age group and awareness of gender more prone to CTS.**

of carpal tunnel syndrome was done using Chi-square test which showed  $p=0.046$  ( $p<0.05$ ) and was found to be a statistically significant association, which indicates that participants in the age group of 17-24 years were aware of carpal tunnel syndrome than the other age groups (Figure 2). Chi-square test showed  $p=0.046$  ( $p<0.05$ ) indicating a statistically significant association between age group and awareness of CTS.

From the data, it was found that 70% of the participants are aware / heard of carpal tunnel syndrome whereas 16% are unaware and the rest of 14% have probably heard of the term CTS but not sure about it (Figure 3). 70% are aware of CTS whereas 16% are not aware of it and the rest 14% might have heard about and are not sure about CTS. 57% of the participants have chosen 'IT profession' as one of the repetitive occupations to have the CTS, whereas 30% have chosen dentistry, 12% musicians and 1% are alone for construction based works (Figure 4). 57% of participants responded to the IT profession, 30% have chosen dentistry, 12% of musicians and 1% alone for construction based works.

The association between age group and profession was done using Chi-square test which showed  $p=0.005$  ( $p<0.05$ ) and was found to have a statistically significant association between them, which shows that IT professionals of the age group between 17-24 years are more affected than any the other age groups (Figure 5). Chi-square test showed  $p=0.005$  ( $p<0.05$ ) indicating a statistically significant association between age group and profession leading to CTS.

It was found that 61% of participants are aware

of the area most affected by CTS, whereas 29% are unaware, and the rest 10% have opted for the option probably (Figure 6). 61% are aware, whereas 29% are unaware and the rest 10% have opted for the option probably. The association between age group and region mostly affected by CTS was done using Chi-square test which showed  $p=0.016$  ( $p<0.05$ ) and was found to have a statistically significant association, which shows that the age group 17-24 are more aware of the region being affected by CTS (Figure 7). Chi-square test showed  $p=0.016$  ( $p<0.05$ ) indicating a statistically significant association between age group and awareness of region mostly affected due to CTS.

51% of participants are unaware of CTS related health disorders whereas 34% are aware and the rest of the 15% have opted for the option probably as they are not sure but may have some idea (Figure 8). 51% of participants are unaware, whereas 34% are aware and the rest 15% have opted for the option probably and are not sure.

Association between age group and health disorders was done using Chi-square test  $p=0.011$  ( $p<0.05$ ) and was found to be statistically significant. Thus chi-square showed that there was a significant association between age group and health disorders due to CTS, which shows that participants of the age group between 17-24 years were less aware of health-related disorders due to CTS than other age groups (Figure 9). Chi-square test showed  $p=0.0$  ( $p<0.05$ ) indicating a statistically significant association between age group and awareness of region mostly affected due to CTS.

From the analyzed data, it was found that 49% of participants are aware that a particular age group was more prone to CTS and the other 51% are unaware of it (Figure 10). 49% of participants are aware of the age group are more prone to carpal tunnel syndrome, and the other 51% are unaware.

The association between age group and awareness of the age group, which are more prone to CTS was done using Chi-square test. It showed  $p=0.103$  ( $p>0.05$ ) indicating statistically not significant. Thus this showed there was no significant association between age and awareness of regions mostly affected due to CTS (Figure 11). Chi-square test showed  $p=0.103$  ( $p>0.05$ ) indicating statistically no significant association between age and awareness of region mostly affected due to CTS.

It was observed that 56% of participants have opted for the female gender being more affected by CTS, whereas the other 44% have chosen male gender (Figure 12). 56% of participants have opted female gender being more affected by CTS, whereas the

other 44% have chosen male gender. The association between age group and awareness of gender more prone to CTS was analyzed. Chi-square test showed  $p=0.096$  ( $p>0.05$ ) indicating statistically not significant. Thus this comparison showed that there was no significant association between age group and the awareness of gender more prone to CTS (Figure 13). Chi-square test showed  $p=0.096$  ( $p>0.05$ ) indicating statistically no significant association between age group and awareness of gender more prone to CTS.

According to results, 70% of participants have heard/ know of the term carpal tunnel syndrome. However, not many people know about this disease. According to another survey by Raman et al., there was a possibility that the general population of Kuwait under-recognized or is unaware of carpal tunnel syndrome (Raman et al., 2012). Our survey has a percentage of 61% people who are aware of the area more affected by CTS which is higher when compared to a survey which stated that only 30% were aware of the most affected area (Alyousef et al., 2019). According to the survey, 56% have chosen the female gender to be more affected by CTS. Atroshi I et al., have proved that electrophysiologically CTS have a higher prevalence in females which is around '5.8' % and lesser in male (around 0.6%) (Atroshi, 1999). However, also another study suggested that although females are more common to experience CTS, men had more severe impairments due to CTS.

Only 49% of participants are aware of the age group more prone to CTS. In a study by Lam et al., they have stated that CTS is more common and harmful in patients older than 55 years old (Lam and Thurston, 1998). Stevens et al. stated that numerous patients report indications outside the conveyance of the median nerve too, and has been affirmed (Stevens et al., 1999).

According to a study by Hagberg M et al., industrial workers faced the lowest risk factors for CTS and higher in occupations such as butchers, frozen food factory workers etc., (Hagberg et al., 1992). This contradicts the results of the current survey, which states that IT professionals will have a higher risk of contracting CTS.

### Limitations of Study

The survey population was less and localized targeted population.

### Future of scope

There is a significant scope on this topic as CTS is very much prevalent in the modern IT world as many are using computers or laptops in many ways.

People are still unaware of CTS, and its risk factors and harmful effects of its long term use. Further studies on CTS in large scale with different populations and locations are required to acquire more knowledge and create more awareness.

### CONCLUSION

According to the survey reports, IT professionals know about the prevalence, risk factors of carpal tunnel syndrome, but they do not have an in-depth knowledge of CTS and its effects mostly in long term use. Also, the survey participants did not intend to take any measures to treat it properly. Thus more studies must be required, and more information must be given to people on its harmful effects.

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### Conflict of interest

The authors declare that they have no conflict of interest

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