Anxiety and Depression in Brazilian Undergraduate Students: The Role of Sociodemographic Variables, Undergraduate Course Characteristics and Social Skills

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Authors' contributions

This work was carried out in collaboration between all authors. Authors ATBS and SRL designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript and managed literature searches. Authors ATBS and SRL managed the analyses of the study and literature searches. All authors read and approved the final manuscript.

ABSTRACT

The prevalence of anxiety and depression disorders in undergraduate students is high and several variables can be influential. The aim is to verify the predictive value of social skills, sociodemographic variables, and course characteristics for depression and anxiety. A total of 1282 students of a public university, of both sexes and from different years and courses, participated in this study. Screening instruments for depression and anxiety were applied, as well as an instrument investigating social skills and a questionnaire covering socio demographic indicators and course characteristics. The data were analyzed using univariate analysis followed by multiple binary

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regression analysis in order to define the relevance of these depression and anxiety measures. The rates of anxiety and depression were 19.4% and 3.8%, respectively. The social skills and living situation were predictive of depression, with the social skills and course area (with higher prevalence for the exact and human sciences) remaining in the final model for anxiety. Such data have implications for psychological prevention and intervention with this population.

1. INTRODUCTION

Anxiety and depression disorders present a high prevalence in the general population leading to interpersonal difficulties and, in the case of young people, difficulties in the academic and professional life. Although anxiety and depression have high rates of comorbidity, around 50% [1], anxiety often precedes depression, which can be seen in early infancy and may be compounded over the life course [2]. Therefore, it is important to map out which variables are predictive of both disorders and which are specific to each of them in order to support psychological evaluations and interventions, which may be general or specific, depending on the needs identified.

The prevalence of depression in the general population of the USA is high and tends to increase over time, according one review [3], which showed prevalence rates for the Baltimore Epidemiologic Catchment Area Survey of 6.3% over 12 months and 8.3% over the life course. The prevalence rate for the National Comorbidity Survey – Replication (NCS-R) over 12 months was 6.6% and the prevalence for the life course was 16.2%. Another author [1] collected data from 3,001 adults (18-70 years of age) in Sweden and found that 10.8% of the population presented clinical depression, according to the Patient Health Questionnaire (PHQ-9). Concerning anxiety, measured using the Generalized Anxiety Disorder 7-item (GAD-7), 14.7% met the criteria for this diagnosis.

In the undergraduate population, differences in prevalence were also observed, according to the study and country in which it was conducted. With a sample of 506 Mexican students, the following indices were identified [4]: 21.1% mild depression; 2.8% moderate; 0.8% severe depression; with 50% of the students presenting some level of anxiety. Another study with Mexican undergraduate students from seven medical courses (n = 1,027) identified that 19% of the sample presented symptoms of anxiety and 18% depression [5]. With from a sample of 287 North American music students, it was identified that 16.5% of the sample presented anxiety and 11.9% depression, considering a 12 month period [6]. Also with North American students, from the first year of a university located in a rural town, the researchers [7] identified 25% with anxiety and 8% with depression. In Malaysia, from a sample of four public universities and 506 students, the following prevalence rates were identified [8]: 27.5% with moderate depression; 9.7% with severe or extremely severe depression; 34% with moderate anxiety; and 29% with severe or extremely severe anxiety. High indicators for depression (41.3%) and anxiety (51.2%) were also found in a sample of Indian students [9].

In Brazil four studies have reported the prevalence of mental disorders in undergraduate students [10,11,12,13], the following rates were found having verified higher prevalence rates of anxiety and depression when compared to the United States, as is common in developing countries. The findings also demonstrate that, in undergraduate students, the prevalence of anxiety is higher than that of depression, regardless of the country in which the study was conducted.

There is no consensus in the literature regarding the impact of the socio demographic variables and the characteristics of the undergraduate courses on mental health. Several researchers agree that, in undergraduate student samples, women are more anxious and depressed than men [1,10,13,14,15,16]. More recent measures have not presented a consensus [8,9,17,18] was in terms of women and men with the same rates of anxiety and depression in populations of different nationalities.

It is possible to identify different prevalence rates according to the areas of the undergraduate courses: 68.1% for "humanities and arts", 56.3% for "health", and 4.7% for "basic, exact, and technological sciences" [13]; the Nursing course presented the highest overall prevalence (34%) [10]. It was also verified that students of courses

in the Exact Sciences, Letters and Humanities areas had lower indicators of mental health problems when compared to students of the Humanities verified that students of Exact Science courses had lower indicators of mental health problems when compared to students of Social Science courses) [18].

The living situation also seems to be associated with mental health problems, with living alone [10,11,12] compared to living with parents being a predictor of problems [8]. To be working with remuneration may also promote mental health [10]. However, it was identified such a relationship only for undergraduate students with anxiety, but not for those with depression [19]. On the contrary, it was found that working did not differentiate a group with anxiety from another nonclinical group in a Pakistani population [15].

Regarding the year of the undergraduate course, in the case of medicine, the fourth year students had more difficulties compared with the others [11]. With a sample from different courses, also it was found that the longer a student is in the university, the greater the tension and mental health problems [10]. It was also identified that the older the undergraduate students, the greater were the indicators of anxiety and depression [8]. Conversely, it was found that age did not differentiate clinical from nonclinical subjects [20] and that first year students had more mental health problems when compared with those of other years [14]. However, the findings [12,16] did not identify the year of the undergraduate course as a predictor for mental health problems.

Several authors have identified that a deficit of social skills has an impact on mental health [12,17,21,22,23,24,25,26,27,28,29,30,31, 32], although some studies did not identify such a relationship [22].

The social demands of entry into the university involve various conditions; however, this study focused on those related to the social skills repertoire, the demographic variables, and the characteristics of the undergraduate courses.

From the studies reviewed it can be noted that the prevalence of mental disorders among undergraduate students is high and varies according to the characteristics of the samples, and that the literature data is inconclusive regarding the influence of the demographic variables, the characteristics of the undergraduate course, and the personal

resources, such as the social skills. The present study is inserted into this space. Given these considerations, the aim of this study was to verify the predictive values of social skills, socio demographic variables, and the characteristics of the courses for depression and anxiety disorders.

2. METHODS

A cross-sectional, predictive design was used and the study was evaluated and approved by the Research Ethics Committee of a public university (Protocol No. 1315/46/01/07 of August 30, 2007).

3. PARTICIPANTS

The study included 1,282 undergraduate students, of both sexes, from different courses in a Brazilian public university, enrolled in the fields of exact sciences, humanities and biological sciences, and distributed throughout all the years of the courses.

4. INSTRUMENTS

Evaluation of Social Skills, Behaviors, and Contexts for Undergraduate Students Questionnaire – Q-ACC-VU [33]. This questionnaire assesses social skills and is composed of questions related to how the participant behaves in relation to various interlocutors and contexts. The first part has three factors: 1-Communication and Affection, 2-Coping, and 3-Public Speaking. The second part organizes the items into two factors: Potentialities and Difficulties. The Q-ACC-VU instrument, considering its measured psychometric characteristics, was approved for use as a psychological test by the Federal Psychology Council, presenting an alpha of 0.953 (p = 0.000) and discriminant validity in the comparison with the SCID, with an area under the *ROC* curve of 0.762 (p = 0.000), in which the factors together explained 66.279% and 71.904% of the variance for Parts 1 and 2, respectively.

Social Skills Inventory - SSI-Del-Prette [34]. This self-reported instrument is composed of 38 items, and aims to assess the situational and behavioral dimensions of the social skills. These items are grouped into five broad factors: self-exposure to unknown people and new situations, self-control of aggression, coping and self-assertion with risk, conversation and social confidence, and self-assertion in the expression

of positive feelings, with it also possible to assign a Total Score. The SSI-Del-Prette presented concurrent validity with the Rathus Scale (r=0.79; p<0.01) and test-retest reliability, with an alpha of 0.90, p<0.001 [18].

The Beck Depression Inventory (BDI) was included to screen for diagnostic indicators of depression. The instrument was translated, adapted and validated for the Brazilian population [35], is self-administered, and is composed of 21 items that assess the severity of the depression symptoms. A study was conducted with the overall aim of validating the BDI for a Brazilian university population, presenting an alpha of 0.89, with temporal stability (IR = 0.73), with the factor analysis indicating three factors, which together explained 44.57% of the variance [36].

The reduced version of the Social Phobia Inventory-SPIN - Mini-SPIN evaluates indicators of social phobia and was included as a measure of anxiety. It contains three items that proved to be the most discriminative for people with social anxiety disorder [37]. In Brazil the instrument was translated and adapted [35,38], presenting a correlation of 0.88 (p<0.01) with the full version of the SPIN, Cronbach's alpha of 0.73 and discriminant validity in the comparison with the SCID, with the area under the ROC curve of 0.81 (p<0.01).

5. PROCEDURES

5.1 Data Collection

Data collection was carried out in groups, with the students being contacted previously in the classrooms. They were informed about the aims of the study and, for those who expressed an interest, a date was scheduled for the application of the instruments, after signing the Terms of Free Prior Informed Consent. The application of the instruments assessing social skills, depression and social anxiety was carried out in groups, in the classroom, with the participants receiving a notebook containing instructions regarding the application of the instruments.

5.2 Data Analysis

Descriptive statistics were used for the prevalence data regarding the mental health indicators (BDI, Mini Spin, SCID).

In order to verify the relevance of the sociodemographic measures, of the

characteristics of the course, and of the social skills for the social anxiety variable (with social anxiety indicators group x without social anxiety indicators group — Mini Spin); and for the depression variable (with depression indicators group x without depression indicators group — BDI), Multivariate Binary Logistic Regression analyzes were conducted.

In the initial model, only the variables that distinguished the groups were included, according to Student's t test (numerical variables) or the chi square test (categorical variables), thus avoiding multicollinearity. In the case of the numerical variables, both for the Mini-Spin and for the BDI, age, year of the course, the five factors of the Q-ACC-VU, and the total score of the SSI-Del Prette were considered, as they deal with the general scores of these instruments. The categorical variables investigated were: period of the course, course type, dating, gender, marital status, employment, and living situation. There was no collinearity between the variables included in the model.

6. RESULTS

The results section presents the demographic profile and the course characteristics of the respondents Table 1, and the prevalence (absolute and relative frequency) of the classification of social anxiety depression indicators and depression indicators in the sample of undergraduate students Table 2. Tables 3 and 4 present the results of the comparisons of the study variables that differentiated the groups with and without indicators of social anxiety and depression. Lastly, Table 5 shows the final regression model for indicators of social anxiety and depression.

The sociodemographic characteristics of the sample were: (a) 699 students from the exact sciences; (b) 662 from the initial years (1st and 2nd years), 305 from the third year, 297 from the final years (4th and 5th year), and 18 were outside the profile (6th and 7th years); (c) 620 were from day time courses and 662 from evening courses; (d) 701 men, 581 women; (e) 455 employed, 827 not employed; (f) 149 were living alone, 610 in student accommodation, 475 with family, 27 with a partner, and 21 with other people, 9 did not provide the information; (g) 1226 were single, 10 married, and 6 divorced/widowed, (h) 601 were dating and 681 not dating; and (i) the mean age was 21 years, with a standard deviation of 2.28 (min = 17, max = 43 years).

Table 1. Demographic variables and course characteristics of the participants

Variables	Subcategories	Number of participants
Course area	Exact sciences	699
	Humanities	514
	Biological sciences	69
Period	Day	620
	Night	662
Year of course	1st and 2nd years	662
	third year	305
	4th and 5th year	297
	6th and 7th years	18
Employment	Employed	455
	Not employed	827
Living situation	Living alone	149
	Student accommodation	610
	With family	475
	With a partner	27
	With other people	21
Marital status	Single	1226
	Married	10
	Divorced/widowed	6
Dating	Dating	601
	Not dating	681

Table 2. Prevalence (absolute and relative frequency) of the classification of social anxiety indicators and depression indicators in the sample of undergraduate students

Instruments	With indicators	Without indicators	Total of respondents
Anxiety mini-spin	249 (19.4%)	1033 (80.6 %)	1282
Depression BDI	49 (3.8%)	1233 (96.2%)	1282

Table 3. Comparisons of social skills for the groups with and without indicators of social anxiety and depression. Presenting the results with statistical differences

Categories of the Q-ACC-VU	With indicators	Without indicators	*t*	*p*
	Mean (standard deviation)			
Social anxiety				
Q-ACC - Communication and affection	19.11	20.94	-4.671	0.000
Q-ACC - Public speaking	3.53	4.73	-9.611	0.000
Q-ACC - Potentialities	83.97	102.97	-8483	0.000
Q-ACC - Difficulties	31.69	19.82	10.603	0.000
SSI-Total score	83.31	98.80	-13.113	0.000
Depression				
Q-ACC - Communication and affection	17.00	20.72	-4.627	0.000
Q-ACC - Coping	9.38	7.19	3.606	0.000
Q-ACC – Potentialities	79.59	100.06	-4.277	0.000
Q-ACC - Difficulties	40.06	21.42	7.931	0.000
SSI-Total score	80.59	96.40	-6.181	0.000

Table 4. Comparisons of demographic and courses variables for the groups with and without indicators of social anxiety and depression. Presenting the results with statistical differences. Chi-square test

Categories	Subcategories	With indicators	Without indicators	X^2	*p*
Social anxiety					
Gender	Male	48.99%	56.05%	4.029	0.045
	Female	51.00%	43.95%		
Course area	Humanities	39.36%	40.27%		
	Exact sciences	50.20%	55.56%	15.799	0.000
	Biological sciences	10.44%	6.68%		
Depression					
Gender	Male	34.69%	55.47%	8.2012	0.004
	Female	65.30%	44.53%		
living situation	Alone	8.16	11.76%		
	University accommodation	55.10%	47.28%		
	With family	28.57%	37.39%	11.829	0.019
	With partner	8.16%	1.86%		
	With others	0%	1.70%		
Course area	Humanities	61.22%	39.25%		
	Exact sciences	34.69%	55.31%	9.508	0.009
	Biological sciences	4.08%	5.43%		

Table 5. Logistic regression considering the categories related to social skills, sociodemographic variables and the characteristics of the undergraduate course assessed for the social anxiety and depression constructs

		C.I. 95%		
	Odds ratio	Lower	Higher	*p*
Social anxiety indicators				
Q-ACC - Public speaking	1.310	1.191	1.442	0.000
Q-ACC - Potentialities	1.020	1.014	1.027	0.000
Q-ACC - Difficulties	0.960	0.951	0.970	0.000
SSI - Total	1.038	1.027	1.049	0.000
Area of the course	3.030	1.595	5.753	0.003
Depression indicators				
Q-ACC - Communication and affection	1.057	0.991	1.126	0.090
Q-ACC - Coping	0.857	0.789	0.932	0.000
Q-ACC - Potentialities	1.037	1.024	1.051	0.000
Q-ACC - Difficulties	0.951	0.936	0.966	0.000
SSI - Total	1.028	1.009	1.047	0.003
Living situation	0.000	0.000	---	0.035

Table 2 summarizes the results related to the Mini-spin and BDI. From Table 1 it can be noted that: (a) regarding the assessment of anxiety (Mini Spin), 19.4% of the students presented social anxiety indicators; and (b) 3.8% of the students shown depression indicators (BDI).

The following variables were entered into the initial regression model for anxiety, from the Mini-Spin:

(a) Social skills: Q-ACC - Communication and Affection (with indicators mean = 19.11; without indicators mean = 20.94, *p* = 0.000), Q-ACC - Public Speaking (with indicators mean = 3.53; without indicators mean = 4.73, *p* = 0.000), Q-ACC - Potentialities (with indicators mean = 83.97; without indicators mean = 102.97, *p* = 0.000), Q-ACC - Difficulties (with indicators mean = 31.69; without indicators

mean = 19.82, *p* = 0.000) and SSI-Total score (with indicators mean = 83.31; without indicators mean = 98.80, *p* = 0.000);

(b) Sociodemographic variables: gender (with indicator: male - 48.99%, female - 51.00%, without indicator: male - 56.05%, female - 43.95%, *p* = 0.045);

(c) Courses variables: course area (with indicator: humanities - 39.36%, exact sciences - 50.20%, biological sciences - 10.44%; without indicator: humanities - 40.27%, exact sciences - 55.56%, biological sciences - 6.68%, *p* = 0.000).

The following variables were entered into the initial regression model for depression, from the BDI:

(a) Social skills: Q-ACC - Communication and Affection (with indicators mean = 17.00; without indicators mean = 20.72, *p* = 0.000), Q-ACC - Coping (with indicators mean = 9.38; without indicators mean = 7.19, *p* = 0.000), Q-ACC – Potentialities (with indicators mean = 79.59; without indicators mean = 100.06, *p* = 0.000), Q-ACC - Difficulties (with indicators mean = 40.06; without indicators mean = 21.42, *p* = 0.000) and SSI-Total Score (with indicators mean = 80.59; without indicators mean = 96.40, *p* = 0.000);

(b) Sociodemographic variables: gender (with indicator: male – 34.69%, female – 65.30%; without indicator: male - 55.47%, female - 44.53%, *p* = 0.004) and living situation (with indicator: alone - 8.16%, university accommodation - 55.10%, with family - 28.57%, with partner - 8.16%, with others - 0%; without indicator: alone - 11.76%, university accommodation - 47.28%, with family - 37.39%, with partner - 1.86%, with others - 1.70%; *p* = 0.019).

(c) Course variables: course area (with indicator: humanities – 61.22%, exact sciences – 34.69%, biological sciences – 4.08%; without indicator: humanities - 39.25%, exact sciences - 55.31%, biological sciences - 5.43%, *p* = 0.009), and course period (with indicator: day - 32.65%, night - 67.34%; without indicator: day - 48.99%, night - 51.01%, *p* = 0.025).

According to Table 5 the social skills indicators that were in the final model of anxiety were speaking in public, potentialities, and difficulties (Q-ACC-VU) and the total score (SSI-Del Prette).

Regarding the course variables, only the area was significant for anxiety, with the highest prevalence for exact sciences (50.20%), followed by humanities (39.36%) and biological sciences (10.44%).

The social skills indicators that were in the final model of depression were communication/affection, coping, potentialities, and difficulties (Q-ACC-VU) and the total score (SSI-Del Prette). Regarding the socio demographic variables only the living situation was significant and no course variable remained in the model.

7. DISCUSSION

The results of this study identified prevalence rates similar to the Brazilian study [10], as adding the 3.8% with depression to the 19.4% with anxiety gives the value of 23.3%, very close to the value of 25% found in the study mentioned. It also approached and Mexican and American studies, for depression [7], and for anxiety [5,6]. However, the rates were lower than those of other studies that assessed mental health disorders in a general way [1,11]. It should be noted that the results differ from another study [13]. One explanation for this discrepancy may be the difference regarding the data collection instruments used. Using a similar instrument, similar data also were identified to the findings of this study [7]. Compared to Brazilian studies, one of evaluated mental disorders in students of medicine, nursing, odontology, and physical education, found a prevalence rate of 34.1%, which is considered high [11]. Similarly, was found that 44.6% of medical students presented an indicator of mental disorders [12]. With a sample of students from different courses, was found a prevalence of mental disorders below 25% [10]. Finally, with 1,290 students in different university courses, was found rates of: 19.7% for dysthymia; 17.3% for depression; 14.4% for agoraphobia; 13.4% for generalized anxiety disorder; 12% for panic disorder; 7.7% for panic attack; and 5.9% for social phobia [13]. Another hypothesis concerns the specificity of the sample, for example, researchers [1,11] presented data obtained from medical students, which is not the case with this work, whereas this study described the prevalence among different courses [9], include without medical students.

In accordance with the literature, anxiety was more prevalent than depression. Considering the general population [1,3], it can be verified that

the prevalence identified in the present study suggests fewer indicators for depression and more for anxiety. It was found that anxiety, gender, and the course area discriminated the groups, with only gender being in the final binary logistic regression model. For depression the groups differed according to living situation and gender, as well as the course period and area, with only the living situation remaining in the final model. The social skills repertoire discriminated both indicator groups (social anxiety and depression), when compared to the without indicators groups, and remained in the final regression models.

Considering anxiety, although gender differentiated the indicator groups from the without indicators groups, in agreement with several authors of the area [10,14,13,16,20], it was not maintained in the final multiple binary regression model, which is in agreement with studies that found that men and women presented the same levels of anxiety and depression [8,9,17,18,20].

Regarding the course area, the prevalence of anxiety was 39.36% for the humanities, followed by 50.20% for the exact sciences, and 10.44% for the biological sciences. The prevalence of depression had a similar distribution: humanities - 61.22%, exact sciences — 34.69%, and biological sciences - 4.08%. The humanities area presented a higher prevalence, which is in agreement with other studies, including Brazilian ones [10,13]. The findings of the present study differed, however, with regard to the exact sciences area, which had the second highest prevalence, unlike other studies that have shown that fewer students from this area present mental health problems [10,13,18]. Such differences may result from the course areas in which the data collections were performed, the distribution between the years, and the instruments used, which, although similar, are not identical to those of the present study.

The living situation variable did not differentiate the groups with regard to anxiety, which is consistent with other studies [8,14]. The study 1 evaluated 14 approximately 10,000 students from 16 Canadian universities, and found no differences between those living in the university residence, off campus with parents, and off campus without the family. A more recent study [8] also did not identify the living situation as predictive of mental health problems. The living situation distinguished the depression group from the nonclinical group, which is not consistent with the findings of other studies [10,11,12]. These studies evaluated the living situation in relation to general mental health, differing from the present study that assessed anxiety and depression separately. Future studies that treat the mental disorder and the type of living situation as dependent variables will possibly be able to clarify these issues.

The work activity variable did not influence mental health [15], however, was noted the importance of work on anxiety and not on depression [19]. The year of the course did not differentiate the groups for anxiety or depression, neither indicating greater difficulty in the initial years [14], nor in the final ones [8,10,11]. Therefore, the results of this study are consistent with literature [12,16], which did not identify that the year of the course could predict mental health problems. The same occurred with age [20].

The assessed social skills repertoire differentiated the anxiety and depression clinical groups from the nonclinical groups, confirming many studies of the area [12,21,22,23,24, 25,26,27,28,29,30,31]. When analyzing each of these studies it was found that they approached the social skills differently, some assessed social perception [22] and others assessed actual behaviors [27], with the classes of behaviors evaluated also differing from one study to another, which may in some ways explain the discrepancies in the results. However, the present study differs from these studies as it simultaneously evaluated many classes of social skills from two different instruments, thus covering a wide dimension of this variable.

In the prediction of anxiety, the total scores of the SSI-Del Prette, the potentialities, the difficulties, and speaking in public remained in the final model. Public speaking is considered the most prevalent social fear, which may explain why this specific repertoire of social skills stood out [39]. The depression group presented fewer communication, affection, and coping social skills, as well as lower scores for the SSI-Del Prette total, potentialities, and difficulties.

In general the results confirmed previous studies which indicated that specific difficulties may negatively influence mental health, such as having difficulty making friends [11,12,13] or having difficulties in interactions with parents [13]. The present study contributed to the

advancement of knowledge about the mental health of undergraduate students by highlighting the social skills more related to anxiety or depression, i.e., those which influence the interactions with friends or family members. The fact that this study assessed potentialities and difficulties also configures it as a contribution, as both constructs predict the assessment of what the student is skilled and unskilled in, as well as the impact this has for the interlocutor.

It is known that the sociodemographic and course variables have an influence on the social skills repertoire [23,31,40,41,42] and it is considered that, although these variables slightly differentiated the clinical groups, they may have potentiated the differences found regarding the social skills repertoire for anxiety and depression. Identifying such data can have a preventive contribution, since it is known that there is a higher risk of dropout for students with low social competence and loneliness [43], and that when entering the labor market low social competence and low effective communication impair the professional life [44,45]. Accordingly, the university must offer interventions to improve social and professional competence. A survey was conducted [46] with 33 English universities in order to verify whether mental health services were available for the students and found that only 15 of them offered any service for students with mental health problems. Additionally, care must be taken so that the student does not feel stigmatized [35] and prefers not to seek help or to seek it outside the university.

8. CONCLUSION

This study separately identified the prevalence of anxiety and depression, and simultaneously evaluated, different classes of social skills, sociodemographic variables, and characteristics of the courses, with undergraduate students, which could expand the knowledge in the area. It should be noted that particular social skill repertoires differentiated the groups with clinical characteristics of anxiety and depression, which can act as a guide when proposing interventions for undergraduate students. Despite having included a large sample, the study was conducted in only one Brazilian public university, which configures a limitation that can be controlled in future studies, including other centers and a greater diversity of courses.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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