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Distance learning during social seclusion by COVID-19: Improving the quality of life of undergraduate dentistry students

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Abstract

Background: Social isolation is ongoing worldwide with the aim to stem the spread of the novel coronavirus SARS-CoV-2 responsible for the COVID-19 pandemic. However, social isolation leads to significant psycho-emotional changes. This study aimed to assess the effect of distance education (DE) activities implemented due to social isolation, on the quality of life of undergraduate dentistry students.

Method: An *e*-questionnaire (Google Forms®) was administered to identify specific DE activities after social isolation and included the World Health Organization Quality of Life (WHOQOL)-Bref questionnaire. The *e*-questionnaire was sent 14 days after the initiation of social isolation, remaining available for 48 hours. Cronbach's alpha and the means of the quality-of-life domains were calculated and analysed using the Friedman/Dunn and Spearman's correlation tests. After ranking, chi-squared and Fisher's exact tests plus multinomial logistic regression were performed (SPSS, $P < .05$).

Result: There was an excellent internal consistency of WHOQOL-Bref ($\alpha = 0.916$), and the mean quality of life (0-100) was 70.66 ± 12.61. The psychological domain was the most affected ($P < .001$). The social domain exhibited the weakest correlation with overall quality of life ($P < .001$, $r = 0.688$). The use of the Internet, cell phones and streaming media increased, although all students had DE activities. In the multivariate analysis, attending virtual meetings ($P = .028$) and performing DE activities in an office/study room ($P = .034$) were significantly associated with good quality of life.

Conclusion: Facing social isolation never previously experienced by this generation, undergraduate dentistry students are at risk of reduced quality of life. Therefore, performing DE activities through devices with teacher-student interaction is a key coping tool.

KEYWORDS

coronavirus, education, dental, education, distance, quality of life, social isolation

1 | INTRODUCTION

Since December 2019, cases of coronavirus disease 2019 (COVID-19), which emerged in Wuhan of the Hubei Province in China, have spread throughout the world, causing great concern.[1] The COVID-19 pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has resulted in widespread infections with severe outcomes. The effects, in terms of mortality rate and global economic impact, have not been seen since the 1918-1919 Spanish flu, which killed 675 000 people in the United States and 50 million worldwide. The damages resulting from COVID-19, not only in terms of health but also in terms of the economy and social context, are incalculable. The spread of the virus has caused school closures, company shutdowns and bans on all public meetings with the aim to minimise the deleterious effects.[2]

On 30 January 2020, the Emergency Committee of the World Health Organization (WHO) declared a global health emergency based on rising case notification rates in Chinese and international locations. Currently, the case detection rate is changing daily at an alarming rate.[3] According to the Ministry of Health (*Ministério da Saúde*—MS), at 12:02PM of 04 April 2020, Ceará was the third most affected Brazilian state, only behind the states of Rio de Janeiro and São Paulo, respectively.[4] To control COVID-19 transmission, various governments implemented strict domestic quarantine and social isolation policies. This measure has proven effective in decreasing the spread of new cases of infection in countries affected by COVID-19. However, recent research has demonstrated that these measures may have adverse psychological effects on the quarantined population.[5]

After traumatic events, people may experience acute stress with long-term mental and physical health impairment, including psychiatric disorders, in addition to family conflicts.[6,7] Quarantine is an unpleasant and traumatic experience, and separation from loved ones, loss of freedom, uncertainty towards the future and boredom may lead to major sequelae.[8] An important consequence of social isolation is its psychological impact on students. Stress factors, such as prolonged isolation; fear of infection; frustration and boredom; inadequate information; lack of personal contact with colleagues, friends and professors; lack of personal space at home; and financial loss for the family, may have even more problematic and lasting effects, especially on children and adolescents.[9]

The Ceará state government, on 16 March 2020, declared the suspension of activities involving crowds to promote social isolation and consequently reduce the spread of COVID-19, and such measures included the suspension of classroom instruction.[10] By March 18, public and private colleges and universities of Ceará were no longer conducting classroom activities. However, Christus Faculty (*Centro Universitário Christus*—Unichristus), on the same day, began preparing online lessons and training/instructing faculty members via distance learning to avoid disruption of the activities of its numerous undergraduate degrees.

Although dentistry is a highly practical profession, the high load of theoretical classes renders it possible to temporarily convert theoretical activities into distance education modalities with the aim to keep adolescent students active and reduce anxiety and discomfort levels during confinement.[9] Thus, since social isolation significantly reduces quality of life, and access to technology can minimise this discomfort,[11] this study aimed to assess the effect of maintaining distance education activities on undergraduate dentistry students in social isolation due to the COVID-19 pandemic.

2 | METHOD

2.1 | Study type, sample and ethical considerations

This observational cross-sectional study, which involved the anonymous opinion of undergraduate dentistry students from a higher education centre of reference in a specific region (Unichristus), followed the rules of Resolution 510/16.[12] The project was approved by the Ethics Committee of the university, in accordance with the Brazilian guidelines for research involving human beings, as established in Resolution 466/12 (Record: 30.535.020.5.0000.5049). Due to the social isolation system implemented by governmental institutions to reduce the spread of COVID-19, an online questionnaire was administered using Google® Forms. The survey was promoted amongst undergraduate dentistry students from Unichristus through various social media platforms: Instagram@, Facebook@ and WhatsApp@.

As an inclusion criterion, students were only included if they answered yes to the first two items of the questionnaire: "Do you wish to participate in this study?" and "Are you an undergraduate dentistry student at Unichristus?" These were the only non-mandatory items of the questionnaire. Questionnaires filled in after the deadline set in the item "sample calculation and questionnaire administration period," and questionnaires in which these two non-mandatory items were not filled were excluded from the study.

2.2 | Research instruments

The questionnaire was designed with four blocks of questions: block 1 contains questions regarding age, sex, semester, shift and extracurricular activities prior to social isolation, and block 2 contains questions regarding study practices prior to and during social isolation, as well as the use of concentration killers (TV, cell phone, streaming media, etc) during this period.

The block 3 (data from student profile) is developed in a 4-step approach to select items.[13] First, a thematic review of questionnaires evaluating study profile in *e*-learning was accessed to understand the important items to investigate this profile.[14-16] Second, a teaching expertise designed a structured questionnaire based on the information previously described. Third, the items were evaluated by three specialists, a doctor in health education, a doctor in teaching and a doctor in biostatistics. Fourth, minor item disposition corrections (objectification of responses) were made based on suggestion

of the three specialists, and the questionnaires were launched. This process was made in four days (one process per day) to minimise fatigue bias, and the meetings were by videoconference due to the context of the COVID-19 pandemic. So, block 3 contains questions regarding distance education activities performed during social isolation.

The block 4 contains the previously validated World Health Organization Quality of Life (WHOQOL)-Bref questionnaire. WHOQOL-Bref is an instrument developed in 1998 by the WHO to measure quality of life through an abbreviated version of a longer pre-existing questionnaire, termed the WHOQOL-100.[17] WHOQOL-Bref was adapted and validated for the Brazilian Portuguese language in 2000 and contains 26 items that can be answered using a 5-point Likert scale, of which 24 items cover four domains (physical health, psychological well-being, social relationships and environment), and the other two items measure self-assessed quality of life.[18] The internal consistency of WHOQOL-Bref was measured as described below (topic 2.4).

The questionnaire is shown in annex 1.

2.3 | Sample calculation and questionnaire administration period

Based on the study by Hawton,[19] which observed significant variation in the quality of life of socially isolated elderly people aged 65 to 74 years in relation to individuals with low social isolation (EQ-5D DSI scores: 0.67 ± 0.29 vs 0.74 ± 0.23), 230 students should be evaluated to obtain a sample that represents the alternative hypothesis of this study with a power of 90% and a confidence level of 95% (Student's *t* test).

As determined by the Ministry of Health (*Ministério da Saúde*—MS), practical classroom instruction was suspended, and the recommendation to teach theoretical lessons using digital platforms in the format of distance learning was promptly followed by the institution on the first day of isolation. The instrument was launched 14 days (on March 18, 2020) after the state government suspended classroom activities and was available for 24 hours on the 14th day of social isolation (01 April 2020; 0:01AM).

During this period, the questionnaire was completed by 135 students. Each dentistry class at Unichristus has a leader, so we contacted by WhatsApp the class leaders who sent the questionnaires to their WhatsApp groups. So, to reach the number set in the sample calculation, the questionnaire remained available for another 24 hours (15th day of social isolation), totalling 236 completed questionnaires. Our dental school has 654 enrolled students, so our response rate in these two days was 36.1%.

Amongst them, four forms were filled after the 48-h deadline (03 April 2020; 0:01AM), and two students failed to answer the items mentioned in the exclusion criteria; thus, the sample size reached 230. Since all items of the blocks of questions were mandatory, the students could not move to the next block without answering all items from the previous block. Thus, all mandatory items of the 230 questionnaires included in this study were properly completed. The number of days in social isolation (14 or 15) was calculated by subtracting the date when the questionnaire was filled out on Google Forms® by the date when classroom activities were suspended at the start of social isolation.

2.4 | Statistical analysis

Data from the completed surveys were exported to a Microsoft Excel spreadsheet using the command "View responses in Sheets" of Google Forms® and subsequently encoded and analysed using the software Statistical Package for the Social Sciences (SPSS) version 20.0 in Windows ($P < .05$).

The scores of the WHOQOL-Bref and of each domain were converted to a linear scale from 0 to 100, according to the syntax proposed by the WHOQOL group. The means and standard deviations were calculated, along with the overall Cronbach's alpha and the Cronbach's alpha values excluding each domain, and the correlation of each domain was analysed with the WHOQOL-Bref (Spearman's rank correlation tests). The Friedman/test was used to analyse the domains, and subsequently, the WHOQOL-Bref scores of each student were classified as dissatisfied/uncertain for scores from 0 to 70 and satisfied for scores from 70 to 100.[20]

The two categories (low/moderate quality of life [0-70] and high quality of life [70-100]) were associated with all items of the first three blocks of the questionnaire using the Pearson's chi-squared test or Fisher's exact test. The variables with $P < .200$ were analysed using a multinomial logistic regression model (multivariate analysis).

3 | RESULTS

3.1 | Social isolation reduces the quality of life of dentistry students

The mean quality of life of dentistry students after two weeks of social isolation was 70.66 ± 12.61 with a median of 71.90 points and scores ranging from 36.20 to 96.20. Cronbach's alpha showed adequate internal validity of the construct ($\alpha = 0.916$), and no exclusion of any domain significantly reduced these values. All domains showed a strong correlation with the overall quality-of-life score (Table 1). The domain most affected by isolation was the psychological domain, with values significantly lower than those of all other domains ($P < .001$), whilst the social relationships domain exhibited the weakest correlation with the overall quality-of-life score ($P < .001$, $r = 0.688$) (Table 1). Most of the sample demonstrated good quality of life (n = 127, 55.2%), but 44.8% of the sample (n = 103) demonstrated low/moderate quality of life (Table 1).

TABLE 1 Descriptive, inferential and reliability analysis of the WHOQOL-Bref amongst undergraduate dentistry students after two weeks of social isolation due to the COVID-19 pandemic

	Mean ± SD	Cronbach's alpha	Correlation with WHOQOL-Bref
WHOQOL-Bref	70.66 ± 12.61	0.916[a]	
D1 physical health	71.37 ± 14.53	0.899[b]	$P < .001$ (r = 0.843)[d]
D2 psychological	67.67 ± 14.59[*]	0.898[b]	$P < .001$ (r = 0.848)[d]
D3 social relationships	70.93 ± 17.51	0.925[b]	$P < .001$ (r = 0.688)[d]
D4 environment	71.67 ± 14.68	0.901[b]	$P < .001$ (r = 0.853)[d]
D5 self-perception	72.70 ± 16.76	0.903[b]	$P < .001$ (r = 0.794)[d]
P-value	<.001[c]		

[a]Cronbach's alpha.
[b]Cronbach's alpha when excluding the item.
[c]Friedman/Dunn test.
[d]Spearman's rank correlation with the overall domain (D).
[*]$P < .05$ vs the other domains.

3.2 | The sociodemographic profile and educational activities prior to and after social isolation for COVID-19 exhibit no effect on the quality of life of dentistry students

The sample consisted of students who were mostly older than 20 years (n = 142, 61.7%), with a mean age of 22.4 ± 4.8 years that ranged from 17 to 46 years. Most students were females (n = 179, 77.8%) and completed their pre-clinical and clinical semesters (n = 109, 53.4%) in evening classes (n = 119, 51.7%) (Table 2). Most students participated in extracurricular activities, primarily study groups (n = 136, 59.1%), followed by teaching assistant jobs (n = 121, 52.6%), continuing education (n = 54, 23.5%) and scientific initiation (n = 31, 13.5%) projects. Of the 230 questionnaires completed, most were completed on the 14th day of social isolation (n = 135, 58.7%), whilst 95 (41.3%) were completed after the 15th day of social isolation (Table 2). None of these variables were significantly associated with the scores for overall quality of life ($P > .05$) (Table 2).

3.3 | Changes in study routines and in the use of concentration killers slightly change the quality-of-life profile of dentistry students

The study routine of most students prior to social isolation involved either 4-6 hours (n = 63, 27.4%) or 2-4 hours (n = 62, 27.0%) of study per day. During social isolation for COVID-19, the numbers were similar, with the highest prevalence of study routines at 2-4 hours (n = 63, 27.4%) and 4-6 hours (n = 54, 23.5%) of study per day, respectively. Thus, no significant difference was found between the two periods ($P = .146$), since although 91 (39.6%) students stated that they spent more time studying daily after social isolation for COVID-19 than previously, 89 (38.7%) stated that they reduced their time studying, whilst 50 (21.7%) maintained their daily study time (Table 3).

Most students stated that they increased their use of the Internet (n = 204, 88.7%) and cell phone (n = 188, 81.7%), as well as the time they spent watching TV (n = 102, 44.5%) and engaging with streaming media (n = 124, 53.9%), during isolation. The increase in Internet and cell phone use was significantly higher than the increase in time spent watching TV or engaging with streaming media ($P < .001$) (Table 3). The only variable of study routine and use of concentration killers that was significantly associated with quality of life during social isolation was watching TV. The students who reduced their time spent watching TV in isolation reported worse quality of life than the students who maintained their time spent watching TV ($P = .016$) (Table 3).

3.4 | Distance education and study environment are determinants of improved quality of life amongst dentistry students in social isolation for COVID-19

All students evaluated in this study attended some type of distance learning or used some type of educational technology during the 14 days of interruption in classroom instruction and social isolation. Nearly all students (n = 222, 96.5%) had virtual meetings with professors using online platforms, such as Zoom or Skype, and received assignments through the educational platform Moodle (n = 207, 90.0%). The system developed by the university was the third most used platform for lessons and distance education activities (n = 175, 76.1%), and video lessons on YouTube were an approach cited by 169 (73.5%) students (Table 4). The high quality of life was prevalent significantly higher amongst students with virtual meetings through online platforms, such as Zoom or Skype, compared to amongst students without virtual meetings ($P = .013$) (Table 4).

The most used device to access distance education content was the computer (n = 201, 87.4%), followed by the cell phone (n = 198, 87.4%). The study environment most frequently used

TABLE 2 Effect of sociodemographic characteristics and educational activities prior to social isolation due to COVID-19 on the quality of life of dentistry students

	Total	Quality of life		*P*-value
		Up to 70	>70	
Age				
Up to 20	88 (38.3%)	34 (33.0%)	54 (42.5%)	.140
>20	142 (61.7%)	69 (67.0%)	73 (57.5%)	
Sex				
Female	179 (77.8%)	80 (77.7%)	99 (78.0%)	.959
Male	51 (22.2%)	23 (22.3%)	28 (22.0%)	
Semester				
Theoretical semester	87 (37.8%)	36 (35.0%)	51 (40.2%)	.216
Pre-clinical and clinical semesters	109 (47.4%)	55 (53.4%)	54 (42.5%)	
Mandatory internship	34 (14.8%)	12 (11.7%)	22 (17.3%)	
Shift				
Morning	114 (49.6%)	49 (47.6%)	65 (51.2%)	.586
Afternoon	19 (8.3%)	11 (10.7%)	8 (6.3%)	.230
Evening	119 (51.7%)	57 (55.3%)	62 (48.8%)	.325
Extracurricular activities				
Teaching assistant	121 (52.6%)	49 (47.6%)	72 (56.7%)	.168
Continuing education	54 (23.5%)	20 (19.4%)	34 (26.8%)	.191
Study groups	136 (59.1%)	67 (65.0%)	69 (54.3%)	.100
Scientific initiation	31 (13.5%)	16 (15.5%)	15 (11.8%)	.411
Number of days without classroom lessons				
14	135 (58.7%)	63 (61.2%)	72 (56.7%)	.493
15	95 (41.3%)	40 (38.8%)	55 (43.3%)	

*$P < .05$, Fisher's exact test or Pearson's chi-squared test (n, %).

to access distance education content was the bedroom (n = 184, 80.0%), followed by the living room (n = 70, 30.4%), dining room (n = 40, 17.0%) and office or study room (n = 32, 13.9%). The students who performed distance education activities in an office or study room had a higher prevalence of high quality of life compared to the students who did not perform those activities in this room ($P = .005$) (Table 4).

Most students stated that they lived in a household with more than three people (n = 131, 57.0%) and that their homes had more than five rooms (n = 155, 67.4%) and more than one room was deemed suitable for studying (n = 165, 71.7%). Students whose homes had more than five rooms ($P = .017$) and had more than one room deemed suitable for studying ($P = .004$) exhibited better quality of life (Table 4). In the multivariate analysis, students who completed distance education activities through virtual meetings using online platforms, such as Zoom or Skype ($P = .028$), in the environment of an office or study room ($P = .034$) exhibited a 9.01 and 2.85 higher prevalence of good quality of life, regardless of other variables (Table 5).

4 | DISCUSSION

According to Johns Hopkins University, which updates numbers in real time, at 12:00PM on 04 April 2020, 1 140 327 people were infected worldwide, with 60 887 confirmed deaths. The United States of America had the highest number of diagnosed cases (278 568), whilst Italy had the highest number of deaths (14 681). According to the same website, on the same day, Brazil had 9216 confirmed cases, with 365 deaths,[3] and the state of Ceará ranked third in the number of cases, totalling 627 confirmed COVID-19 diagnoses and 22 deaths, with a 3.5% mortality rate.[4]

Social isolation and quarantine measures have been adopted worldwide to control the spread of COVID-19,[2] and on 16 March 2020, activities involving crowds of people, such as classroom activities, were suspended in our state (Ceará, Brazil).[10] On March 18, the Brazilian government regulated an ordinance published seven days earlier, authorising higher education institutions to engage in distance education activities through communication technologies to maintain the classroom activities of undergraduate degrees.[21] On the same day, distance lessons and activities were made available to students on the systems and platforms of Unichristus, thus avoiding the interruption of teaching activities; nevertheless, social isolation was inevitable. We performed a web-based questionnaire invitation, because this was the only method to conduct the study in COVID-19 pandemic. But, although this method is described as having lower response rates (36.3%) than paper-based questionnaire invitations (46.0%), our response rate (36.1%) was strongly similar to previously described.[22] So, a good adhesion to research was obtained.

Long periods of social isolation are associated with mental health problems, post-traumatic stress symptoms, avoidance and anger behaviours, and family conflicts.[6,7,23] In the study sample, the domain most strongly affected by the quality of life was the psychological domain, whilst the social domain exhibited the weakest correlation with the overall quality-of-life scores, demonstrating the impact of social isolation on the psychological profile of individuals in social isolation.

Confinement, loss of usual routines and reduced social and physical contact with other people can induce boredom, frustration and a feeling of isolation from the rest of the world. This can lead to anguish, which directly interferes with quality of life,[8,24] even within a considerably short period of 14-15 days, as shown in the sample of this study. A study by Hawryluck[25] demonstrated that individuals

TABLE 3 Effect of educational activities prior to and after social isolation for COVID-19 on the quality of life of dentistry students

	Total	Quality of life		*P*-value
		Up to 70	Up to 70	
Study time prior to isolation				
Up to 1 h/d	15 (6.5%)	11 (10.7%)	4 (3.1%)	.256
From 1 to 2 h/d	50 (21.7%)	21 (20.4%)	29 (22.8%)	
From 2 to 4 h/d	62 (27.0%)	27 (26.2%)	35 (27.6%)	
From 4 to 6 h/d	63 (27.4%)	27 (26.2%)	36 (28.3%)	
>6 h/d	40 (17.4%)	17 (16.5%)	23 (18.1%)	
Study time during isolation				
Up to 1 h/d	29 (12.6%)	14 (13.6%)	15 (11.8%)	.729
From 1 to 2 h/d	39 (17.0%)	17 (16.5%)	22 (17.3%)	
From 2 to 4 h/d	63 (27.4%)	31 (30.1%)	32 (25.2%)	
From 4 to 6 h/d	54 (23.5%)	20 (19.4%)	34 (26.8%)	
>6 h/d	45 (19.6%)	21 (20.4%)	24 (18.9%)	
Study time during isolation				
Reduced	89 (38.7%)	38 (36.9%)	51 (40.2%)	.178
Neither increased nor decreased	50 (21.7%)	18 (17.5%)	32 (25.2%)	
Increased	91 (39.6%)	47 (45.6%)	44 (34.6%)	
Internet use after isolation				
Reduced	3 (1.3%)	2 (1.9%)	1 (0.8%)	.703
Neither increased nor decreased	23 (10.0%)	11 (10.7%)	12 (9.4%)	
Increased	204 (88.7%)	90 (87.4%)	114 (89.8%)	
Cell phone use after isolation				
Decreased	11 (4.8%)	3 (2.9%)	8 (6.3%)	.264
Neither increased nor decreased	31 (13.5%)	17 (16.5%)	14 (11.0%)	
Increased	188 (81.7%)	83 (80.6%)	105 (82.7%)	
TV use after isolation				
Decreased	51 (22.3%)	28 (27.5%)*	23 (18.1%)	**.016**
Neither increased nor decreased	76 (33.2%)	24 (23.5%)	52 (40.9%)*	
Increased	102 (44.5%)	50 (49.0%)	52 (40.9%)	
Streaming media use after isolation				
Decreased	36 (15.7%)	18 (17.5%)	18 (14.2%)	.775
Neither increased nor decreased	70 (30.4%)	30 (29.1%)	40 (31.5%)	
Increased	124 (53.9%)	55 (53.4%)	69 (54.3%)	

*$P < .05$, Fisher's exact test or Pearson's chi-squared test (n, %).

Bold values are equalent significant associations.

quarantined for a period of more than 10 days showed significantly higher post-traumatic stress symptoms than those quarantined for less than 10 days, suggesting that, even in short periods of time, the psycho-emotional changes of individuals in social isolation are eminent. In our sample, 44.8% of students evaluated in this study demonstrated low/moderate quality of life, with noticeable impact due to social confinement, and as Brazil has an exponentially increasing number of cases and deaths from COVID-19, reaching the second position in the number of cases worldwide,[26] the fear caused by the pandemic may directly impact the quality of life.[27] So, the impair in WHOQOL-Bref psychological domains (the most affected domain) as showed in this study may be related to current situation in Brazil with regard to alarming number of cases of COVID-19.

Social isolation has a strong impact on children and adolescents,[9] which prompted the initiative of maintaining distance education activities to mitigate this process. However, most students increased

TABLE 4 Effect of distance education during social isolation due to COVID-19 on the quality of life of dentistry students

	Total	Quality of life		*P*-value
		Up to 70	>70	
DE: platform				
University system	175 (76.1%)	75 (72.8%)	100 (78.7%)	.295
Educational platform Moodle	207 (90.0%)	92 (89.3%)	115 (90.6%)	.757
Video lessons on YouTube	169 (73.5%)	73 (70.9%)	96 (75.6%)	.420
Virtual meetings (Zoom/Skype)	222 (96.5%)	96 (93.2%)	126 (99.2%)*	**.013**
Others	52 (22.6%)	24 (23.3%)	28 (22.0%)	.821
DE: device				
Cell phone	198 (86.1%)	85 (82.5%)	113 (89.0%)	.160
Computer	201 (87.4%)	89 (86.4%)	112 (88.2%)	.686
Others	12 (5.2%)	5 (4.9%)	7 (5.5%)	.824
DE: environment				
Bedroom	184 (80.0%)	81 (78.6%)	103 (81.1%)	.643
Living room	70 (30.4%)	35 (34.0%)	35 (27.6%)	.293
Dining room	40 (17.4%)	16 (15.5%)	24 (18.9%)	.503
Kitchen	18 (7.8%)	7 (6.8%)	11 (8.7%)	.600
Office/Study	32 (13.9%)	7 (6.8%)	25 (19.7%)*	**.005**
Balcony, sidewalk, outdoor	17 (7.4%)	6 (5.8%)	11 (8.7%)	.414
Number of people who live in the same home				
Up to 3	99 (43.0%)	41 (39.8%)	58 (45.7%)	.372
>3	131 (57.0%)	62 (60.2%)	69 (54.3%)	
Total number of rooms				
Up to 5	75 (32.6%)	42 (40.8%)*	33 (26.0%)	**.017**
>5	155 (67.4%)	61 (59.2%)	94 (74.0%)*	
Number of rooms suitable for studying				
1	65 (28.3%)	39 (37.9%)*	26 (20.5%)	**.004**
>1	165 (71.7%)	64 (62.1%)	101 (79.5%)*	

Abbreviations: DE, distance education.

*$P < .05$, Fisher's exact test or Pearson's chi-squared test (n, %).

Bold values are equalent significant associations.

the use of the Internet, cell phone and streaming media due to the idleness and boredom that comes with being secluded at home.[9] The use of technologies in individuals in social isolation improves interaction with society and mitigates dissatisfaction with life.[19] However, technologies are important concentration killers and reduce knowledge retention and the benefits that distance education activities can provide.[28]

Various factors, including shift, sex, age and length of social isolation (14 or 15 days), exhibited no significant effect on quality of life. Interestingly, no significant effect was observed on the quality of life of students who had performed extracurricular activities prior to socially isolating due to COVID-19. Extracurricular activities are associated with improved social interaction and life satisfaction. Accordingly, the group of students who had adhered to extracurricular activities are expected to show a greater decrease in quality of life after such activities are temporarily prevented.[29] Therefore, maintaining distance education activities may help to retain these indices.

All dentistry students of our university attended some type of distance instruction, but virtual meetings using online platforms, such as Zoom/Skype, were the most used distance education modality, significantly affecting quality of life. These technologies with advanced interaction structures between people, even over long distances, virtually increase social contact, reduce distance and promote interaction between students and professors.[30] Distance education has been used worldwide as a rich tool to access education. Despite the resistance of students and teachers to this technological innovation,[31] distance education adds value to those who lack

TABLE 5 Multivariate analysis of modifying factors on quality of life amongst dentistry students in social isolation due to COVID-19

	P-value	Adjusted OR
High quality of life (WHOQOL-Bref >70)		
Age (>20 years)	.109	1.65 (0.89-3.06)
Extracurricular activity (teaching assistant)	.533	1.23 (0.65-2.33)
Extracurricular activity (continuing education)	.281	1.48 (0.73-3.00)
Extracurricular activity (study group)	.169	1.58 (0.82-3.04)
Study time (increased)	.061	2.11 (0.97-4.61)
TV use (increased)	.089	1.81 (0.91-3.61)
DE: virtual meetings in Zoom/ Skype	**.028***	**9.01 (1.37-85.42)**
DE: devices: cell phone	.334	1.51 (0.65-3.49)
DE: environment: office/study	**.034***	**2.85 (1.08-7.50)**
Total number of rooms (>5)	.095	1.71 (0.91-3.21)
Number of rooms suitable for studyin (>1)	.074	1.82 (0.94-3.52)

Abbreviations: DE, distance education; OR, odds ratio.

*$P < .05$, multinomial logistic regression.

Bold values are equalent significant associations.

access to information through conventional means.[32] Thus, distance education, particularly with online interaction devices, plays a key role in this period of social isolation due to the COVID-19 pandemic, even becoming a way to manage stress.[8]

Despite the benefits of online learning, content must be accessed in a suitable environment to both maintain a level of adequate concentration and favour its assimilation.[33] The results of this study indicate that performing distance education activities in an office or study room was an important factor to maintaining a high quality of life. A suitable study and work environment is crucial for improved academic and professional performance.[34,35] The home environment's role as educator is interdependent with many other, continuing, changing and frequently competing roles that it fulfil, and the home atmosphere strongly supports the academic achievement.[36] The size of the study site, the amount of light and even the colour of the environment influence the quality of learning.[37] When associated with a good e-learning environment, a pleasant environment for study can improve the quality of life of students by dedicating themselves to their main activity, the study.[38] Therefore, the use of more appropriate environments to conduct distance learning activities is recommended.

5 | CONCLUSION

Thus, undergraduate dentistry students, who are globally encountering social isolation on a scale that has never been experienced previously by this generation, are at a risk for reduced quality of life. Performing distance education activities using devices that promote thorough interaction with professors is a key coping tool. However, these activities must be improved and conducted in an appropriate environment for quality education and student satisfaction. Although our short-time results, we recommend to carry out future studies with a longer isolation time to assess the real impact of a major confinement as is happening today.

6 | EXAMPLE SCENARIO

Undergraduate students in dentistry are young, and the youth predisposes to anxiety. Facing social isolation never previously experienced by this generation, this sample is at risk of reduced quality of life. Therefore, performing DE activities through devices with teacher-student interaction is a key coping tool.

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CONFLICT OF INTEREST

The authors certify that they have no conflict of interest.

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ANNEX 1

Questionnaires applied in dentistry students

1. Do you wish to participate in this study?

( ) No ( ) Yes

2. Are you an undergraduate dentistry student at Unichristus (Fortaleza, Ceará, Brazil)?

( ) No ( ) Yes

Block 1

1. Age: _____ years old
2. Sex: ( ) Female ( ) Male
3. Semester:

( ) 1st to 3th (Theoretical semester)

( ) 4th to 8th semester (Pre-clinical and clinical semesters)

( ) 9th to 10th semester (Mandatory internship)

4. Study Shift: ( ) Morning ( ) Afternoon ( ) Evening
5. Extra-curricular activities

( ) Teaching assist

( ) Continuing education
( ) Study groups
( ) Scientific initiation
6. Study time prior to isolation
( ) Up to 1 h/d
( ) From 1 to 2 h/d
( ) From 2 to 4 h/d
( ) From 4 to 6 h/d
( ) >6 h/d
Block 2
1. Study time during isolation
( ) Up to 1 h/d
( ) From 1 to 2 h/d
( ) From 2 to 4 h/d
( ) From 4 to 6 h/d
( ) >6 h/d
2. Internet use after isolation
( ) Reduced
( ) Neither increased nor decreased
( ) Increased
3. Cell phone use after isolation
( ) Reduced
( ) Neither increased nor decreased
( ) Increased
4. TV use after isolation
( ) Reduced
( ) Neither increased nor decreased
( ) Increased
5. Streaming media use after isolation
( ) Reduced
( ) Neither increased nor decreased
( ) Increased
Block 3
1. Did you had distance learning at University system? ( ) No ( ) Yes
2. Did you had distance learning at Educational platform Moodle? ( ) No ( ) Yes
3. Did you had distance learning at Video lessons on YouTube? ( ) No ( ) Yes
4. Did you had distance learning at Virtual meetings (Zoom/ Skype)? ( ) No ( ) Yes
5. Did you had distance learning at other platforms? ( ) No ( ) Yes
6. Did you accessed distance learning at Cell phone? ( ) No ( ) Yes
7. Did you accessed distance learning at Computer? ( ) No ( ) Yes
8. Did you accessed distance learning at others dispositive? ( ) No ( ) Yes
9. Did you accessed distance learning in bedroom? ( ) No ( ) Yes
10. Did you accessed distance learning in living room? ( ) No ( ) Yes
11. Did you accessed distance learning in dining room? ( ) No ( ) Yes
12. Did you accessed distance learning in kitchen? ( ) No ( ) Yes
13. Did you accessed distance learning in office/ Study? ( ) No ( ) Yes
14. Did you accessed distance learning in Balcony? ( ) No ( ) Yes
15. Did you accessed distance learning in sidewalk? ( ) No ( ) Yes
16. Did you accessed distance learning in outdoor? ( ) No ( ) Yes
17. Number of people who live in the same home: _____
18. Total number of rooms: _____
19. Number of rooms suitable for studying: _____
Block 4
1. How would you rate your quality of life?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
2. How satisfied are you with your health?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
3. To what extent do you feel that physical pain prevents you from doing what you need to do?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
4. How much do you need any medical treatment to function in your daily life?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
5. How much do you enjoy life?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
6. To what extent do you feel your life to be meaningful?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
7. How well are you able to concentrate?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
8. How safe do you feel in your daily life?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
9. How healthy is your physical environment?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
10. Do you have enough energy for everyday life?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
11. Are you able to accept your bodily appearance?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
12. Have you enough money to meet your needs?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
13. How available to you is the information that you need in your day-to-day life?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
14. To what extent do you have the opportunity for leisure activities?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
15. How well are you able to get around?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
16. How satisfied are you with your sleep?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
17. How satisfied are you with your ability to perform your daily living activities?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
18. How satisfied are you with your capacity for work?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
19. How satisfied are you with yourself?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.
20. How satisfied are you with your personal relationships?
( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.

21. How satisfied are you with your sex life?

( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.

22. How satisfied are you with the support you get from your friends?

( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.

23. How satisfied are you with the conditions of your living place?

( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.

24. How satisfied are you with your access to health services?

( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.

25. How satisfied are you with your transport?

( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.

26. How often do you have negative feelings such as blue mood, despair, anxiety, depression?

( ) 1. ( ) 2. ( ) 3. ( ) 4. ( ) 5.