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AWARD WINNING ORIGINAL ARTICLE

Quality of life in chiropractic students pre- and post-COVID-19 lockdowns utilizing the Short-Form Health Survey-36

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ABSTRACT

Objective: To compare previously recorded quality of life scores of students at the New Zealand College of Chiropractic using the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) to those after New Zealand (NZ) COVID lockdowns.
Methods: Previously recorded students' SF-36 questionnaires were collected before (2019) and after (2022) the lockdowns. Student populations were independent at each time point (pre- and post-lockdown) and were compared between 2019 and 2022 using unpaired Wilcoxon tests and to similarly aged and NZ normative data.
Results: Two hundred seventy-six pre-COVID (51.1% female) and 120 post-COVID (60.8% female) data sets were returned. All pre-COVID years and scores were significantly higher or comparable with reference data ($p \leq .050$). Post-COVID scores dropped below pre-COVID and reference data—with the largest drops seen in emotional wellbeing, emotional role limitations, social, and fatigue domains ($p < .05$ - $p < .001$). Only post-COVID physical functioning was comparable with pre-COVID or reference data ($p > .050$).
Conclusion: This study suggests that before COVID New Zealand College of Chiropractic perceived their quality of life as the same or better than the average New Zealander or similarly aged person. After COVID, most quality of life scores dropped substantially with emotional, social, and fatigue-related domains showing the greatest decline.

Key Indexing Terms: Chiropractic; Mental Health; Students; Health Surveys; New Zealand

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INTRODUCTION

On the 23rd of March 2020, the first of New Zealand's stringent COVID-19 lockdowns began, restricting the movement of people within the community.[1] This initial lockdown lasted till the 14th of May and schools, universities, nonemergent healthcare, and business were shut down. Classes moved on-line, and people were restricted to their family or household-only bubble.[1] What followed, for the wider-Auckland area, were 3 more stringent lockdowns with a total of 185 days or just over 6 months isolated from normal daily life.[2]

A great deal of research has described the effects on the mental, physical, and effects of people during and after the New Zealand and worldwide COVID-19 lockdowns, effects that seem to be overwhelmingly negative.[3–5] Post-lockdowns, many people have described long-lasting feelings of fear, isolation, depression, and anxiety, alongside financial, vocational, and educational insecurity.[3–5]

For students attending the New Zealand College of Chiropractic (NZCC), lockdown meant not only social isolation, but isolation from classes, internships, laboratory groups, and from faculty and trusted healthcare providers.[1] Faculty members and administrators rushed to convert an intensely practical and hands-on curriculum to being taught on-line, with some adapting more successfully than others. Over the course of the lockdowns and during the return to so-called normalcy, this author, and many other NZCC faculty, anecdotally noted and remarked on what we saw as a large dip in students' emotional and mental health, observations that eventually informed this study: to assess for changes in quality of life pre- and post-COVID-19 lockdowns.

As part of the NZCCs normal teaching practice and internship all students regularly complete a health-related quality of life questionnaire called the Medical Outcomes Study 36-Item Short-Form Health Survey or SF-36 (also known as the RAND-36, QualityMetric Inc, Lincoln, RI, USA). The SF-36 is reliable and valid, and the most widely-used tool for assessing health-related QOL in the general population and in clinical trials.[6–8] The SF-36

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consists of 36 questions that assess 8 concepts of health: physical functioning, role limitations caused by physical health problems, role limitations caused by emotional problems, social functioning, emotional well-being, energy and fatigue, pain, and general health perceptions.[6] Each domain is scored out of 100, which represents the best score for participants perception of their own health domain.[6] Health-related quality of life (QOL) links how an individual's overall health status affects their ability, and their perceived ability, to function in the physical, mental, and social spheres.[9] This type of health-related QOL is a useful standardized measure of health status and is commonly used in clinical trials to assess changes in physical and mental health associated with health-related interventions or life events.[10]

Previous research suggests that as loneliness or social isolation increases, SF-36 measures of QOL decrease, especially in mental health domains.[11,12] The SF-36 is a commonly used patient outcome metric in chiropractic practice,[13] and ideally placed for an investigation of this type—assessing potential changes in QOL associated with social isolation. However, there is still debate on how loneliness, social isolation, or other factors interact to affect QOL. For instance, how much higher education an individual has seems to increase the effects of isolation and may affect QOL measures, as does sex, with women being more sensitive to social isolation.[11] At the time of writing, there was also little previous research investigating if COVID-19-lockdown isolation was different to previously described social isolation, so more research is needed to fully describe the relationship and interaction of COVID-specific social isolation, QOL, and mental health.

This study aimed to compare QOL in chiropractic students pre- and post- the New Zealand COVID-19 lockdowns and compare their QOL scores to that of similarly aged and New Zealand normative data. The results of this study may also provide information that could be used to improve students' experiences during their academic career at the NZCC.

METHODS

Previously recorded SF-36 scores for all 4 NZCC year groups were collected from 2 time points, 2019 and 2022, as these were the years directly preceding and following COVID-19 lockdowns in Auckland, New Zealand. Students were not followed longitudinally over time but assessed as 2 independent populations. As part of their education, all chiropractic students are assessed in the chiropractic intern clinic and the SF-36 is a metric that is recorded in that assessment, and regularly updated throughout each student's time at the NZCC. Initially, this study began as a simple description of student QOL over the student population of NZCC, but the COVID-19 lockdowns provided a unique opportunity to assess students' QOL after an unexpected upheaval to normal daily life.

A snowball sampling[14] method was used, and all students were contacted via email or word-of-mouth, and were encouraged to recruit their classmates to this study. Informed consent to release the SF-36 information had previously been gained as all students had consented to their SF-36 information being available for research purposes.

Ethical Approval

The study was reviewed and approved by the college's research committee. As previously stated, informed consent had previously been gained. However, the Heath and Disabilities Ethics Committee of New Zealand was contacted to gauge whether further ethical approval should be sought. After consideration, the Heath and Disabilities Ethics Committee recommended no further ethical approval was needed as data collection was deemed as part of a curriculum review processes.

Procedure

Chiropractic interns were contacted via email in 2019 and invited to fill out an SF-36 recording spreadsheet with the recorded SF-36 scores for their student patients. In 2022, an emailed questionnaire was sent out to all students requesting they provide their own, current, SF-36 scores from their own patient files. The email included a link to an electronic Survey Monkey questionnaire. Both the 2019 spreadsheet and 2022 questionnaire record the same data (including age, sex, year group, and SF-36 results). All SF-36 recording spreadsheets and questionnaires were anonymous. Once completed, recording spreadsheets were returned (converted to electronic format if necessary) for data analysis and stored in a password protected electronic database ready for analysis.

Statistical Analysis

Statistical analysis was performed using R software (version 4.0.3) in RStudio.[15] Only fully completed SF-36 data sets were used in analysis and any responses with missing data were not used. Descriptive statistics such as unadjusted means, standard deviations, and counts were used to describe the baseline characteristics of the data, and Shapiro-Wilk tests were computed to assess for normality. Data were analyzed to describe differences in domain scores for students in year 1 to 4 at each timepoint—before and after COVID. Data were also compared with both New Zealand normative data[16] and similarly aged Canadian data[17] using unpaired Wilcoxon tests, with adjusted p-values for pairwise comparisons.[18] Similarly aged Canadian data[17] were included as the age of participants from the NZ study included many older adults,[16] and SF-36 score tends to decline with age.[17,19]

RESULTS

Two hundred seventy six pre-COVID (2019, 51.1% female, mean age 25.6±5.2 years) and 120 post-COVID (2022, 60.8% female, mean age 25.1 ± 6.0 years) SF-36 results were returned. New Zealand normative data were from 2006–2007, from over 3.1 million individuals (age range 15–65+, 48.3% female) and similarly aged were from 399 Canadian individuals (age range: 25–34, 49.9% female) in 1999, see Table 1.

Due to the large number of domains, year groups, and comparisons, data are presented with plots to best illustrate differences between time points and to reference data. The full tabulated results are available in the supplementary materials.

Mental Health Domains

Prior to the COVID-19 lockdowns students' emotional well-being scores (80.1 ± 3.3–82.2 ± 1.4) did not differ from New Zealand (NZ) normative data (81.9, $p > .05$) and were all higher than their similarly aged counterparts (75.9 ± 15.7, $p < .05$).

Table 1 - Demographic Data

Group	*n*	Age (y)	% Female
Year 1 2019	81	25.6±5.1	51.9
Year 1 2022	22	21.0±3.5	54.5
Year 2 2019	81	25.5±5.1	51.9
Year 2 2022	27	25.8±8.2	59.3
Year 3 2019	77	25.6±5.2	51.9
Year 3 2022	27	25.6±5.8	59.3
Year 4 2019	37	25.8±5.5	45.9
Year 4 2022	43	26.3±4.5	67.4
NZ Normative data 2006/7	3,120,700	15–65+	48.3
Similarly aged data 1999	399	25–34	49.9

Post-COVID scores were significantly different, dropping far lower (50.7 ± 4.0–65.6 ± 3.3), than reference data or pre-COVID scores ($p < .05$). The largest drop in emotional wellbeing was seen in year group 3 which fell from 82.2 ± 1.4 to 50.7 ± 4.0 pre- to post-COVID (Fig. 1).

Students' perceptions of their limitations due to emotional constraints (89.1 ± 2.2–90.5 ± 3.0) were not different to NZ normative data (93.6, $p > .05$) but were higher than their similarly aged counterparts (82.9 ± 32.3, $p < .05$). Similar to emotional wellbeing scores, post-COVID emotional role limitations scores dropped significantly (23.5 ± 6.6–62.3 ± 7.6) compared with pre-COVID, NZ, and similarly aged counterparts ($p < .05$). This domain showed the largest drop of all domains, falling over 65 points in the year 3 group from 89.1 ± 2.2 to 23.5 ± 6.6 $p = .001$ (Fig. 1).

Physical Health Domains

Physical functioning, prior to COVD-19 lockdowns, was significantly different, sitting higher (92.7 ± 1.0–97.8 ± 0.7) than NZ (87.5) and similarly aged scores (92.4 ± 14.6, $p < .05$). Post-lockdown, most student scores were still higher (91.4 ± 2.4–95.7 ± 1.2) than NZ and similarly aged scores ($p < .05$) with the exception of year 2 (87.4 ± 3.2) which was not different to NZ normative scores ($p > .05$) and lower than similarly aged data ($p < .05$, Fig. 1).

While students' perception of their physical functioning stayed reasonably steady post-COVID their perception of their physical limitations worsened significantly post-COVID for the year 2 group, falling from 88.3 ± 2.6 to 55.9 ± 8.5 ($p < .05$). Prior to the lockdowns, perception of any physical-based role limitations reduced as the year group progressed from 1 (87.4 ± 2.3) – 4 (94.5 ± 2.7, $p < .05$) and was significantly better than NZ (86.6) and similarly aged data (87.1 ± 29.3, $p < .05$, Fig. 1).

For the bodily pain domain, prior to COVID-19 lockdowns, scores improved from year 2 (78.4 ± 1.9) to 4 (84.9 ± 2.4, $p < .05$), meaning students' perception in pain within their own bodies reduced—compared with NZ (75.8) and similarly aged scores (77.0 ± 21.8). Body pain scores from after the lockdowns showed significant drops in scores from years 2 (50.6 ± 8.5) – 4 (60.8 ± 6.2, $p < .05$), compared with pre-COVID scores (76.2 ± 1.7–84.9 ± 2.4), NZ, and aged-matched scores. Only year 1 post-COVID scores (73.9 ± 7.6) were not different to pre-COVID scores (Fig. 1).

Students prior to COVID-19 showed significant improvements to their energy levels in years 3 (69.9 ± 1.6) and 4 (68.3 ± 3.3), compared with reference data (age: 64.9 ± 17.2, NZ: 64.0, $p < .05$). However, post-lockdowns students' scores of energy and fatigue worsened significantly for all years (27.0 ± 4.3–43.7 ± 3.5, $p < .05$), falling over 42 points in year 3, (Fig. 1).

Other Domains

Social functioning did not change for students pre-COVID (88.7 ± 1.6–90.9 ± 1.4) when compared with NZ normative scores (88.5, $p > .05$) but was higher than their similarly aged cohort (86.3 ± 20.3, $p < .05$). Post-COVID, all year groups had a poorer perception of their social functioning (60.6 ± 4.9–79.7 ± 5.3) compared with pre-COVID scores, but only years 3 (62.2 ± 5.2) and 4 (60.6 ± 4.9, $p < .05$) were significantly lower than reference data, falling almost 40 points in year 4 (Fig. 1).

Students' perception of their general health, prior to COVID, was different to similarly aged data (79 ± 16.1) in year 1 (77.2 ± 1.6) and 2 (77.8 ± 1.9, $p > .05$). But years 3 (81.6 ± 1.4) and 4 (84.2 ± 1.9) were better than similarly aged controls ($p < .05$) and all years had better general health perception that NZ normative data scores ($p < .05$). Post-COVID all years had significantly poorer perception (56.6 ± 5.0–64.8 ± 3.8) of their general health compared with pre-COVID times, similarly aged controls, or NZ normative data ($p < .05$, Fig. 1).

Domains That Differed Between Year Groups At Each Timepoint

Before the COVID-19 lockdowns most domains were not significantly different between year groups ($p < .05$, see supplementary materials 1 for all values). Pre-COVID years 1 (92.7 ± 1.0) to 3 (96.8 ± 0.6, z: −2.88, $p = .010$), 1 to 4 (97.8 ± 0.7, z: −3.36, $p = .004$), and 2 (95.4 ± 0.7) to 4 (z: −2.23, $p = .050$) differed in physical functioning—scores improved in the higher year groups. Scores related to experiencing body pain were also better in later year groups (year 1 (76.2 ± 1.7) to 3 (82.3 ± 1.4, z: −2.51, $p = .037$), year 1 to 4 (84.9 ± 2.4, z: −3.09, $p = .014$), and year 2 (64.6 ± 1.8) to 4 (z: −2.23, $p = .050$)). Emotional wellbeing, role limitations from emotional constraints, energy and fatigue, general health, and social functioning did not change between year groups.

After the COVID-19 lockdowns, most domains did not change between year groups. Emotional wellbeing was worse in later years (year 1:65.6 ± 3.3 to 3:50.7 ± 4.0, z: −2.65, $p = .008$, year 2: 61.8 ± 3.3 to 3: z: −1.99, $p = .047$). Role limitations from emotional constraints also dropped markedly in later years (year 1: 62.3 ± 7.6 to 3: 23.5 ± 6.6, z: −3.38, $p = .003$, year 2: 51.9 ± 7.8 to 3: z: −2.65, $p = .015$, year 1 to 4: 27.9 ± 5.9, z: −3.29, $p = .003$, and year 2 to 4: z: −2.54, $p = .016$). Similarly, social functioning dropped as the year groups progressed; year 1 (79.7 ± 5.3) to 3 (62.2 ± 5.2, z: −2.54, $p = .050$). Physical functioning, physical role limitations, body pain, and general health perception did not change over year groups.

DISCUSSION

Key Points

The results of this study suggest that pre-COVID NZ-based chiropractic students perceived their quality of life (QOL) as same or better than the average New Zealander or similarly aged person. Post-COVID most QOL scores dropped substantially with emotional wellbeing, limitations of life role due to emotional

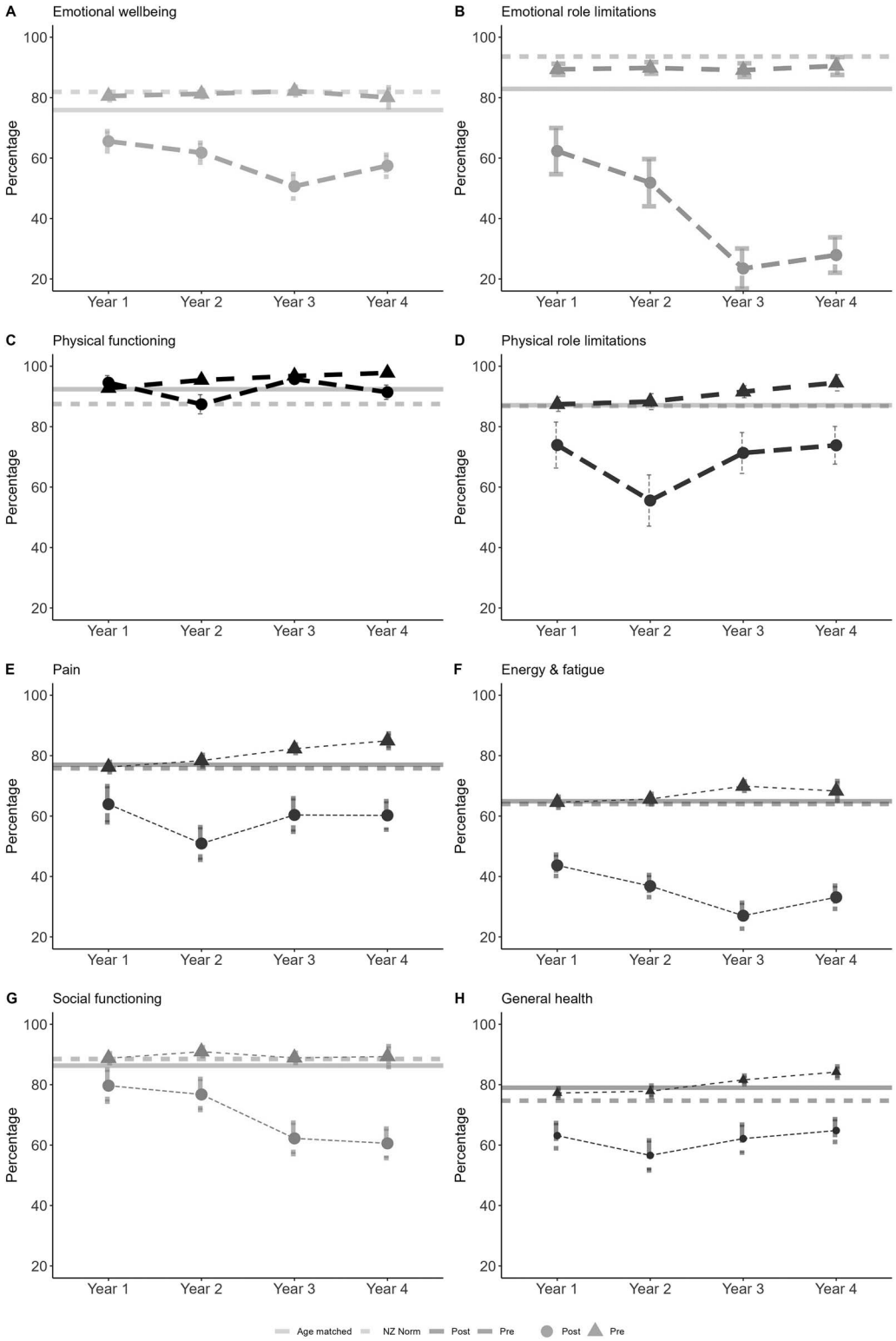

Figure 1 - SF-36 plots for all domains; pre- and post-COVID-19 lockdown scores, plus comparisons to New Zealand normative and age-matched scores. Panel A shows emotional wellbeing, panel B shows role limitations due to emotional health, panel C shows physical functioning, panel D shows roles limitations due to physical functioning, panel E shows pain, panel F shows energy and fatigue, panel G shows social functioning, and panel H shows general health.

constraints, energy and fatigue, and social functioning domains showing the greatest decline. Only physical functioning showed no significant differences in scores pre- to post-COVID, excepting year 4 student scores, which dipped slightly but were still comparable to reference data.

New Zealand's COVID-19 response was stringent and long-lasting periods of isolation,[20] and changes such as these can make people feel anxious and unsafe in their daily life.[5] People from all walks of life are at risk of psychological harm when kept in isolation, but the most vulnerable to these harms are children and adolescents, older adults, minority groups, and those from lower socio-economic groups[21]—groups that the average undergraduate student often fill, resulting in them being particularly at risk of harm during isolation. Potential harms due to isolation are more likely, during stressful situations, such as the threat of a world-wise pandemic, where the need for social support is at its greatest.[21] Much research has suggested that removing social support and isolating humans from each another can threaten people's sense of connectedness and take a substantial toll on their mental health.[3–5,20] The results of this study seem to echo these findings, as SF-36 scores showed vast drops in metrics assessing mental health, limitations to life roles from emotional problems, and worsening scores of energy and fatigue, bodily pain, and social functioning. While it is possible to argue that a taxing undergraduate program and a physically demanding chiropractic internship[22] may also be responsible for some of the changes seen, this argument is not supported by the pre-COVID data which shows minimal changes in domains as year groups progressed through the degree program.

This study aimed to collect QOL data to support or refute what many faculty members at the NZCC suspected—that students' mental health and QOL had dropped post-COVID-19 and its associated lockdowns. Thankfully, the data gleaned from this study has already been used to inform changes to procedures, protocols, and support structures to improve the experience students have at the NZCC. For example, a full-time on-site student support ambassador was instated, unlimited on-site and off-site mental-health support was provided for all students, and compassionate consideration for academic, internship, and leave-of-absences was extended. Other initiatives such as a compulsory fitness program (graded to student ability) was implemented to bolster students' fitness and raise social interactions. Future studies aim to collect a new cohort of SF-36 data to assess the impact of these initiatives and to also gauge the effect of some distance from COVID-19 lockdown times.

Limitations

This study captured data at 2 points in time, 2019 and 2022, for students' SF-36 scores, but did not track individual students longitudinally. It is therefore possible that the differences seen pre- to post-COVID were due to differences in the student population and may not be completely attributable to the effects of the COVID-19 lockdowns. Additionally, participants were recruited based on a snowball sampling method,[14] which may have resulted in selection bias as not all students returned SF-36 results.

New Zealand normative data[16] and the similarly aged Canadian data[17] were collected up to 2 decades earlier (2016 and 1999, respectively) so may not be completely representative of the current population—which is a limiting aspect of this study. Future studies comparing current post-COVID NZ based SF-36 scores would be useful to assess if the changes seen in this study are consistent with the wider NZ population.

In regard to the measuring instrument itself, while the SF-36 has been shown to be a reliable instrument when assessing health-related QOL in the New Zealand population.[23] But, while the SF-36 has had a vast number of studies performed in order to demonstrate its cross-cultural validity, that validity has not been proven when measuring Māori and Pacific Peoples health-related QOL.[24,25] The SF-36 may have validity issues for Māori or Pacific Peoples as it generates separate mental and physical health scores, whereas Māori and Pacific Peoples health models view mental and physical health more holistically or as intertwined.[25] This may mean that the SF-36 is not entirely valid for a subset of the NZCC cohort, limiting the generalizability of these data to the wider NZ population.

Finally, this study did not consider other potentially confounding variables (eg, socio-economic status or pre-existing health conditions that students may have had). Future studies should consider the impact of these issues and control for them during analysis.

CONCLUSIONS

Data taken from all years of an undergraduate chiropractic program show that, prior to the Auckland-wide COVID-19 lockdowns, students' perception of their mental, emotional, and physical health, and their social functioning was on-par or better than NZ normative or similarly aged Canadian data. However, post New Zealand's stringent and long-running COVID-19 lockdowns, students in all years showed marked declines in their quality of life, particularly in that of mental health, energy, and social functioning. Based on these data a number of initiatives were implemented to support students and improve their experiences while studying. Future research is planned to examine the effects of these initiatives of chiropractic students' quality of life.

FUNDING AND CONFLICTS OF INTEREST

There were no funding sources for this study and the authors report no conflicts of interest.

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