

Mental Health and Meditation in a Post-Pandemic Perú: A Normative Study of Upper Primary School Children^{doi}

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ABSTRACT

In a post-pandemic Perú, problems associated with the mental health of children have been highlighted and effective methods of intervention have been discussed. This study sought to examine: 1) current levels of depression, anxiety, and stress in Peruvian school children; 2) how these levels compare to other children in Latin America and elsewhere; 3) whether these levels are different when covaried for school, age, gender, and grade level; and 4) whether there are any indications that depression, anxiety, or stress are lower when Peruvian school children practice Transcendental Meditation.

For a group of 809 children from two schools using the DASS-21, findings indicate depression $M = 6.79$, anxiety $M = 6.31$, and stress $M = 7.37$. These data indicate somewhat elevated levels when compared to other pre-pandemic adolescents in Australia, Chile, China, and Malaysia, but were lower when compared to a group of similar-aged children at another school in China. Preliminary results also suggest lower levels of depression, anxiety, and stress can be observed in children who practice Transcendental Meditation as part of the school curriculum. School, age, gender, and grade level did not predict these differences, although girls had higher levels than boys, a finding consistent with other research.

Keywords

Perú; depression; anxiety; stress; transcendental meditation

RESUMEN

En un Perú post-pandemia, se han destacado los problemas asociados con la salud mental de los niños y se han discutido métodos efectivos de intervención. Este estudio buscó examinar: 1) los niveles actuales de depresión, ansiedad y estrés en niños escolares peruanos; 2) cómo se comparan estos niveles con los de otros niños en América Latina y otras regiones; 3) si estos niveles son diferentes cuando se controlan variables como la escuela, la edad, el género y el nivel de grado; y 4) si hay indicios de que la depresión, la ansiedad o el estrés son menores cuando los niños escolares peruanos practican Meditación Trascendental. En un grupo de 809 niños de dos escuelas, utilizando el DASS-21, los resultados indican depresión $M = 6.79$, ansiedad $M = 6.31$ y estrés $M = 7.37$. Estos datos indican niveles algo elevados en comparación con otros adolescentes pre-pandemia en Australia, Chile, China y Malasia, pero fueron más bajos en comparación con un grupo de niños de edad similar en otra escuela en China. Los resultados preliminares también sugieren que se pueden observar niveles más bajos de depresión, ansiedad y estrés en los niños que practican Meditación Trascendental como parte del currículo escolar. La escuela, la edad, el género y el nivel de grado no predijeron estas diferencias, aunque las niñas presentaron niveles más altos que los niños, un hallazgo consistente con otras investigaciones.

Palabras clave

Perú; depresión; ansiedad; estrés; meditación trascendental

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Salud Mental y Meditación en un Perú Post-Pandemia: Un Estudio Normativo de Niños de Primaria Superior

Introduction

Elevated levels of depression, anxiety, and other mental health challenges in children during the COVID-19 pandemic have been reported (Cao, 2022; Ludwig-Walz et al., 2022; Orgilés Amorós et al., 2021). And while schools have reopened in Perú and children have returned to their classrooms, mid- to longer-term mental health impacts of the pandemic, particularly associated with prolonged home isolation and the death of family members, have yet to be fully examined. Initial warning data are emerging. For example, in a group of 562 Peruvian school children, Fernandez-Canani, Burga-Cachay and Valladares-Garrido (2022) reported 48% had lost a family member to COVID-19, 60% had post-traumatic stress disorder (PTSD), 76% had mild to serious depression, and 62% had mild to serious anxiety. Not surprisingly, levels of depression, anxiety, and stress are higher in Latin American students who experienced the death of a close family member from COVID-19 (Mejia et al., 2022).

Of equal concern for educators and health professionals is the knowledge that many mental health disorders emerge at an early age. Indeed, more than 38%, 17%, 51%, and 34% of people suffering, respectively, from general anxiety disorder, PTSD, social anxiety disorder, or any mental disorder at all (such as depression, attention deficit hyperactivity disorder [ADHD], and panic disorder) experienced symptoms by 14 years of age (Solmi et al., 2022). Hence the need for early intervention. As Rider et al. (2021, p. 1) have concluded, “early recognition and treatment of the potential impacts of the COVID-19 pandemic will help protect children’s and adolescents’ current and future mental health, development, learning, and wellbeing”. One of the basic purposes of this study is to examine current mental health levels of upper primary school children in Perú to further this assessment of needs.

The Transcendental Meditation technique is one such early intervention for improving the mental and physical health of children. According to Nader (2020, p. xviii), the technique is “a universal technique, effective for people of every culture, age, background, and educational attainment”. Practiced twice each day by school children for about ten to 15 minutes, once before classes begin and once before going home at the end of the day, Transcendental Meditation is an easy-to-practice, natural mental technique which allows the conscious thinking mind to experience a silent, peaceful level of deep rest and heightened awareness—a state of restful alertness. As a result of this brief but

meaningful experience each day, students report greater energy, clarity of mind, relaxation, self-confidence, and happiness within themselves.

Importantly for this study, evidence gathered by researchers at some of the world's leading health institutions over the last 50 years suggests practice of Transcendental Meditation reduces the incidence of depression, anxiety, and other mental health disorders. For example, at the Brigham and Women's Hospital in Boston, Massachusetts, Azizoddin et al. (2021) observed significant reductions in burnout ($p < .05$, $d = 0.43$ – 0.45), depression, anxiety, stress, and sleep disturbance ($p < .001$, $d = 0.70$ – 0.87) in physicians, nurses, and physician-assistants during the COVID-19 pandemic; and at the Unified Behavioral Health Center for Military Veterans and their Families in New York, using a randomised controlled design over a 12-week period of Transcendental Meditation practice, Bellehsen et al. (2021) found statistically significant reductions of depression ($F = 7.02$, $p = .03$, $d = -0.84$), anxiety ($F = 13.47$, $p = .001$, $d = -1.16$), and sleep difficulties ($F = 6.40$, $p = .01$, $d = -0.80$) in U.S. military veterans. At post-test, 50% of veterans in the Transcendental Meditation group no longer met PTSD diagnostic criteria as compared to 10% in the control group ($p = .007$).

Such a proposition has also been tested in children, with similar results. At the University of Michigan's Department of Family Medicine, Rosaen and Benn (2006) found evidence of increased emotional intelligence (i.e., improved social-emotional capacities) in 12–14 year-old school children after one year of practicing Transcendental Meditation; and at the Center for Brain, Consciousness and Cognition in Iowa, Grosswald et al. (2008) similarly found evidence of curtailed anxiety and stress, leading to reduced symptoms of ADHD in 11–14 year-old school children. In a randomised trial at the Louis Bolk Institute in the Netherlands, Jong et al. (2019) found evidence that Transcendental Meditation reduced the number of headaches, and the symptoms of depression and anxiety after three and then again after nine months of practice in children and adolescents between the ages of nine and 18 years; and at the Center for Wellness and Achievement in Education in California, in a controlled experiment, Wendt et al. (2015) found evidence of increased wellbeing—measured by elevated happiness, resilience, and self-confidence—in 14 year-old school children.

The authors of this study have therefore embarked on a pre-, peri- and post-pandemic research program in Perú to investigate the potential of Transcendental Meditation to enhance the mental and physical health of school children, more than 53,000 of whom have learned the technique since the late 1990s. The program now

consists of: a) pre-pandemic quantitative findings associated with the health of 91 students in Huay-Huay, a high-altitude, remote Andean school (Fergusson, Ortiz Cabrejos, & Bonshek, 2021b), a large-scale confirmatory study on the physical, cognitive and emotional health of 520 students in four diverse school settings (Fergusson, Ortiz Cabrejos, & Bonshek, 2022a), and third-person perspectives of the mental and physical health of students by parents and teachers in Puno (Fergusson, Ortiz Cabrejos, & Bonshek, 2021a); b) peri-pandemic findings associated with the health and school performance of 54 primary and secondary school students who practiced Transcendental Meditation in relation to a matched comparison group of 53 students during home isolation (Fergusson, Ortiz Cabrejos, & Bonshek, 2022b) and a proto-theoretical model of stress and psychosocial measures of cognitive, affective, and conative outcomes in students during home isolation (Fergusson, Ortiz Cabrejos, & Bonshek, 2023a); and c) post-pandemic findings on increased wellbeing in orphan girls through Transcendental Meditation (Fergusson, Ortiz Cabrejos, Bonshek, & Datey, 2023b). That Transcendental Meditation has been so widely embraced by children, parents, teachers, school and care facility administrators, and the Ministerio de Educación in this predominantly Catholic country is important because clearly participants and the government see no conflict between the practice of meditation, which is described as a natural process requiring no change in belief or lifestyle, and the practice of their religion.

The present normative study considered findings from the aforementioned literature and sought evidence for the proposition that practice of Transcendental Meditation might improve the post-pandemic mental health of school children in Perú. To guide this purpose, we asked the following research questions: RQ₁—what are the current levels of depression, anxiety, and stress in upper primary school children in Perú; RQ₂—how do these compare to other children in Latin America and elsewhere; RQ₃—are these levels different when measured for school, age, gender, or grade level; RQ₄—are there any indications that depression, anxiety, or stress are lower when Peruvian upper primary school children practice Transcendental Meditation, especially when controlled for school, age, gender, or grade level; and RQ₅—is there any evidence that depression, anxiety, and stress are related constructs when measured in upper primary school children?

Methodology

Research Design

This study used a cross-sectional, quantitative design with data gathered in one sitting per class at each of two schools in March 2022 (for Group 1) and November 2022 (for Group 2).

Participating Schools

Two schools participated in this research, one in Puno and one in Lima. Schools were of the same approximate size, however the first was attended by mostly Aymara and Quechua indigenous students, whereas the second was attended by mostly mestizo students; the first was located at approximately 3,800 m above sea level on the Altiplano and is considered regional, whereas the second was located at sea level and is considered inner urban.

Glorioso Colegio Nacional de San Carlos (Glorious National School of Saint Carlos) is famous throughout Perú because it was founded in 1825 by Simón Bolívar, the military and political leader who led Colombia, Venezuela, Ecuador, Perú, Panama, and Bolivia to independence from the Spanish. San Carlos, with approximately 1,500 students across all primary and secondary grade levels, is a government-run school located in Puno on the eastern banks of Lake Titicaca in the country's southeast. About 5,000 students attending San Carlos have been instructed in Transcendental Meditation between 1997 and 2022, including 600 in 2022.

Institucion Educativa Emblematica César Vallejo (Emblematic Educational Institution of César Vallejo) is a government-run primary and secondary school located in the La Victoria district of central Lima. La Victoria is one of the most densely populated and dangerous areas of Lima and is home to about 185,000 people within its 8.7 km² area. It is mainly a residential community, with 'slums' in the north, pueblos jóvenes (or 'squatter settlements') in the east, and middle-income housing in the south, but with high levels of crime and unemployment throughout the district. César Vallejo has an enrolment of about 1,400 mostly disadvantaged students across all primary and secondary grade levels. Transcendental Meditation was introduced into the curriculum in 2014, with approximately 3,000 upper primary and secondary students instructed in the practice since then.

Participants

Eight hundred and nine students ($M_{age} = 10.9$ years), who were purposively sampled for the study, volunteered to participate in this research. Inclusion criteria included: 1) upper primary-aged student; 2) a willingness to answer written questions honestly; and 3) for participants in Group 2, an agreement they had meditated regularly at the beginning and end of the school day for at least eight months prior to testing. Exclusion criteria included students under the age of nine years who had not yet learned the Transcendental Meditation technique, however no students were excluded based on these criteria. Of these 809 students, 289 were girls and 520 were boys, distributed across three grades, as shown in Table 1.

Table 1

Descriptive statistics by school and participants

School	Total	Girls	Boys	4 th Grade	5 th Grade	6 th Grade
San Carlos	$n = 638$ (79%)	$n = 205$ (32%)	$n = 433$ (68%)	$n = 121$ (19%)	$n = 213$ (33%)	$n = 304$ (48%)
	$M_{age} = 10.8$	$M_{age} = 10.6$	$M_{age} = 10.9$	$M_{age} = 9.8$	$M_{age} = 10.4$	$M_{age} = 11.5$
	$SD_{age} = 0.90$	$SD_{age} = 0.84$	$SD_{age} = 0.91$	$SD_{age} = 0.48$	$SD_{age} = 0.61$	$SD_{age} = 0.54$
César Vallejo	$n = 171$ (21%)	$n = 84$ (49%)	$n = 87$ (51%)	—	$n = 99$ (58%)	$n = 72$ (42%)
	$M_{age} = 11.0$	$M_{age} = 10.9$	$M_{age} = 11.1$		$M_{age} = 10.5$	$M_{age} = 11.8$
	$SD_{age} = 0.88$	$SD = 0.88$	$SD_{age} = 0.87$		$SD_{age} = 0.57$	$SD_{age} = 0.58$
Total	$n = 809$ (100%)	$n = 289$ (36%)	$n = 520$ (64%)	$n = 121$ (15%)	$n = 312$ (33%)	$n = 376$ (46%)
	$M_{age} = 10.9$	$M_{age} = 10.0$	$M_{age} = 11.0$	$M_{age} = 9.8$	$M_{age} = 10.4$	$M_{age} = 11.6$
	$SD = 0.90$	$SD = 0.86$	$SD_{age} = 0.91$	$SD_{age} = 0.48$	$SD_{age} = 0.61$	$SD_{age} = 0.56$

For the purposes of this study, participants consisted of two groups: Group 1 included 424 students ($M_{age} = 10.7$ years) before they learned Transcendental Meditation; and Group 2 included 385 students ($M_{age} = 11.1$ years) after at least eight months of regular practice of Transcendental Meditation (all 385 students in Group B were also part of Group 1 but some students in Group 1 did not participate in Group 2). Group 1 included 380 students from San Carlos and 44 from César Vallejo, and Group 2 included 258 students from San Carlos and 127 from César Vallejo. The same approximate ratios for age, gender, and grade levels as described above for each school apply equally to Groups 1 and 2.

Instrumentation

The DASS-21 test instrument was used to gather data on depression, anxiety, and stress (Lovibond & Lovibond, 1995a, 1995b; Oei et al., 2013). According to Gomez (2014), the DASS-21 is a “21-item self-report questionnaire designed to measure the severity of a range of symptoms common to both depression and anxiety. In completing the DASS, the individual is required to indicate the presence of a symptom over the previous week. Each item is scored from ‘0’ (did not apply to me at all over the last week) to ‘3’ (applied to me very much or most of the time over the past week). The essential function of the DASS is to assess the severity of the core symptoms of depression, anxiety and stress”. The instrument, with instructions for young children, takes about ten to 15 minutes to administer.

The DASS-21 has been translated into Spanish and tested extensively with Spanish-speaking people and countries, including children and adolescents (e.g., Camacho, Cordero, & Perkins, 2016; Contreras-Mendoza, Olivas-Ugarte, & de la Cruz-Valdiviano, 2021; González-Rivera, Pagán-Torres, & Pérez-Torres, 2020) as well in non-Spanish-speaking countries such as Brazil, Canada, Hong Kong, Romania, Taiwan, Türkiye, United Arab Emirates, and the United States (e.g., Mellor et al., 2018; Yıldırım, Boysan, & Celal Kefeli, 2018; Zanon et al., 2021).

For *depression*, the DASS-21 asks seven questions, including: Q3 “I couldn’t seem to experience any positive feeling at all” (No he podido sentir ninguna emoción positiva), and Q10 “I felt that I had nothing to look forward to” (He sentido que no había nada que me ilusionara). For *anxiety*, the DASS-21 asks seven questions, including: Q7 “I experienced trembling, e.g., in the hands” (He tenido temblores, p.ej., en las manos), and Q15 “I felt I was close to panic” (He sentido que estaba al borde del pánico). For *stress*, the DASS-21 asks seven questions, including: Q1 “I found it hard to wind down” (Me he sentido muy tenso ultimamente), and Q18 “I felt that I was rather touchy” (He tendido a sentirme enfadado/a con facilidad). Where necessary, as was the case in the present context, questions can be clarified by trained test administrators before being completed by young students. Based on international normative data, results on the DASS-21 are scored on a four-point Likert response scale and categorised according to the following rating criteria:

1) *Depression*—‘normal’ (z -score < 0.5 ; score range 0–4), ‘mild’ (z -score = 0.5–1.0; score range 5–6), ‘moderate’ (z -score = 1.0–2.0; score range 7–10), ‘severe’ (z -score = 2.0–3.0; score range 11–13), and ‘extremely severe’ (z -score > 3.0 ; score 14+);

2) *Anxiety*—‘normal’ (z -score < 0.5 ; score range 0–3), ‘mild’ (z -score = 0.5–1.0; score range 4–5), ‘moderate’ (z -score = 1.0–2.0; score range 6–7), ‘severe’ (z -score = 2.0–3.0; score range 8–9), and ‘extremely severe’ (z -score > 3.0 ; score 10+); and

3) *Stress*—‘normal’ (z -score < 0.5 ; score range 0–7), ‘mild’ (z -score = 0.5–1.0; score range 8–9), ‘moderate’ (z -score = 1.0–2.0; score range 10–12), ‘severe’ (z -score = 2.0–3.0; score range 13–16), and ‘extremely severe’ (z -score > 3.0 ; score 17+).

According to González-Rivera et al. (2020), the DASS-21 conceptualises ‘depression’ as hopelessness, low self-esteem, and low positive affection, ‘anxiety’ as autonomic arousal, musculoskeletal symptoms, situational anxiety, and the subjective experience of anxious arousal, and ‘stress’ as tension, agitation, and negative affection.

Using confirmatory factor analysis, Mellor et al. (2018, p. 141) tested the applicability of the DASS-21 in Australia ($N = 371$), Chile ($N = 448$), China ($N = 558$), and Malaysia ($N = 388$) to study adolescents, and found average factor loadings for each question of .75 on the depression scale, .59 on the anxiety scale, and .60 on the stress scale in a cohort of Chilean adolescent boys and girls, and Camacho, Cordero and Perkins (2016, p. 1021) found factor loadings for each question of .75 on the depression scale, .68 on the anxiety scale, and .69 on the stress scale in Latina/o college students.

Data Analysis

In addition to essential descriptive statistics, including internal consistency using Cronbach Alpha ($C\alpha$), means (M), standard deviations (SD), skewness ($Skew$), and kurtosis ($Kurt$), analysis of variance (ANOVA) and analysis of covariance (ANCOVA) were conducted to determine levels of depression, anxiety, and stress and any possible differences on these measures between students who practice Transcendental Meditation and those who do not. Pearson product moment coefficients were used to measure correlations. All statistical tests were carried out at the two-tailed, 95% level of confidence.

Reliability and Validity

Internal consistency of the DASS-21 scales ranges from $C\alpha = .85$ for depression, $C\alpha = .72$ for anxiety, and $C\alpha = .79$ for stress in findings reported by Mellor et al. (2018) with Chilean adolescents, to $C\alpha = .91$ for depression, $C\alpha = .80$ for anxiety, and $C\alpha = .84$ for stress in findings reported by Sinclair et al. (2012) with U.S. adults. The authors of the DASS-21 reported scale discriminant, criterion-relation, and predictive validity for depression and anxiety (Lovibond & Lovibond, 1995a).

According to Sinclair et al. (2012), construct validity for the original 42-item instrument (i.e., DASS-42) has generally been positive, with each dimension shown to effectively differentiate between groups, and yielding moderate-to-large correlations with other existing instruments which claim to measure similar constructs, such as the Beck Depression Inventory, Beck Anxiety Inventory, and Positive and Negative Affect Schedule. Internal consistency and concurrent validity of the longer 42-item version have been rated as ‘excellent’. Results for the DASS-21 have identified ‘strong’ evidence for discriminant and convergent validity of the instrument (Dreyer, Henn, & Hill, 2019).

Ethics

This project was approved in March 2022 by the Research Ethics Approval Committee of Maharishi Vedic Research Institute (MVRI) no. MVRI-2022-026, and by Instituto Maharishi de Ciencia y Tecnología del Perú, and was conducted under the strictest terms of research integrity. The MVRI Code conforms to both the *Australian Code for the Responsible Conduct of Research* and the *National Statement on Ethical Conduct in Human Research*. The project was also sanctioned, and informed consent was given in advance, by the administrators of San Carlos, César Vallejo, and Instituto Maharishi de Ciencia y Tecnología del Perú.

Results

For this cohort, Cronbach alphas indicate internal consistencies of $C\alpha = .80$ for depression, $C\alpha = .77$ for anxiety, and $C\alpha = .76$ for stress, thereby representing comparable scale reliability to the normative data reported by Lovibond and Lovibond (1995a, p. 27), and compare favourably to findings reported by Mellor et al. (2018, p. 141) for 448 Chilean adolescents, and by Oei (2013, p. 1025) for 2,630 adults in Asia.

These findings can be considered ‘reliable’ at $C\alpha = .60-.79$ and ‘very reliable’ at $C\alpha \geq .80$. As shown in Table 2, the present data were normally distributed, with acceptable levels of total average skewness ($Skew[0.55]$) and kurtosis ($Kurt[-0.41]$) recorded across all three scales. No missing data were identified.

Table 2

Descriptive statistics for all students by variable.

Statistic	Depression	Anxiety	Stress	Total
<i>N</i>	809	809	809	809
Mean	6.68	6.30	7.25	20.23
Standard Deviation	5.11	4.76	4.83	14.70
Skewness	0.61	0.61	0.46	0.55
Kurtosis	-0.53	-0.38	-0.50	-0.41

Table 2 shows scores for the total cohort of students, with depression $M_{dep} = 6.68$, anxiety $M_{anx} = 6.30$, and stress $M_{str} = 7.25$ for a total DASS-21 score of $M_{tot} = 20.23$.

Using the normative *z*-score standards of Lovibond and Lovibond (1995a), Table 3 shows: on the depression scale, 41% of children were classified as normal, 13% of children suffered from mild depression, 21% suffered from moderate depression, 12% suffered from severe depression, and 13% suffered from extremely severe depression; on the anxiety scale, 35% of children were classified as normal, 15% of children suffered from mild anxiety, 14% suffered from moderate anxiety, 11% suffered from severe anxiety, and 25% suffered from extremely severe anxiety; and on the stress scale, 35% of children were classified as normal, 15% of children suffered from mild anxiety, 14% suffered from moderate anxiety, 11% suffered from severe anxiety, and 25% suffered from extremely severe anxiety.

Table 3

DASS-21 rating values by variable and percentage

Variable	Normal	Mild	Moderate	Severe	Extremely Severe
Depression	334 (41%)	106 (13%)	171 (21%)	95 (12%)	103 (13%)
Anxiety	280 (35%)	124 (15%)	113 (14%)	87 (11%)	205 (25%)
Stress	452 (56%)	99 (12%)	120 (15%)	101 (12%)	37 (5%)

Tables 4, 5, and 6 provide data related to depression, anxiety, and stress by school, gender, and grade level. Note, because age is a continuous, not nominal, variable, grade level can be taken as a proxy for age in these descriptive Tables.

Table 4

Descriptive statistics for school by variable

Statistic	School	Depression	Anxiety	Stress	Total
<i>n</i>	San Carlos	638	638	638	638
	César Vallejo	171	171	171	171
Mean	San Carlos	6.94	6.60	7.67	21.21
	César Vallejo	6.70	5.87	6.77	19.34
Standard Deviation	San Carlos	5.03	4.83	4.86	14.72
	César Vallejo	5.40	4.45	4.70	14.55
Skewness	San Carlos	0.61	0.55	0.40	0.49
	César Vallejo	0.60	0.84	0.73	0.78
Kurtosis	San Carlos	-0.48	-0.47	-0.55	-0.48
	César Vallejo	-0.69	0.12	-0.17	-0.01

Table 4 indicates that average scores for all scales by school were largely the same, although the San Carlos scores were almost two points higher than the César Vallejo total; SDs were similar in both schools, with data sets normally distributed.

Table 5

Descriptive statistics for gender by variable

Statistic	Gender	Depression	Anxiety	Stress	Total
<i>n</i>	Girls	289	289	289	289
	Boys	520	520	520	520
Mean	Girls	7.33	6.55	7.60	21.48
	Boys	6.11	6.01	7.00	19.12
Standard Deviation	Girls	5.33	5.02	5.15	15.50
	Boys	4.95	4.60	4.62	14.17
Skewness	Girls	0.49	0.54	0.44	0.51
	Boys	0.67	0.63	0.44	0.52
Kurtosis	Girls	-0.76	-0.50	-0.56	-0.54
	Boys	-0.38	-0.34	-0.56	-0.44

Table 5 indicates that average scores for all scales by gender were largely the same, although the girls’ total score was more than two points higher than the boys’ score; *SDs* were somewhat lower for boys, with both data sets normally distributed.

Table 6 indicates that average scores for all grade level scales were somewhat the same, although the depression score for 5th grade primary was one point higher than the scores for 4th grade and for 6th grade, and anxiety scores for 5th grade were also higher than 4th grade and 6th grade. No obvious difference was observed between grades for stress, and *SDs* were similar for all grade levels, with both data sets normally distributed.

Table 6

Descriptive statistics for grade level by variable

Statistic	Grade Level	Depression	Anxiety	Stress	Total
<i>n</i>	4 th Grade Primary	121	122	122	122
	5 th Grade Primary	309	309	309	309
	6 th Grade Primary	370	370	370	370
Mean	4 th Grade Primary	6.33	5.60	7.15	19.08
	5 th Grade Primary	7.41	6.91	7.56	21.88
	6 th Grade Primary	6.43	6.04	7.33	19.80
Standard Deviation	4 th Grade Primary	5.28	5.22	5.34	15.84
	5 th Grade Primary	4.98	4.65	4.75	14.38
	6 th Grade Primary	5.15	4.64	4.74	14.53
Skewness	4 th Grade Primary	0.78	0.96	0.42	0.73
	5 th Grade Primary	0.39	0.46	0.45	0.40
	6 th Grade Primary	0.75	0.64	0.50	0.63
Kurtosis	4 th Grade Primary	-0.15	0.20	-0.66	-0.11
	5 th Grade Primary	-0.73	-0.51	-0.55	-0.46
	6 th Grade Primary	-0.36	-0.36	-0.40	-0.41

The data related to group differences can be seen in Tables 7, 8 and 9. Table 7 indicates that Group 2 depression, anxiety, and stress scores were lower than Group 1. Thus, the Group 2 DASS-21 total $M_{tot} = 17.49$ was also lower than the Group 1 total $M_{anx} = 23.18$. *SDs* were similar, with both data sets normally distributed.

Table 7

Descriptive statistics for all students by Group and variable

Statistic	Group	Depression	Anxiety	Stress	Total
<i>n</i>	Group 1	424	424	424	424
	Group 2	385	385	385	385
Mean	Group 1	7.59	7.54	8.05	23.18
	Group 2	5.91	4.95	6.63	17.49
Standard Deviation	Group 1	4.86	4.54	4.72	14.12
	Group 2	5.24	4.64	4.86	14.74
Skewness	Group 1	0.51	0.48	0.43	0.49
	Group 2	0.82	0.94	0.55	0.75
Kurtosis	Group 1	-0.63	-0.52	-0.45	-0.42
	Group 2	-0.24	0.22	-0.51	-0.18

Table 8 shows the results of analysis of variance, indicating that difference between Groups for all three DASS-21 scales were significant to $p < .001$.

Table 8

ANOVA for Group 1 and Group 2 by variable

Variable	<i>F</i>	<i>df</i> ₁	<i>df</i> ₂	<i>p</i>
Depression	22.2	1	784	< .001
Anxiety	64.4	1	796	< .001
Stress	17.9	1	795	< .001
Total	38.0	1	789	< .001

Figure 9 presents the tests of difference between the Group 1 and Group 2 total DASS-21 scores when school, age, gender and grade level are computed as covariates. Differences between Groups can be observed for all four computations (when testing for difference and covarying for school, age, gender, and grade level), however, these differences were not subject to the influence of either school, age, gender, or grade level, although there was a statistically significant difference between the DASS-21 scores of girls and boys, as noted in Table 5.

Table 9

ANCOVA for Group 1 and Group 2 total DASS-21 score with school, age, gender, and grade level as covariates

Statistic	Sum of Squares	df	Mean Square	F	p
Group	1,245	1	1,245	59.10	< .001
School	0.22	1	0.22	0.01	.91
Residuals	16,975	806	21.90	—	—
Group	5.853	1	5,853	34.00	< .001
Age	2,216	1	216	1.26	.26
Residuals	138,448	805	172.00	—	—
Group	6,279	1	6,279	36.80	< .001
Gender	1,110	1	1,110	6.50	.01
Residuals	137,554	806	171.0	—	—
Group	6,590	1	6,590	38.30	< .001
Grade Level	23.40	1	23.40	0.91	.33
Residuals	138,583	806	171.90	—	—

As shown in Table 10, these findings are reflected in the scale ratings for each Group when compared to normative *z*-score standards of Lovibond and Lovibond (1995a). For Group 2 depression, 57% of student were rated as normal compared to 34% in Group 1 (a 41% difference); for Group 2 anxiety, 49% of student were rated as normal compared to 21% in Group 1 (a 57% difference); and for Group 2 stress, 62% of student were rated as normal compared to 50% in Group 1 (20% difference).

The same trend can be observed for Group 2 moderate, severe, and extremely severe ratings of all scales compared to Group 1, with many of the higher rated students in Group 1 in the ‘normal’ category in Group 2.

Table 10

Rating values for Group 1 and Group 2 by variable and percentage.

Variable	Group	Normal	Mild	Moderate	Severe	Extremely Severe
Depression	Group 1	143 (34%)	59 (14%)	105 (25%)	55 (13%)	62 (14%)
	Group 2	191 (57%)	47 (14%)	66 (20%)	40 (12%)	41 (12%)
Anxiety	Group 1	91 (21%)	72 (17%)	73 (17%)	49 (12%)	139 (33%)
	Group 2	188 (49%)	53 (14%)	43 (12%)	31 (8%)	70 (17%)
Stress	Group 1	212 (50%)	59 (14%)	78 (18%)	52 (13%)	23 (5%)
	Group 2	239 (62%)	40 (10%)	55 (14%)	38 (10%)	13 (4%)

Consistent with previous research, irrespective of before or after instruction in Transcendental Meditation, significant correlations were observed between depression and anxiety $r = .80, p < .001$, depression and stress $r = .72, p < .001$, and anxiety and stress $r = .70, p < .001$.

Discussion and Conclusions

Table 2 provides evidence to answer RQ₁. Mellor et al. (2018) measured the pre-pandemic mental health of Australian ($N = 371; M_{age} = 14.5$), Chilean ($N = 448; M_{age} = 15.8$), Chinese ($N = 558; M_{age} = 15.9$), and Malaysian ($N = 388; M_{age} = 14.9$) adolescents. They found: $M_{dep} = 5.48, M_{anx} = 4.51$, and $M_{str} = 5.92$ for female adolescents, and $M_{dep} = 3.98, M_{anx} = 3.55$, and $M_{str} = 3.71$ for male adolescents in Australia; $M_{dep} = 6.72, M_{anx} = 5.50$, and $M_{str} = 7.55$ for female adolescents, and $M_{dep} = 4.79, M_{anx} = 4.05$, and $M_{str} = 5.93$ for male adolescents in Chile; $M_{dep} = 5.65, M_{anx} = 6.51$, and $M_{str} = 7.68$ for female adolescents, and $M_{dep} = 5.28, M_{anx} = 6.08$, and $M_{str} = 6.69$ for male adolescents in China; and $M_{dep} = 5.69, M_{anx} = 6.25$, and $M_{str} = 6.72$ for female adolescents, and $M_{dep} = 5.56, M_{anx} = 5.30$, and $M_{str} = 6.24$ for male adolescents in Malaysia. Our findings are generally higher than Mellor et al.'s data ($M_{tot} = 20.20$ versus $M_{tot} = 13.50$ for Australia, $M_{tot} = 17.20$ for Chile, $M_{tot} = 18.80$ for China, and $M_{tot} = 17.80$ for Malaysia).

Chen et al. (2022) also measured the pre-pandemic mental health of 575 Chinese children ($M_{age} = 10.80$), reporting $M_{dep} = 5.86, M_{anx} = 7.98$, and $M_{str} = 7.96$; the total score for these data in China was $M_{tot} = 21.80$. Our findings were generally lower than Chen et al.'s data ($M_{tot} = 20.23$ versus $M_{tot} = 21.80$). In Australia, Chile, China, and Malaysia,

females had in each case higher levels of depression, anxiety, and stress than males, as was the case with these upper-primary school children in Perú.

Using the DASS-21, Hernández-Yépez et al. (2022) found evidence from 400 university students in peri-pandemic Perú that 19.2% suffered from depression, 23.2% from anxiety, and 17.2% from stress. Using a different instrument with 863 students in four schools in post-pandemic Perú, Fernandez-Canani et al. (2022) found 24% of children were classified as having minimal depression (we equate this rating to ‘normal’ on the DASS-21), 30% of children suffered from mild depression, 19% suffered from moderate depression, 14% suffered from moderate to serious depression, and 13% suffered from serious depression.

Fernandez-Canani et al. (2022) also found 37% of children were classified as having no anxiety, 28% suffered from mild anxiety, 20% suffered from moderate anxiety, and 15% suffered from severe anxiety. For children diagnosed with PTSD, these percentages were even higher. In our study, 35% of children were classified as normal, 15% of children suffered from mild anxiety, 14% suffered from moderate anxiety, 11% suffered from severe anxiety, and 25% suffered from extremely severe anxiety. Thus, while both Fernandez-Canani et al.’s groups indicated the same ‘normal’ level of anxiety, a higher proportion of students in our cohort were rated in the highest category of anxiety. These combined findings answer RQ₂.

The findings related to RQ₃ indicate there is no difference in depression, anxiety, and stress levels for school or grade level but that girls had higher levels than boys, a finding consistent with those of Mellor et al. (2018), who found female adolescent scores were higher than male adolescent scores in Chile.

The data needed to answer RQ₄ indicate that Group 2 depression, anxiety, and stress scores were lower than Group 1. Thus, the Group 2 DASS-21 total $M_{tot} = 17.49$ was also statistically lower than the Group 1 total $M_{anx} = 23.18$ even when covaried for school, gender, age, or grade level. Similarly, the ratings values on all scales (except ‘mild’) and for the total DASS-21 measure, Group 2 scores after Transcendental Meditation practice were more ‘normal’ than Group 1.

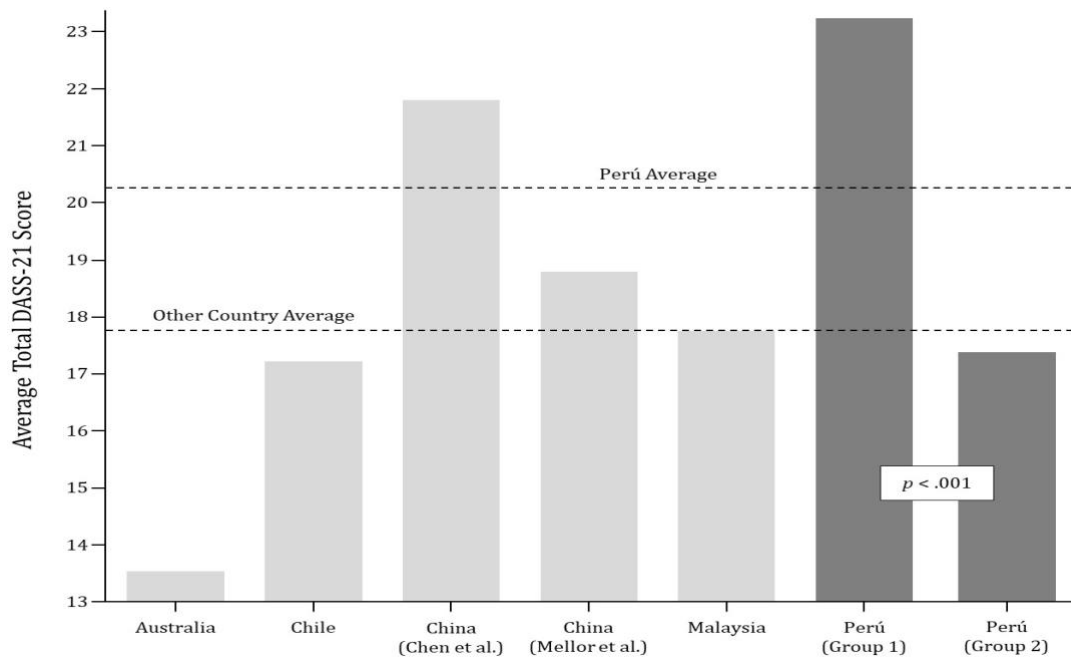
The correlational findings in this study, which answer RQ₅, are higher than those reported by the authors for the original DASS-42 when administered to college students, i.e., between depression and anxiety $r = .54, p < .001$, depression and stress $r = .56, p < .001$, and anxiety and stress $r = .64, p < .001$ (Lovibond & Lovibond, 1995b, p. 337) but roughly the same as those for 2,630 participants from Indonesia, Malaysia, Singapore, Sri

Lanka, and Thailand for depression and anxiety $r = .75, p < .01$, depression and stress $r = .75, p < .01$, and anxiety and stress $r = .69, p < .01$ (Oei, et al., 2013).

The findings of this study can therefore be summarised in the following way and shown in Figure 1. Data indicate that the average total DASS-21 score of Peruvian upper-primary students is $M_{tot} = 20.21$, a level marginally lower than same-age students in China, but above adolescents in Australia, Chile, China, and Malaysia.

Figure 1

Comparison of average total scores for children and adolescents in Australia, Chile, China, Malaysia, and Perú



Note. own authorship.

Moreover, Group 1 students before they learned Transcendental Meditation had higher levels of depression, anxiety, and stress than their counterparts in Group 2 who had learned Transcendental Meditation and practiced it regularly for eight months. These findings were unaffected by the influence of school, gender, age, or grade level. However, participants in this study and in Chen et al.’s China were upper-primary age students, whereas those in Mellor et al.’s Australia, Chile, China, and Malaysia were adolescents, making comparisons between cohorts less valuable. But to these authors’ knowledge there are no other relevant available comparative data. Certainly, Contreras-Mendoza et al. (2021) provided evidence of the reliability and validity of using the DASS-21 with adolescents in a peri-pandemic Perú, but they did not provide data necessary for

comparative purposes, such as the means and standard deviations for each dimension or total student scores.

It is also important to point out that children attending San Carlos were disadvantaged indigenous students and those attending César Vallejo were from disadvantaged and sometimes violent homes, with one or both parents in jail. Thus, any direct or meaningful comparison between the depression, anxiety, and stress levels of children in this study and the children and adolescents attending schools in more developed countries or in schools with less socially disadvantaged students must be taken as indicative only.

To paraphrase Rider et al. (2021), early recognition, intervention, and treatment of potential adverse impacts of the COVID-19 pandemic will go some of the way to protecting children's and adolescents' current and future mental health needs. Such interventions may include introduction of Transcendental Meditation because its widespread use in school curricula in more than 49 countries (Herani & Kumar, 2015), including in schools throughout Perú, suggests it may promote improved physical, cognitive and emotional health, as well as learning ability and school performance (Fergusson, Ortiz Cabrejos, & Bonshek, 2021b, 2022a).

Fernandez-Canani et al. (2022) provided evidence that during the COVID-19 pandemic, PTSD could be observed in 48%–71% of the adolescent population of the world, depending on the country. And whereas “increasing rates of PTSD in adolescents are commonly attributed to natural disasters and wars...during the COVID-19 pandemic, PTSD has been linked to prolonged quarantine, fear of contagion, frustration, boredom, not seeing peers and teachers, lack of space at home, and the loss of loved ones” (p. 1). These authors also noted “students with depression had a higher frequency of PTSD, and this gradually increased as depressive symptoms became more pronounced. In China, there was a correlation between PTSD and depressive symptoms in 10.7% of adolescents” (p. 12). While our study did not specifically target PTSD, it too found evidence that depression was statistically correlated to stress ($r = .72, p < .001$).

Given that higher levels of anxiety, for example, are also inverse predictors of lower levels of satisfaction with one's studies and academic self-efficacy, and higher levels of academic self-efficacy are predictors of higher levels of satisfaction with studies in university students (Carranza Esteban et al., 2022), and students with higher levels of resilience also have lower levels of stress (Fernandez-Canani et al., 2022), the need for

early intervention to reduce depression, anxiety, and stress is manifestly clear. Such is also the case for depression and anxiety, as shown by Bellehsen et al. (2022).

The most obvious limitation of the present study relates to participant selection and the absence of a properly selected control group. As a result, causal relationships between independent and dependent variables of interest cannot be confirmed. Further, the findings cannot be generalised to the entire Peruvian population of upper-primary school students, and selection bias could exist although is unlikely given the large cohort of students from two disparate and geographically separate schools. The students in this study were homogeneous but nevertheless inferences drawn from these findings can only be tentatively advanced.

This preliminary normative study, the first of its kind in Latin America, provides evidence of current levels of depression, anxiety and stress in young Peruvian students. However, experimental research, with random selection and properly matched pairs, is required to determine if regular practice of Transcendental Meditation by upper-primary school students in Perú reduces depression, anxiety, and stress. The current study suggests such a controlled experiment may yield salutary results and thereby further establish the practice as a viable intervention to counter the effects of stress and social disadvantage. Given the extensive corpus of previously conducted research on this subject, including a significant number of meta-analyses and randomly controlled trials, this conclusion is not unreasonable.

Data Availability

Raw data were generated by Dr Lee Fergusson. Derived data supporting the findings of this study are available from the corresponding author Dr Lee Fergusson on request.

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