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Artículo de investigación científica y tecnológica

# Effectiveness of a multicultural technique to improve the mood of Peruvian university students

## Efectividad de una técnica multicultural para mejorar el estado de ánimo de estudiantes universitarios peruanos

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## ABSTRACT

The COVID-19 pandemic affected the mental health and academic performance of university students, prompting institutions to take action. This study evaluated the effectiveness of the intercultural technique Pukllasun in reducing anxiety among Andean Peruvian students during the pandemic. In a quasi-experimental study, 181 participants were included, divided into an intervention group (IG = 49) and a control group (CG = 132), assessed with the Generalized Anxiety Disorder (GAD-7) test at the beginning and end of the study. The average age was 19.2 years (SD = 2.1) in the IG and 20.3 years (SD = 2.8) in the CG. A Student's t-test was used to analyze differences between and within groups, and Cohen's d was used to measure the effectiveness of the intervention. Initially, both groups had similar anxiety levels (t = 1.09; p = 0.246), but by the end of the study, significant differences were observed in favor of the IG, both between groups (t = 3.28; p = 0.00) and within groups (t = 2.42; p = 0.02), with large effect sizes (d = 1.68 and d = 1.38). The Pukllasun activities effectively reduced anxiety, highlighting the importance of adapting culturally relevant interventions in various educational contexts.

**Keywords:** mental health; pukllasun; generalized anxiety; non-pharmacological intervention.

## RESUMEN

La pandemia de COVID-19 afectó la salud mental y el rendimiento académico de los universitarios, lo que llevó a las instituciones a tomar medidas. Este estudio evaluó la efectividad de la técnica intercultural Pukllasun para reducir la ansiedad en estudiantes peruanos andinos durante la pandemia. Estudio cuasi experimental, se incluyeron 181 participantes divididos en grupo intervención (GI=49) y grupo control (GC=132); evaluados con la prueba de ansiedad generalizada GAD-7, al principio y al final del estudio. La edad promedio fue de 19,2 (DE: 2,1) años en el GI y 20,3 (DE: 2,8) años en el GC. Se empleó t Student para analizar las diferencias entre y dentro de los grupos, y d de Cohen para medir la efectividad de la intervención. Al inicio, ambos grupos tenían niveles similares de ansiedad (t = 1,09; p = 0,246), pero al finalizar el estudio, se observaron diferencias significativas a favor del GI, tanto entre grupos (t = 3,28; p = 0.00) como intragrupal (t = 2,42; p = 0.02), con tamaños de efecto elevados (d = 1.68 y d = 1.38). Las actividades del Pukllasun resultaron efectivas para reducir la ansiedad, subrayando la importancia de adaptar intervenciones culturalmente relevantes en diversos contextos educativos.

**Palabras clave:** salud mental; pukllasun; ansiedad generalizada; intervención no farmacológica.

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## INTRODUCTION

The COVID-19 pandemic was a complex event that affected the entire world, leading governments of different countries to implement restrictive measures to curb the spread of the virus (Pfefferbaum & North, 2020; Romero-Saritama et al., 1995). In Latin America, in an attempt to control the exponential growth of SARS-COV-19 infections, actions were taken such as border closures, the suspension of in-person school and work activities, the implementation of curfews and mobility restrictions, as well as the mandatory use of face masks and the promotion of social distancing (Benítez et al., 2020; Qian & Jiang, 2022).

Some countries, like Argentina and Peru, adopted more severe restrictions. Argentina, for instance, imposed one of the longest and strictest quarantines (Levi Yeyati & Sartorio, 2020; Sagripanti & Aquilano, 2022), severely limiting the mobility of its citizens and halting the continuation of all non-essential activities for months (Conde Bachiller et al., 2022; Song et al., 2021). Meanwhile, Peru, during the first wave of the pandemic, implemented nightly curfews and restrictions on interprovincial travel (Cáceres Cabana et al., 2021; Rodríguez et al., 2022). Other countries implemented rigorous measures in specific sectors, depending on the levels of infection by region and area, as was the case in Argentina, Chile, and Colombia (BBC News Mundo, 2020; Criales et al., 2020; Knaul et al., 2022).

These measures, although necessary, had significant repercussions on the mental health of the population (Ammar et al., 2020; Chan et al., 2020; Rodríguez-Fernández et al., 2021). Numerous studies documented a significant increase in mental health indicators as a result of the pandemic. One of the most prevalent disorders was generalized anxiety disorder (GAD) (Organización Mundial de la Salud [OMS], 2022), which is characterized by symptoms such as excessive worry, difficulty controlling negative thoughts, trouble concentrating, restlessness, fatigue, irritability, muscle tension, and sleep problems (Mishra & Varma, 2023). These issues hindered people's ability to carry out their daily activities normally (Jonikas et al., 2021; Qi et al., 2021). During COVID, GAD manifested with restlessness, fear, and a sense of helplessness (Becerril et al., 2022; Porcelli, 2020).

This issue was particularly complex in the university population for several reasons. At the beginning of the confinement measures, adolescents and university students were among the groups that showed the most resistance to self-care measures, quarantine, and protection against COVID-19 (Domínguez et al., 2024). In Mexico, a study focused on exploring the impact of the pandemic on a group of 93 university students, using a questionnaire that assessed physical health, emotional health, and academic aspects. 65% of the participants failed to comply with the quarantine period or social distancing measures, reporting that due to the need to fulfill certain domestic chores, work, care for a family member, or pay bills, they had to break the restrictions (Domínguez et al., 2024).

This phenomenon may be associated with psychological immaturity, which leads young people to make poorly informed and, in some cases, irresponsible decisions (Garbula, 2023; Marin, 2023; Vicsek & Mikó, 2023). Several studies reported deaths among family members because students did not take proper precautions during the pandemic (Gallo, 2020; Vicsek & Mikó, 2023). Likewise, there could be a relationship between non-compliance with the imposed restrictions and a low socioeconomic level, which would make it difficult to access means and resources, unlike their counterparts, who would have greater ease in performing tasks and limiting social contact remotely (Cantarero Prieto et al., 2023; Chang et al., 2021).

This new health landscape of contagion and death due to COVID significantly affected the mental health of university students, due to the scarcity of emotional resources to cope with this phenomenon and its

associated consequences (Andersson et al., 2024; Pan & Sass, 2020). Copeland et al. (2021) reported in their study on the impact of COVID-19 on the behavior and well-being of first-year university students, highlighting negative and persistent effects on the behavioral and emotional functioning of the students. Fontoulakis et al. (2024) obtained similar results in their research, analyzing the risk of depression, anxiety, and suicidal tendencies, reporting 15.66% dysphoria, 25.81% depression, and 6.34% suicidal tendencies. In the United States, these issues were also explored, revealing a greater predisposition toward anxiety, loneliness, and depression (Lee et al., 2021). Finally, in a multicenter study that included Latin American, Hispanic, and Spanish university populations, a high incidence of symptoms associated with depression, suicide, and post-traumatic stress was reported (Torres et al., 2023).

Additionally, university students had to continue their academic studies during this pandemic, which further affected their mental health and academic performance. As a result, several studies have shown a decrease in academic performance in this population (Camacho-Villa et al., 2023; Kissi et al., 2024; Lira Neto et al., 2024; Siena et al., 2024), due to the fear of contagion and death from COVID, there was an increase in academic absenteeism (Chandra, 2020; Sandoval Elías, 2021; Van Der Feltz-Cornelis et al., 2020); elevated stress levels (Chávez Reinoso et al., 2021), cognitive function impairment (Tortella et al., 2021), greater predisposition to illness (Chacón Figueroa, 2021; Pacori Paricahua et al., 2022) and a higher prevalence of mood-related disorders, such as anxiety and depression (Vigo et al., 2021; Woon et al., 2021; Yu et al., 2021).

Peru was not immune to this issue. In the student population at Higher Education Institutions (IES), there was an increase in complaints related to emotional distress resulting from the COVID-19 confinement (Bazo-Alvarez et al., 2024; Murrieta-Ruiz et al., 2023). The abrupt shift to virtual education and prolonged confinement had a significant negative impact on their mental health. Studies reveal that a large proportion of university students in Peru experienced high levels of anxiety and depression. An investigation of medical students at a private university in Lima found that 75.4% of first-year students showed some degree of anxiety, with women being the most affected (Saravia-Bartra et al., 2020). Additionally, another multicenter study with medical students from various Peruvian universities reported that 74% exhibited depressive symptoms, 57% showed symptoms of anxiety, and 65% manifested symptoms of psychological distress (Huarcaya-Victoria et al., 2023). These emotional problems were exacerbated by factors such as family economic instability, fear of delays in academic progress, and concern about the deterioration in the quality of their medical education (Fuerte-Montaño et al., 2021; Huarcaya-Victoria et al., 2023).

Faced with the challenges confronting the university population arising from the transition to virtual environments and the emotional impact of the pandemic, the need has emerged to develop innovative strategies that promote psychological well-being and academic performance. However, existing literature highlights the scarcity of interventions that integrate culturally relevant approaches, particularly in communities with a strong sociocultural identity, such as the Andean university population (Cubillos & Díaz, 2018; Gomez Gutierrez et al., 2024).

Emotional regulation plays a fundamental role in mitigating stress and anxiety in high academic demand contexts (Gross, 2015). Strategies such as cognitive reappraisal and positive distraction have proven effective in reducing anxiety symptoms and fostering better adaptation to situations of uncertainty (Durham et al., 2025; Youn & Marques, 2021). Within this framework, emotional intelligence is recognized as a key factor for academic success and personal well-being, emphasizing the importance of developing emotional skills in the educational context (Goleman, 1996; Mayer et al., 2008). Similarly, resilience, defined as the ability to cope with adversity and maintain stable functioning despite challenges, has been

identified as a protective factor against stress in student populations during health crises (Magorokosho et al., 2024; Shillington et al., 2024).

Despite these findings, most studies have focused their interventions on standard approaches, without considering the cultural particularities that may influence the effectiveness of coping strategies (Liu et al., 2023; Toktas, 2024; Younas et al., 2024). In this regard, incorporating emotional education strategies in academic settings has proven to be an effective means of improving emotional regulation and strengthening students' well-being (Brackett & Rivers, 2014) Therefore, it is essential to design and evaluate techniques to incorporate elements of cultural identity and a sense of community, facilitating a more effective response to academic and emotional stress.

Although in the region, some studies had already considered the implementation of virtual or remote academic activities as a long-term strategy before the pandemic (Antón-Sancho & Sánchez-Calvo, 2022) It is evident that students from various sectors and educational levels were not prepared for online education (Alania-Contreras et al., 2024; Roa-Meggo & Baca-Gamarra, 2024). The transition required knowledge of the use of office tools, access to the internet, and the adaptation of a space at home to attend classes (García-Planas & Taberna Torres, 2020). This complicated access to this basic right during the pandemic, increasing indicators of stress and psychological distress, especially in lower socioeconomic groups and rural populations, which have limited and precarious access to basic services necessary for education (Zea Bastidas et al., 2024); particularly access to the internet (CEPAL, 2020; Instituto Nacional de Estadistica e Informatica [INEI], 2019).

This health and academic landscape created a challenge for universities, which quickly began to develop and implement intervention measures for mental health and academic performance. In some countries, higher education institutions made mental health support services and psychological first aid available to students via phone and video calls, to address issues ranging from psychosomatic distress related to academic grades to more specific aspects of mental health or fear of contagion (Fortim et al., 2023; O'Hara, 2020). Support groups, online sessions, and surveys were also implemented to assess mood-related issues (Prado et al., 2023). They also incorporated some financial support strategies, including an increase in scholarships, emergency funds, discounts, and payment flexibility, to facilitate accessibility to education and prevent dropout during the critical period of the pandemic (McKinnon-Crowley, 2023; Urbina-Najera & Canton-Croda, 2022).

In response to stabilize mental health and academic performance, around the world, major governing bodies implemented strategies that included expanding access to mental health services through telemedicine and online consultations (Augusterfer et al., 2020; Rutkowska, 2022); campaigns and awareness guides on the importance of mental health, encouraging people to seek emotional support (Organización Panamericana de la Salud [OPS], 2020, 2022). Additionally, psychosocial support programs were developed for vulnerable populations (Equipo Humanitario del país. El Salvador, 2020; World Health Organization, 2020).

Applications, social media, and online resources were promoted that offered self-help techniques, psychological first aid, meditation, and stress management (Bak et al., 2023; Cao, 2023; Fiol-DeRoque et al., 2021; Norbury et al., 2021). Locally, help lines and telephone support services have been implemented (dos Santos et al., 2014), as well as training in techniques to strengthen resilience and other skills to cope with the health situation (Lino Talavera et al., 2023).

Some of these measures impacted mental health, showing improvements in mood and academic performance (Rutkowska, 2022) However, many of these strategies did not show significant effectiveness, or their results were not sustained in the long term (Abulfaraj et al., 2024).

Our team developed an intervention strategy called Pukllasun, aimed at first-semester university students, with a strong intercultural component. *Pukllasun* is a Quechua word that translates to "playing"; through the playing, feelings are shared, learning occurs, and mental health is improved. Originally, *Pukllasum* was a festival with deep spiritual significance, as it is a time to honor Pachamama (Mother Earth) and other Andean deities. During the celebration, offerings and ceremonies are performed to give thanks for the harvest and to ask for blessings for the future (González, 2018). This act reaffirms the community's connection with the land, ancestors, and protective spirits, keeping Andean spirituality alive (Quispe, 2021). This festival is deeply rooted in the popular and social culture of the Peruvian highlands, whether Quechua-speaking or not, and consists of recreational activities, physical exercise, and play.

In the context of confinement and restrictions on large cultural activities, we wanted to give a socio-pedagogical meaning to the term by adapting some Pukllasun activities to the virtual context. We used videos and guided games, activities designed in the Peruvian highlands, to address mental health issues and mitigate the levels of anxiety caused by COVID-19 in university students. Therefore, we analyzed the effectiveness of each task in this technique to reduce levels of generalized anxiety in a sample of Andean Peruvian students during the COVID-19 pandemic.

## METHODOLOGY

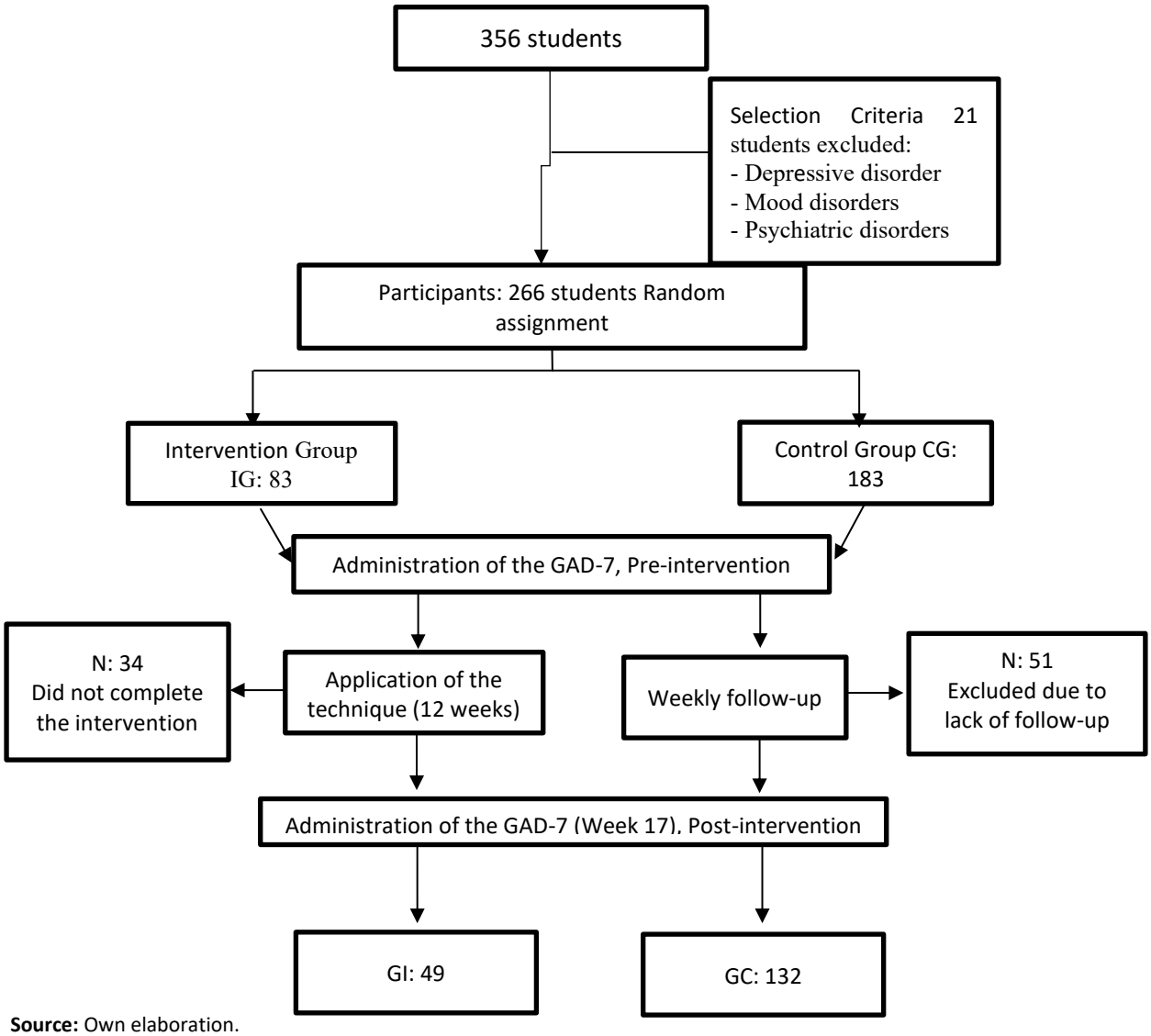
A Quasi-experimental study with pre-test, intervention, and post-test. It included an intervention group (IG=49) and a control group (CG=132); all were first-semester university students from the Faculty of Education at the National University of Huancavelica, Peru. The age of the participants was homogenized (t: 0.325; P: 0.684), but not the gender (Men: 42.3%; Women: 57.7%). In the intervention group (GI), the average age was 19.2 years (SD: 2.1), and in the control group (CG), it was 20.3 years (SD: 2.8).

### Procedure

Initially, a call was made via institutional emails and social media, inviting first-semester students from the Faculty of Education at a state university located in the Peruvian highlands to aid in improving academic and socio-emotional performance indicators. Inclusion criteria included being enrolled in the first semester of one of the education programs, showing emotional disturbances, and consenting to participate in the study. 356 students responded; those with a medical diagnosis of depression or other mood or psychiatric disorders were excluded. They were referred to specialist professionals for their care. 266 students responded to the call and were randomly divided into 2 groups (IG: 83 and CG: 183).

Both groups were assessed with the GAD-7 test. Subsequently, the intervention group underwent the tasks and activities of the *pukllasun* technique. In contrast, the control group was not subjected to the technique and received weekly follow-up. At the end of the intervention, after 4 months of working with the technique, both groups were reassessed with the GAD-7 test. At this point, 49 participants from the intervention group and 132 from the control group were evaluated. 85 participants did not complete all phases of the intervention, withdrew, or were unavailable for the post-test evaluation.

**Figure 1.** Flowchart.




**Source:** Own elaboration.

## Instrument

To assess anxiety levels, the Generalized Anxiety Disorder Scale (GAD-7) was used (Spitzer et al., 2006) It is a brief, self-administered screening tool designed to detect levels of generalized anxiety in individuals over the past two weeks (American Psychiatric Association, 2013). The GAD-7 consists of seven items on a Likert scale, which indicates the frequency of symptoms on a four-point scale where "0" means "not at all" and "3" means "nearly every day." It allows for the classification of anxiety severity into three categories: mild, moderate, and severe. The total score ranges from 0 to 21 points, where a score ≥ 10 indicates generalized anxiety disorder (Zhong et al., 2015).

Originally created in English by Spitzer et al. (2006), it has been translated and validated in several languages (2024; Garcia-Campayo et al., 2010; Masuyama et al., 2022; Sawaya et al., 2016; 2006). The version that has adequate values for sensitivity (0.92) and specificity (0.83) (Spitzer et al., 2006). It has been widely used in epidemiological and clinical studies to assess anxiety in various population groups, including university students (Franco-Jimenez & Nuñez-Magallanes, 2022; B. Lee & Kim, 2019), healthcare Workers

(Camargo et al., 2023; Porto et al., 2022) patients with chronic illnesses (Budikayanti et al., 2019; Seo & Park, 2015) and the general population (Villarreal-Zegarra et al., 2023; Zhong et al., 2015). Similarly, some studies have demonstrated its clinical utility and adaptability for detecting and measuring anxiety in diverse contexts (Camargo et al., 2023; Monterrosa-Blanco et al., 2021; Muñoz-Navarro et al., 2017; Seo & Park, 2015).

**The Pukllasun technique**

*Pukllasun* is a word from Quechua, an indigenous language of South America, particularly spoken in Peru, as well as in Bolivia, Ecuador, and Argentina. The word "Pukllasun" is composed of two parts: "Puklla," which means "game" or "fun," and "Sun," which is a suffix indicating "festival" or "celebration." Therefore, "Pukllasun" can be translated into Spanish as "Festival of Play" or "Celebration of Fun." In the Andean culture of Peru, Pukllasun is a traditional festival celebrated at various times of the year, particularly during the harvest season or in honor of fertility deities. During the festival, games, dances, music, and rituals are performed to thank the gods for the abundance of resources, food, and life.

Pukllasum is celebrated primarily in the Andean regions of Peru during the carnival season, typically in February and March. The festival is connected to the Andean worldview, which integrates nature, spirituality, and community life (Huamán, 2015; Valderrama, 2018). The celebration focuses on life, fertility, the renewal of nature, and the continuity of ancestral traditions. In this context, "playing" or "Puklla" is a symbolic way to celebrate abundance and seek the protection and favor of Andean deities (Ríos, 2017).

During the festival, a series of rituals, dances, music, and community activities centered around games are performed. Participants typically dress in traditional costumes, colorful masks, and decorations that reflect the rich cultural heritage of the región (Sánchez, 2016). Among the prominent traditional dances is the "tinku," which symbolizes the confrontation and harmony between opposing forces, as well as other dances that represent stories, myths, and daily life (Cáceres, 2019). Additionally, it is common to prepare and share traditional foods, symbolizing abundance and the act of sharing with the community and the spirits of nature (Flores, 2020).

Besides its spiritual dimension, Pukllasum is a moment of unity and strengthening of community bonds. Collective activities and games promote solidarity and cooperation among community members, reinforcing the cultural and social identity of the participants (Vega, 2019). The festival is an opportunity for Andean communities to celebrate together, preserving and passing on their cultural traditions to new generations.

In the context of the COVID-19 pandemic, students from the Faculty of Education at the National University of Huancavelica began to exhibit various emotional and physical ailments. This was due to the conditions of confinement, contagion, or family losses associated with the Coronavirus. The student population has a significant concentration of rural and ethnic backgrounds. Therefore, considering that the cultural festivities of Pukllasun were restricted in the community and with the aim of providing support during the pandemic, a strategy was designed that retained the cultural essence of Pukllasun, with the objectives of: first, mitigating the psychosocial and mental health effects; and second, supporting and evaluating the academic activities that students should carry out autonomously or independently at home. To achieve this, the following steps were taken:

1. The research team developed a series of videos (36) that included tutorials for games and activities that students were required to complete. These activities were designed to be carried out safely at home during confinement. The tasks and physical activities emulated those performed during the in-person Pukllasun festivals. Therefore, students engaged in activities involving precision, strength, agility, and balance, using materials available at home, such as brooms, sinks, ropes, hoops, balls, and clothing items, among other household objects.

2. Each video featured background music appropriate to the Pukllasun festivities. These videos were validated by family members and key cultural actors from the community.

3. Each tutorial video lasted 10 minutes. Each session took 2 hours, which included a group review of the video. Subsequently, participants had to perform the activities individually, recording each one (5 minutes) and then sharing their experience in a focal group discussion. A total of 36 videos were used over 12 sessions (3 months), with one session held each week.

4. At the end of each session, group experiences were shared.

5. A control group was included, which declared not being interested in participating in the virtual Pukllasun activities, despite being offered the opportunity to join. Instead, they were monitored weekly for their control status, reviewing their emotional state and the non-engagement in stimulating group activities.

**Statistical analysis**

First, descriptive analyses of skewness and kurtosis were performed, and the Kolmogorov-Smirnov tests were used to estimate the statistical normality of the data. Then, to analyze the average results on the Generalized Anxiety Disorder Scale (GAD-7) before and after the intervention, between the study groups, a Student’s t-test for independent samples was used; this included intergroup and intragroup mean difference analyses. Finally, for significant results, *Cohen's d* was used to measure the effect size of the Pukllasun technique on participants' generalized anxiety symptoms, based on the methodology of Thalheimer & Cook (2002). The data provided by Cohen's d are interpreted as follows: a small effect, with values ranging from 0.15 to 0.40; a medium effect, with scores between 0.40 and 0.75; and a large effect, when the statistic score is greater than 0.75. All analyses were processed using SPSS 27.

**Formal aspects**

This study was conducted following all ethical guidelines and standards for human experimentation according to the Helsinki Declaration of 1975, revised in 2008. The participation was voluntary, and informed consent was obtained from all participants beforehand. Additionally, the study was reviewed and approved by the Ethics Committee of the Universidad Nacional Autónoma Altoandina de Tarma (Ethical Act No. 01-2024). The research was funded by the Peruvian Mining Canon Fund (FOCAM), with the Research Competitive Fund Resolution 0254-2021-CU-UNH. At the conclusion of the study, all participants were gathered in an auditorium where the results of the study were presented. Additionally, a practical manual to improve mental health indicators, incorporating the Pukllasun technique, was distributed. Furthermore, this research is part of an international and multicentric study that is analyzing mental health indicators among university students in Latin America.

## RESULTS

As shown in Table 1, in the pre-intervention intergroup analysis, no statistically significant differences were observed in the average scores of the GAD-7 test (t: 1.09; p: 0.246). In contrast, upon completing the intervention with the Pukllasun technique activities, significant differences were found (t: 3.28; p: 0.00**), with a very high effect size (d: 1.68) favoring the intervention group (GI).

**Table 1.** Intergroup Comparisons Pre and Post Intervention

| | **Initial Assessment** | | | | **Final Assessment** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **IG** | **CG** | | | **IG** | **CG** | | | |
| | ME±ED | ME±ED | ***t*** | ***p*** | ME±ED | ME±ED | ***t*** | ***p*** | *d Cohen* |
| GAD-7 | 11,16 | 11,86 | 1,09 | 0,246 | 8,36 ± 2,17 | 11,89± 2,08 | 3,28 | 0.00** | 1.68 |
| IG: Intervention Group. GC: Control Group. ME: Mean. ED: Standard Deviation. *t*: t Student. P<0.05 | | | | | | | | | |

**Source:** Own elaboration.

Next, an intragroup analysis was conducted to verify the presence of changes in the average results of the GAD-7 for each study group separately. According to Table 2, only the members of the intervention group exhibited significant intragroup differences in their average performances on the generalized anxiety test (t: 2.42; p: 0.02**). These results decreased following the intervention with the Pukllasun technique, showing a large effect size (d: 1.38). In contrast, the control group did not show differences in the average scores of the anxiety test (t: -0.63; p: 0.87).

**Table 2.** Intragroup Comparisons Pre- and Post-Intervention

| **Test** | | **Initial Mean** | **Final Mean** | ***t*** | ***p*** | ***d* Cohen** |
|---|---|---|---|---|---|---|
| **GAD-7** | **IG** | 11,16 | 8,36 | 2,42 | 0.02** | 1.38 |
| | **CG** | 11,86 | 11,89 | -0,63 | 0,87 | - |
| IG: Intervention Group. GC: Control Group. | | | | | | |

**Source:** Own elaboration.

## DISCUSSION

The health emergency that occurred in 2021 had profound repercussions on the mental health of the general population globally, especially affecting students who faced a new landscape in their academic training (Di Malta et al., 2022; Giusti et al., 2021). This change directly impacted their academic performance and led to the development of symptoms associated with Generalized Anxiety Disorder (GAD) (Jehi et al., 2024; Siena et al., 2024). As a result, there was an urgent need to create and implement programs and strategies that mitigated emotional effects and aimed to improve academic performance and the well-being of university students.

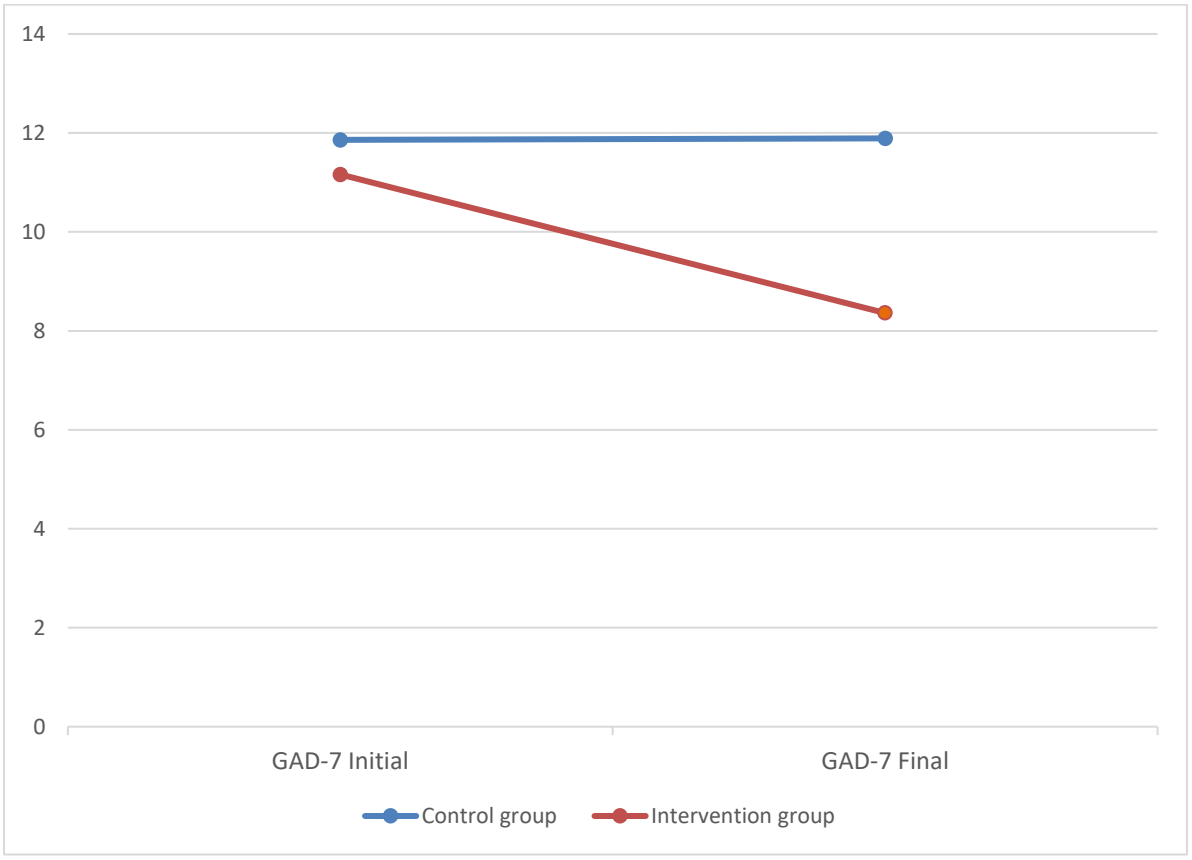
In this regard, our research group analyzed the effectiveness of a set of integrated tasks rooted in interculturality, known as Pukllasun. The intervention activity consisted of a series of video tutorials,

carefully designed to address and reduce levels of generalized anxiety; activities that simulated the cultural activities of this festival (Pukllasun) from the Andean highlands of Peru. The research focused on applying these techniques to a specific sample of Andean Peruvian university students who faced additional challenges due to the COVID-19 pandemic. Through these audiovisual resources, the aim was to provide an accessible and effective tool to mitigate the psychological impact that the pandemic had on this population.

Our results show that the initial scores for both the intervention group (GI) and the control group (GC) were similar before starting the intervention, with no statistically significant differences between the groups (t: 1.09; p: 0.246). It is important to note that both groups exhibited concerning levels of generalized anxiety symptoms before the intervention began, which underscores the urgency of implementing effective interventions. In contrast, when analyzing the scores after the intervention, a notable improvement in Generalized Anxiety Disorder (GAD) symptoms was observed in the experimental group (t: 3.28; p: 0.00**) (see Figure 2).

This result suggests that psychoeducational strategies and non-pharmacological techniques based on play can have a considerable positive impact on students' mood and mental health. These improvements reflect not only the effectiveness of the applied interventions but also their potential to be integrated into educational programs as tools for emotional and psychological support. This approach has been supported by several previous studies highlighting the effectiveness of these interventions in educational contexts (Pallavicini et al., 2018; Respati et al., 2024; Tomoiagă & David, 2022; Xin et al., 2024).

**Figure 2.** Changes in participants' mood.




**Source:** Own elaboration.

These findings align with existing evidence demonstrating that mental health interventions must be culturally adapted to be effective in Indigenous communities. Among Indigenous university students, mindfulness has been modified to fit their worldview and reduce anxiety (Beshai et al., 2023). Video games have also been explored as therapeutic tools, helping to overcome access barriers in these communities (Ferrari et al., 2022). Additionally, repeated intergroup interactions have been shown to reduce social anxiety and decrease stress reactivity (Page-Gould et al., 2008). In this context, Pukllasun, a playful technique based on traditional Andean activities, has proven effective in reducing anxiety in university students. This aligns with the results observed in our study, where Pukllasun demonstrated a significant impact in lowering anxiety levels among university students.

In the second place, an intragroup analysis was conducted separately on the average GAD-7 scores for each study group (experimental and control). The results revealed a notable reduction in anxiety levels after the intervention. In contrast, the control group (GC) maintained similar scores before and after the study, suggesting that the absence of the technique applied in the experimental group (GI) prevented improvements in anxiety for these participants. These findings underscore the effectiveness of the Pukllasun technique in reducing or mitigating anxiety levels among university populations, highlighting its potential as a tool for managing students' emotional well-being. This effectiveness is particularly relevant given the context of the severe impact in which the study was conducted, marked by the COVID-19 pandemic, which led to an increase in the prevalence of Generalized Anxiety Disorder (GAD) among university students. Thus, the technique not only demonstrates its effectiveness under normal conditions but also in crisis situations, reinforcing its importance as part of psychological support strategies in educational settings. Additionally, it highlights the socio-emotional value of play in its various forms and variations. In this case, symbolic play, emulating traditional cultural festivities, helps alleviate emotional distress and improves mental health and academic performance, as described in various previous studies (Bratton et al., 2013; Hamari et al., 2016; Li et al., 2013; Respati et al., 2024).

Finally, we found that the change in participants' mood was associated with the application and training in the skills proposed by the *pukllasun* technique. This led to a significant reduction in emotional distress among the included population. Effect size analyses using Cohen's *d* indicated that the reduction in anxiety symptoms was primarily due to students' participation in the virtual Pukllasun activities. In this regard, the available evidence points to two main approaches for addressing mental health. The first is pharmacological treatment, which should be complemented by psychotherapeutic interventions to ensure sustained results over time. However, some studies question the effectiveness of this type of treatment, as it may not demonstrate long-term improvements in quality of life on its own (Andrade, 2022; Bumpus, 2020; Hasler et al., 2002). Additionally, it is important to highlight that such treatments can be costly and less accessible for vulnerable, rural, and ethnic populations (Iseselo et al., 2016; Knapp et al., 2006).

In second place, non-pharmacological intervention techniques have been analyzed to mitigate emotional and cognitive distress (López et al., 2015; Rodrigues et al., 2021); even in neurodegenerative conditions (López, Véliz, et al., 2015; López, Veliz, et al., 2015). Among these, interventions include physical activity training (Popovych et al., 2022), techniques based on board games (Respati et al., 2024), the use of applications or web platforms(Suen et al., 2024; Szigethy et al., 2023), and the implementation of strategies with video games to reduce symptoms (Kowal et al., 2021). There is extensive evidence supporting the effectiveness of these interventions in the treatment of various disorders and conditions, including generalized anxiety disorder (GAD) (Kowal et al., 2021; Respati et al., 2024; Schaeuffele et al., 2022; Suen et al., 2024)

Additionally, some studies have implemented techniques specific to particular communities, facilitating skill development through activities with a strong cultural identity (Fondo Nacional de Desarrollo de la Educación Peruana [FONDEP], 2015; Sourander et al., 2024). In this regard, our research group recently conducted an intervention study with the cultural orientation of Pukllasun; these were interventions based on games and playful activities in a face-to-face format, aimed at fostering group exploration, cultural, spiritual, and emotional integration of a broad group of Quechua university students; with the goal of improving emotional well-being and academic performance (Rodriguez-Benites et al., 2024). The results showed changes in the emotional perception of stressful situations when they are approached socially and culturally; additionally, an increase or maintenance in academic performance was observed. This reinforces that non-pharmacological techniques can become an alternative to counteract the psychological impact of stressful conditions in the university population; and especially when these activities consider the intercultural vision of well-being and mental health.

The results indicate that Pukllasun is an effective strategy for reducing anxiety in university students, with statistically significant effects supporting its applicability in higher education contexts. A long-term follow-up would allow for a more comprehensive evaluation of its lasting benefits and adaptability across different educational and cultural settings. Future studies could strengthen the discussion by incorporating moderation analyses, including various factors that provide a deeper understanding of the phenomenon. Variables such as gender, socioeconomic status, cultural context, and access to support networks may influence the effectiveness of the intervention. Integrating these analyses would help identify the conditions under which Pukllasun has the greatest impact, offering valuable insights for its adaptation and implementation in different educational and cultural settings.

Despite these positive findings, the study has some limitations. First, the sample was limited to students from a university in the Andean region of Peru, restricting the generalizability of the results to other populations with different cultural backgrounds. While the findings suggest that the Pukllasun technique positively impacts anxiety reduction, it is necessary to replicate the study in other educational and cultural contexts to assess its broader applicability. A second limitation relates to the study's design. Although an intervention was conducted, it cannot be classified as a follow-up study. Therefore, once the study concluded, it was not possible to determine whether the reduction in anxiety symptoms was sustained over time in the intervention group. A long-term follow-up would provide valuable insights into the persistence of the benefits and the adaptability of Pukllasun in diverse educational and cultural contexts.

Additionally, the study did not aim to balance gender representation within the sample. This factor should be considered in future research, as previous studies suggest that men and women may respond differently to interventions based on play and emotional expression. Another potential limitation is the influence of uncontrolled variables, such as family support, access to technological resources, and academic workload, which may have impacted the results. Despite these limitations, this study provides valuable evidence supporting the importance of culturally adapted psychological interventions. The integration of identity and community elements into emotional regulation strategies emerges as a promising approach for student populations. Future research should expand the scope of Pukllasun, exploring its effectiveness in different academic environments and evaluating its impact on multiple dimensions of psychological and academic well-being.

In this regard, the study addresses a critical issue in mental health and higher education. Its culturally adapted approach is valuable, but its impact could be further enhanced through replication studies in other contexts. Future research could explore its effectiveness in universities with students from diverse ethnic

and socioeconomic backgrounds, as well as in urban and rural settings outside the Andean region. Finally, a third limitation relates to the cultural relevance of the Pukllasun activities. They may be more effective in Quechua or Aymara cultural contexts, such as communities in Peru, Bolivia, and northern Argentina and Chile. Therefore, the activities of the technique might require adjustments to be effective in diverse cultural settings.

With these limitations in mind, we can conclude that a three-month intervention using a set of activities infused with the cultural essence of a widely practiced festival in the Andean community of Peru effectively reduces generalized anxiety disorder symptoms among university students. Activities that emulate the Pukllasun festival in a virtual setting and involve group sharing of experiences have a significant effect in reducing mental health issues among university students. These activities help decrease risky behaviors and self-harm, while also improving academic performance and overall quality of life.

## DECLARATION OF CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest. During the execution of the work and the writing of the article, no personal or external interests have influenced their actions, including misconduct or values that deviate from the usual and ethical standards of research.

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