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Relationship between parental stress and adaptation to the virtual educational environment in contexts of technological limitations in the Milagro canton during the covid-19 pandemic

Relación entre el estrés parental y la adaptación al entorno educativo virtual en contextos de limitaciones tecnológicas en el cantón de Milagro durante la pandemia de covid-19

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ABSTRACT

The present study aimed to analyze parental stress levels and their relationship with the virtual educational environment during a period of forced technological adaptation. The sample consisted of 105 participants, mostly mothers (71.43%), with a predominance of secondary education

(51.43%) and married or in a common-law relationship. Predominant levels of stress were identified as medium (37.14%) and moderate (27.62%), as well as technological barriers mainly associated with lack of internet access (28.57%) and slow connection speed (18.10%). The statistical analysis included descriptive statistics and Spearman's correlation. Significant positive correlations were found between stress coping and the dimensions of communication (ρ = .360), participation (ρ = .332), and virtual setting (ρ = .409), while negative perceptions of stress were inversely associated with these dimensions. These results highlight the importance of emotional coping for adaptation to virtual environments and the need for public policies that mitigate technological gaps in family contexts.

Keywords: parental stress, coping, virtual environment, technological barriers, pandemic

RESUMEN

El presente estudio tuvo como objetivo analizar los niveles de estrés parental y su relación con el entorno virtual educativo durante un periodo de adaptación tecnológica forzada. La muestra estuvo conformada por 105 participantes, en su mayoría madres (71,43 %), con predominancia de nivel educativo secundario (51,43 %) y estado civil casado o en unión libre. Se identificaron niveles predominantes de estrés medio (37,14 %) y moderado (27,62 %), así como barreras tecnológicas asociadas principalmente a la carencia de internet (28,57 %) y a la baja velocidad de conexión (18,10 %). El análisis estadístico incluyó estadística descriptiva y correlación de Spearman. Se hallaron correlaciones positivas significativas entre el afrontamiento del estrés y las dimensiones de comunicación (ρ = ,360), participación (ρ = ,332) y escenario virtual (ρ = ,409), mientras que las percepciones negativas del estrés se asociaron inversamente con dichas dimensiones. Estos resultados evidencian la relevancia del afrontamiento emocional para la adaptación a entornos virtuales y la necesidad de políticas públicas que mitiguen las brechas tecnológicas en contextos familiares.

Palabras clave: estrés parental, afrontamiento, entorno virtual, barreras tecnológicas, pandemia

INTRODUCTION

Throughout the timeline, humankind has faced different public health events (Morsut & Kruke, 2017; Omenn, 2010), in which the human being has had to face these types of unexpected problems in such a way that transcends its capacity and out of control of the situation (Beghetto, 2021; McVicar, 2015), these types of situations not only affect the human being in the physical but also in the emotional sphere that encompasses in each of the families of the society (Cersosimo & Marra, 2020; Solehah & Ariantini, 2022; Walper et al., 2023; Wang et al., 2022).

In Wuhan, China, COVID-19 started, which later generated a pandemic, causing global public health alerts (Jia et al., 2020; Onyeaka et al., 2021; Velavan & Meyer, 2020). From a health alert to a pandemic, significant changes occurred in various areas, including health, Social, and educational contexts (Damme et al., 2020)

Given the magnitude of the problem of covid 19 that was generated worldwide (Filip et al., 2022), international health agencies such as the WHO (2022) (World Health Organization), which issued guidelines and recommendations to countries, the necessary measures were applied to protect the health of the inhabitants, including the decision to apply social isolation as a preventive measure (Brečić et al..., 2020; Krupina & Shirenova, 2024; Mann & Walker, 2022), so that family groups do not generate public and social health saturation, opting to use technology as a personal, work and academic resource (Garfin ., 2020).

With the significant advances in science, the development of technology and the Internet have become a fundamental strategic ally in society, especially in the educational context (Antunes & Barreto, 2022a). Currently, the Internet is a basic and necessary resource for human beings, since it allows them to carry out daily activities, including those in the school environment. The benefits of connectivity, social networks, and digital resources available through the Internet have facilitated real-time communication, as well as access to a large amount of information hosted on different platforms and websites. Being interconnected from anywhere allows expanding knowledge and generating new contributions in the educational field.

In the academic context, before the pandemic, the challenges were notorious, the inequality in education, due to the pandemic (Antunes & Barreto, 2022b), new adjustments were made in the school curriculum, face-to-face classes changed from face-to-face to virtual modality (Stafford et al., 2023), which for the entire educational community was a change in the teaching structure. To adapt to the new reality was a difficult and stressful process (Ugochukwu Okwudili Matthew et al., 2022). Adjustments were made that were relevant due to the health situation that was being experienced at that time. The use of digital communication tools, was implemented Zoom, Google Meet, and Classroom, has allowed students to continue with the course of their studies at different educational levels (Sadia et al., 2023). Although the use of technology is part

of society, its application in education represents a challenge for the academic community, including teachers and especially for parents and students.

In particular, parents faced different realities and difficulties in handling these new digital tools in order to support their children and accompany them in the learning process from home (Passey, 2024; Struyf et al., 2022). In addition to technological difficulties, the pandemic caused a series of discomforts within the family environment that affected the dynamics among its members, especially in relation to the educational environment (Ogwu et al., 2023). Tensions were observed in family interaction, where students were also affected (Ferreras-Listán et al., 2021; Ogwu et al., 2023).

It is evident that all these changes caused tension within the family nucleus, so stress was part of this problem. Currently, stress has become a mental health problem that has become even more evident in the course of the pandemic, which affects human beings in different spheres and contexts (Buitrago Ramirez et al., 2020).

This type of health problem has taken relevance and has had a growth by continuing to investigate this phenomenon of study concerning the family environment in the educational context (online classes) (Crandall et al., 2023; Zhu et al., 2023). In this case, due to a global health issue, a growth of tension in households during confinement was generated, one of the concerns is education for their children and adapting to new educational changes at home (Rangel-de Lázaro & Duart, 2023).

Since the pandemic, education has taken another turn, which has been presented as another alternative in the educational context, as is the case with the online modality (Kaisar, 2023; Shahid & Mughal, 2020; Thahir et al., 2023). This modality is characterized by being flexible, where the process takes place in a digital environment, which involves the use of a virtual platform accompanied by a tutor and the use of digital resources. In addition, it allows progress with the curricula from home, and at the same time allows families to have a higher degree of responsibility for managing their children's school hours.

In this context, the present study aims to identify both the digital tools used and the skills that parents developed to organize their children's class hours at home. The purpose is to understand how they tried to avoid stress levels that would alter coexistence, particularly when faced with the difficulty of separating the time devoted to study from the time devoted to family life. This research was carried out in a public institution in the city of Milagro during the pandemic situation in the year 2021.

Parents, despite the events that the world was going through due to the pandemic (Chen et al., 2022), accepted the responsibility to continue to fulfill and watch over the education of their children in such a way that they helped to guide school activities at home in a virtual way (Chen et al., 2022; Coniglio et al., 2025; Zhang, 2021), in way that allows the satisfactory completion of the children's studies, those situations added up to an overload of activities and responsibility

added to the confinement that generates stress in the family nucleus. Compliance with the strict measures of confinement caused friction among family members, weakening the family system.

METHODOLOGY

For this research study, a quantitative approach of non-experimental, cross-sectional, descriptive, and correlational design was applied (Ato et al., 2013; Hernández Sampieri & Mendoza Torres, 2018). This type of approach allows the variables to be quantified through the application of instruments for subsequent in-depth analysis. Non-experimental design, this in particular is characterized by not having the intention of manipulating the study variables. Cross-sectional, in which the data is collected in a single moment. The study is descriptive; it aims to describe the characteristics or phenomena of the nature of the variables. And finally, the correlational type, which is characterized by relating or associating the study variables.

Participants

In this particular case, the sample is made up of 105 people from the city of Milagro, Ecuador. The sample was selected by means of a non-probabilistic sampling by convenience, characterized by establishing the characteristics according to the research, the same that establishes according to the criteria of inclusion and exclusion.

Instruments

In the present research, two instruments were applied with the purpose of evaluating the variables of perceived stress and the perception of the school-family relationship in the context of virtual education during the pandemic.

Perceived Stress Scale (PSS-14)

The Perceived Stress Scale is the adaptation of the original questionnaire of Cohen (1983), adapted by Remor & Carrobles (2001), which is a widely used tool in the psychological field to measure the perception of stress in everyday situations. In this study, we used the 14-item version, adapted to the Spanish-speaking context and previously validated in various countries. This scale makes it possible to identify the degree to which people consider that their life has been unpredictable, uncontrollable, or overloaded.

The instrument consists of statements related to recent experiences and the frequency with which these have been experienced as stressful. Responses are collected using a five-level Likert-type scale, from "never" to "very often". Some items are reverse-scored to ensure the validity of the analysis. The total of the scores allows the stress levels to be classified into four ranges: low, medium, moderate, and high.

From a technical perspective, the scale has demonstrated adequate levels of internal consistency, with Cronbach's alpha coefficients above 0.80 in studies conducted in Latin America, even in populations similar to the one analyzed in this research. Its application is agile, can be individual or collective, and does not require complex technical conditions.

Instrument on the school-family relationship in the virtual context

The second instrument was specifically designed to explore the perception of mothers and fathers on the relationship between home and school during the implementation of virtual education in the context of the health crisis by author Piere Rojas (2020). The questionnaire was developed from a pilot test in educational institutions in Quito and was validated with the support of specialists using the Delphi method, which guarantees its relevance and contextual validity.

It is made up of 21 items: 19 items of an evaluative type, measured with a five-level Likert-type scale that allows identifying the degree of agreement or disagreement with situations related to communication, family participation, and access to technological tools; and 2 additional items that collect information on the technological conditions in the home.

The reliability analysis of the instrument yielded a Cronbach's alpha coefficient of 0.824, which indicates an adequate internal consistency for its use in similar contexts. Its structure allows a comprehensive assessment of the conditions under which the families faced the virtual educational process, making it a relevant tool for analyzing the impact of the pandemic on family educational dynamics.

Procedure

In the first instance we proceeded to structure the corresponding information Google forms, the bank of questions, the same that integrate sociodemographic questions, the respective information about the study and finally the instruments in the form and additionally informed consent, the same that aims to develop a study with the ethical principles of research; confidentiality, respecting the participation of individuals (autonomy) and (Länsimies-Antikainen et al., 2010). Subsequently, the link was sent to the participants so that they could answer the questions (Casas M, 2016; Martín, Apericio, & Jarne, 2023) .

Data analysis

For this study, the statistical treatment applied was as follows. We proceeded to apply a frequency analysis to review or verify if there are empty or missing data. Once the data had been reviewed, first, a descriptive analysis of the data was applied to detail the sociodemographic characteristics of the study sample. The objective is to evaluate the associations of the variables, the assumption of normality of the distribution of the data is verified through the Kolmogórov-Smirnov test, and a statistical significance level of 0.05 ($p < 0.05$) is established to subsequently select the appropriate statistical analysis such as Sperman or Pearson, depending on the case.

RESULTS

The data presented in Table 1 are described below and allow us to characterize the population on the basis of basic sociodemographic variables. Regarding parental role, the mother was identified by most of the participants. Regarding marital status, the most populated category was married. Almost 32% of the participants live with their partner in a common-law relationship,

23% were single, 8% were divorced, and almost 1% were widowed. As for the level of education attained, the most populated category is by far the high school level. In second place are students who have completed primary education. To a much lesser extent, third-level and fourth-level education are reported.

Table 1

Characteristics of sociodemographic variables

Variable	Category	f	%
Paternal role	Mother	**75**	71.43 %
	Father	**30**	28.57 %
Participant's marital status	Single	24	22.86 %
	Married	39	37.14 %
	Free union	33	31.43 %
	Divorced	8	7.62 %
	Widow/er	1	0.95 %
	Total	105	100%
Study Level	Primary	28	27.62 %
	Secondary	53	51.43 %
	Third level	19	19.05 %
	Fourth Level	2	1.90 %

Table 2 describes the means of communication between the parents and the teacher during class participation in the virtual modality in covid 19 time. The means of communication played a fundamental role in the students' educational environment. According to the results, the tool that was predominant in pandemic situations was WhatsApp, where 82.9% of the participants used it as one of the main channels of information and response. Other media mentioned by the participants were the Google Classroom accounts, being 5.7%, and also (2.9%) accessed institutional accounts. Some accessed other types of media to contact teachers: 1.9% (video calls) and 6.7% (others). In this case, there is evidence that technologies in times of crisis, whether related to health or other situations, can be beneficial in supporting students' education. This enables flexibility in the teaching and learning process.

Table 2

Means of communication used to contact the teacher during times of crisis

Media and communications	n	%
WhatsApp	87	82,9
Classrom	6	5,7
Corporate account	3	2,9

Via a telephone call	2	1,9
Others	7	6,7
Total	105	100%

Table 3 presents the results of parental stress levels, showing that most participants exhibit a medium level of stress. Additionally, a group with moderate stress can be observed, closely followed by those with high stress levels. However, a clear indication from the collected data is that only 14.29% of the sample shows a low level of parental stress, which may be relevant concerning family psychological health and parent–child dynamics.

Table 3

Parental stress level

Stress level	**n**	**%**
Low level	15	14,29
Medium level	39	37,14
Moderate level	29	27,62
High level	22	20,95
Total	105	100%

Table 4 shows that the technological difficulties most frequently reported by the participants were the lack of Internet access, with 31.43% of the total. Low connection speed and insufficient technological means were the most frequent problems, both with 18.10% (18). In 17.14 % (17) of the cases, the difficulty was the lack of time for training in Information and Communication Technologies, and 13.33 % (14) reported that they had no specific difficulty. As can be concluded, these are structural and pedagogical challenges, which, in some way, will impact the performance of the households studied in terms of their technological adaptation skills and capabilities.

Table 4

Technological difficulties in times of pandemic

Technological difficulties	**n**	**%**
Lack of internet	33	31,43
Internet - low speed	18	18.10
Insufficient technological resources	18	18.10
Lack of training time concerning the technology	17	17.14
No difficulty	14	13.33
Total	105	100%

In Table 5, Spearman's correlation analyses indicated that there are significant associations between the dimensions of coping and perceptions of stress with the components of the educational virtual environment. First, the data indicated that perceived stress coping showed moderate positive coefficients with communication, participation and virtual setting, with (p =.360), ρ =.332 and p =.409), respectively, all p <.001, suggesting that a higher level of perceived stress coping goes hand in hand with greater interaction of the subjects with the virtual environment. In contrast, as far as stress perceptions are concerned, negative correlations were found in all cases, with (ρ = -.290 and p <.001) for communication, (p = -.428 and p <.001) for participation and (ρ = -.135 and p <.001) for the correlation of issues related to the virtual setting.

Table 5

Spearman's correlation according to the dimensions of the variables

			Communication	Participation	Virtual scenario
Spearman's Rho	Coping with stress	Correlation coefficient	.360**	.332**	.409**
		Sig. (bilateral)	.000	.000	.000
		N	105	105	105
	Perceptions of stress	Correlation coefficient	-.290**	-428**	-.135**
		Sig. (bilateral)	.000	.000	.000
		N	105	105	105

DISCUSSION

The results obtained in this study allow us to reflect on the significant relationship between parental stress levels and participation in virtual educational environments. The positive correlation between stress coping and the dimensions of communication, participation, and adaptation to the virtual scenario suggests that parents with greater emotional resources and stronger coping strategies manage to integrate more effectively in technology-mediated educational processes. This finding is consistent with previous research highlighting the role of psychosocial support and family resilience in contexts of accelerated digital transition. The study by Meitasari et al (2023) highlights the role of the family system in crises, where resilience and adaptability are key to strengthening the family in the management of technological resources.

On the contrary, high stress perceptions were negatively associated with these dimensions, which shows that unmanaged stress can act as a limiting factor for the active involvement of parents in the educational accompaniment of their children (Cheng et al., 2024; Tekavc, 2023). This situation is aggravated in contexts marked by structural barriers such as lack of connectivity, shortage of devices, or lack of time for technological training, conditions that were evidenced in this study (Sintema & Singogo., 2020)

These results make visible the digital inequalities that persist in households and the need to generate public policies aimed at reducing the technological gap, strengthening access to basic digital services, and promoting training programs that include mental health and digital education components for mothers, fathers, and caregivers (van de Werfhorst et al., 2022).

According to the study by Gómez-Navas & Del Pilar Marín-Rivas (2023), they evaluate the impact of the relationship between families and schools in times of COVID-19. According to the study, parents reported experiences of overload in the accompaniment of their children's education, as well as a poor perception of the quality of education and pedagogical loss in times of pandemic.

CONCLUSION

The present study showed a significant relationship between the level of parental stress and the ability to adapt to the virtual educational environment, highlighting the role of emotional coping as a protective factor in the face of technological challenges. The data reveal that the greater the capacity to cope with stress, the better the interaction of mothers and fathers with ICT-mediated educational processes. In turn, high perceptions of stress are associated with lower participation and communication in these environments, which limits their role of accompaniment.

Likewise, structural technological barriers were identified, such as the lack of internet access, low connection speeds, and insufficient devices, all of which negatively impact the educational experience at home and deepen access gaps. These findings reaffirm the need to implement comprehensive policies that strengthen families' digital capacities, ensure equitable connectivity, and provide emotional support to caregivers in times of crisis or digital transition.

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