



The Relationship Between Virtual Education and Perceived Stress in High School Male Students During the Corona Era

Gh. Sanagouye Moharer¹ , S. Taheri^{2*}, S. Mohsenizadeh³, R. Montazeri², A. Haji Abbasi²

¹ Associate professor, Department of Psychology, Zahedan Branch, Islamic Azad University, Zahedan, Iran

² PhD Student, Department of Psychology, Zahedan Branch, Islamic Azad University, Zahedan, Iran

³ Master of Clinical Psychology, Department of Psychology, Hamedan Branch, Islamic Azad University, Hamedan, Iran.

ARTICLE INFO	ABSTRACT
<p>Article History: Received 3 January 2022 Received in revised form 21 February 2023 Accepted 9 March 2023 Available online 17 March 2023</p>	<p>Background: The COVID-19 pandemic has necessitated a rapid transition from traditional classroom learning to virtual education, which may have affected students' mental health. This study investigates the relationship between virtual education and perceived stress among male high school students in Tehran. Methods: A descriptive-correlational research design was employed. The statistical population included all male high school students in Tehran during 2021. Using stratified random sampling proportional to school size, 100 students were selected according to Morgan's table. Data were collected using the Perceived Stress Scale (Cohen et al., 1983) and the electronic learning questionnaire (Watkins et al., 2004). Statistical analyses were performed in SPSS version 22, applying descriptive statistics and Pearson correlation tests. Results: Findings revealed a significant positive correlation between virtual education and perceived stress levels ($r = 0.639$, $p < 0.001$). Students reporting higher engagement in virtual learning also exhibited greater stress, potentially due to factors such as technological challenges, reduced peer interaction, and increased self-directed learning demands. Conclusion: The results suggest that while virtual education offers continuity of learning during crises, it may increase stress among students. Educational authorities should provide psychological support and enhance digital readiness to mitigate adverse effects. Further research should investigate mediating factors, including socioeconomic background and digital literacy.</p>
<p>Keywords: Channel Education, Perceived Stress, High School Students</p>	

1. INTRODUCTION

The outbreak of the coronavirus disease (COVID-19) in late 2019 triggered one of the most disruptive global public health crises in modern history, forcing governments to implement strict measures such as lockdowns, social distancing, and the suspension of face-to-face education in schools and universities [1]. In response, educational systems worldwide were compelled to rapidly transition to virtual education, utilizing online platforms and digital resources to ensure the continuity of learning [2,3]. Although this digital shift was essential to prevent academic

* Corresponding Author: sahadr65@gmail.com

PhD Student, Department of Psychology, Zahedan Branch, Islamic Azad University, Zahedan, Iran



stagnation, it also introduced substantial pedagogical and psychological challenges, particularly among adolescent students who are in a critical developmental stage [4].

Virtual education—while offering flexibility, accessibility, and the opportunity for independent learning—has been linked to increased cognitive load, diminished interpersonal communication, and limited physical engagement [5]. For high school male students, these challenges can be compounded by socio-cultural expectations, gender-specific coping mechanisms, and varying levels of technological literacy [6]. Evidence suggests that prolonged exposure to online learning environments during the COVID-19 era correlates with heightened levels of perceived stress, which can negatively impact academic performance, motivation, and emotional well-being [7,8].

Perceived stress refers to an individual's subjective evaluation of the degree to which life circumstances are deemed unpredictable, uncontrollable, or overwhelming [9]. In the context of the COVID-19 pandemic, sources of stress for high school students have included fear of infection, uncertainty about academic progression, reduced peer interaction, and decreased extracurricular involvement [10]. For male adolescents in particular, societal norms emphasizing emotional restraint may further hinder adaptive stress management, potentially exacerbating psychological strain [11].

Furthermore, the abrupt and prolonged school closures disrupted structured daily routines, reduced opportunities for collaborative learning, and limited access to school-based mental health resources [12]. Studies from multiple countries have confirmed that such disruptions, when combined with the isolating nature of remote education, can significantly increase anxiety, depressive symptoms, and perceived stress among adolescents [13,14]. Understanding the dynamics of this relationship is crucial, as high stress levels during adolescence can have lasting effects on cognitive development, academic outcomes, and overall mental health [15].

Given these considerations, investigating the relationship between virtual education and perceived stress among high school male students during the COVID-19 era is both timely and essential. Insights from such research can inform policymakers, educators, and mental health professionals in developing targeted interventions, optimizing online learning environments, and preparing adaptive strategies for future crises [16,17].

The increasing popularity of virtual education has captured the attention of researchers; however, limited attention has been given to its relationship with perceived stress. Thus, this study aims to investigate whether a relationship exists between virtual education and perceived stress in male high school students during the COVID-19 pandemic.

2. METHOD

1.1. Research design, population, sample, and sampling method

This study adopted a descriptive–correlational design, appropriate for examining relationships between variables without manipulating them [18]. In such research, control over variables is not feasible, and the aim is to describe the existing conditions and investigate possible associations.

The statistical population comprised all high school male students in Tehran during the 2021 academic year. Sampling was conducted using a stratified random sampling method proportional to the size of the population in each school [19]. After obtaining the necessary administrative approvals, the number of participants from each school was determined using proportional allocation formulas. Subsequently, the required number of students was randomly selected from each stratum and invited to participate.

Inclusion criteria were as follows: male gender, enrollment in the 10th grade, absence of any disciplinary records, no history of expulsion, and not being categorized as elite or Olympiad-level students. Exclusion criteria included incomplete responses to questionnaires or withdrawal from participation. Data collection was conducted through online questionnaires, and analyses were performed using SPSS version 22, employing both descriptive and inferential statistical methods [20].

Ethical principles were fully observed in this study. Participation was voluntary, and prior to data collection, all participants were informed about the research purpose, procedures, and their right to withdraw at any stage without penalty [21]. Written informed consent was obtained from all participants. Confidentiality of the data was strictly maintained, with all questionnaires and records securely stored by the research team.

1.2. Perceived Stress Scale (PSS)

Perceived stress was measured using the Perceived Stress Scale (PSS) developed by Cohen et al. (1983) [22]. The PSS is available in three versions with 4, 10, or 14 items, assessing the degree to which individuals perceive their lives as stressful over the past month. The scale addresses aspects such as unpredictability, uncontrollability, and overload in life events. Higher scores indicate greater perceived stress.

The reliability of the PSS has been established in multiple studies, with Cronbach’s alpha values typically ranging from 0.74 to 0.91 [23,24]. Validity has been confirmed through significant correlations with measures of anxiety, depression, and physical symptoms [25]. In this study, the Cronbach’s alpha coefficient for the scale was 0.726, indicating acceptable internal consistency.

1.3. E-learning Readiness Questionnaire

E-learning readiness was assessed using a standardized questionnaire adapted from Watkins et al. (2004) [26], which evaluates six dimensions critical to success in virtual education:

1. Technology Access
2. Online Skills and Communication
3. Motivation
4. Ability to Learn Through Media
5. Internet-based Group Discussions
6. Importance of E-learning for Academic Success

The instrument uses a 5-point Likert scale (1 = strongly agree to 5 = strongly disagree). It comprises 27 items distributed across the six dimensions. Previous studies have reported Cronbach’s alpha coefficients above 0.70, indicating satisfactory reliability [27]. Construct validity has been supported through factor analyses confirming the six-dimensional structure [28].

3. FINDINGS

The research findings were analyzed through descriptive (frequency, frequency percentage, mean, and standard deviation) and inferential (covariance and multivariate variance analysis) methods. Table 1 presents the descriptive results of the research variables.

Table 1 . Average And Deviation Criterion scores To Hand Perceived stress and virtual education have come

Variable	Average	Deviation Criterion	Z statistic	Sig	Result Test
Perceived Stress	00/4	0.47	0.06	0.200	normal
Virtual training	3/73	0.56	0.06	0.200	normal

The table above presents general descriptive information including the mean, standard deviation of the perceived stress and virtual training variables, as well as the results of the Pearson correlation test conducted in relation to this research. Table 2 displays this information.

Table 2. Correlation test Pearson related research

Pearson correlation coefficient	Sig	Variables :
0.639	0.000	Perceived stress and authorized training

Based on Table 2 results, the Pearson correlation test indicated a rejection of the null hypothesis and confirmation of the research hypothesis that a positive and significant correlation exists between perceived stress and virtual education. Specifically, there is a significant direct relationship between virtual education and perceived stress in male high school students during the Corona era.

4. CONCLUSION

The present study demonstrated a statistically significant and positive correlation between virtual education and perceived stress among male high school students during the COVID-19 pandemic. The findings suggest that as the extent of engagement with virtual learning increases, students' perceived stress levels also tend to rise. This relationship may be explained by challenges inherent to online learning, such as limited access to stable internet connections, reduced face-to-face social interaction, and the cognitive demands of adapting to new learning technologies [29,30].

These results align with prior research indicating that the rapid and large-scale transition to online education during the pandemic created additional psychological pressures for students [31,32]. While virtual education offers flexibility and accessibility, it also requires self-regulation, technological readiness, and adaptability, which, when lacking, may elevate stress levels [33].

Given these findings, educational policymakers and school administrators should consider implementing targeted interventions to mitigate stress in virtual learning environments. Such strategies might include providing technical support, offering psychological counseling services, and incorporating training programs that enhance students' e-learning readiness. Future research is recommended to explore the mediating effects of variables such as socioeconomic status, family support, and digital literacy on the relationship between virtual education and perceived stress.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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