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CYBERBULLYING IN SCHOOL ENVIRONMENTS: ANALYZING SOCIODEMOGRAPHIC FACTORS IN SPANISH STUDENTS IN THE CONTEXT OF PHYSICAL EDUCATION

Ciberacoso en el entorno escolar: analizando factores sociodemográficos en estudiantes españoles en el contexto de la educación física

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INTRODUCTION. Cyberbullying is a growing problem of great social concern. Today's students face a major cyber threat, despite being more connected than ever before. This insidious behavior can have serious consequences for the mental health and academic performance of those affected. Knowing that Physical Education has a direct impact on these behaviors, the aim of this study is to analyze cyberbullying in the physical education classroom based on nine sociodemographic variables and 22 questions from the European Cyberbullying Intervention Project Questionnaire in a sample of 1232 Spanish students (aged 8 to 18 years). **METHODS**. A non-probabilistic convenience-based method was used to determine the sample size. To validate the assumption of normality in the statistical analysis, the Kolmogorov-Smirnov test was used. Non-parametric tests were used when this assumption was not met. The same variables were examined as in the differences according to the questionnaire items, in addition to five nominal sociodemographic questions differentiated according to the two dimensions of the questionnaire. Significant differences were observed between groups. The correlation between the dimension scores and the four continuous demographic questions was then examined using Spearman's rho test. Finally, Cronbach's alpha was used to assess the internal consistency. **RESULTS**. Although there are determinant variables of cyberbullying, sex did not seem to be one of them, although other studies have shown a wide range of results, establishing that context determines this behavior. Age and school cycle have more homogeneous evidence in this aspect, both in victimization and in the aggressor part. Access to smartphones and the Internet play a determining role. **CONCLUSIONS**. This study found that several factors influence cyberbullying. It would be interesting if prevention and educacommunication programs with respect to new information technologies were approved in administrations and school institutions, as well as detailing how harmful this type of abuse and others can be.

Keywords: *Cyberbullying, Physical Education, Physical activity, Adolescents, Children, BMI.*

Introduction

Cyberbullying refers to bullying that occurs online or through mobile devices and involves repeated, aggressive, and intentional behavior directed at any person or group that is unable to protect itself (Livazović & Ham, 2019). It is a form of online harassment and aggression that has become a prevalent issue for students in today's digital age (Azami & Taremian, 2020). According to a study called U-Reporters by the United Nations Children's Fund (UNICEF) (UNICEF, 2019) that involved 170,000 and 30 countries adolescents between the ages of 13 and 18 and young adults up to 24 years, one in three young people report having experienced online bullying, and one in five claim to have missed school because of incidents involving cyberbullying and violence. It was also demonstrated that cyberbullying among classmates is not related to having a high income level (UNICEF, 2019). According to a recent report, approximately 59% of teenagers have personally experienced some form of cyberbullying (Bayari & Bensefia, 2021). Additionally, the internet provides a platform for cyberbullies to reach a wider audience and inflict more harm upon their victims (Putra & Ramli, 2022).

In recent years, the rise of technology has brought about light cyberbullying in educational institutions (Keitemoge, 2018). In this sense, the scientific community has explored tools and means to alleviate this situation and improve the educational experience of the youngest. In this research, physical education (PE) was identified as a fundamental factor for this, as it is an essential part of any child's development (Coulter *et al.*, 2020). Not only does it promote good health, but it also develops important life skills, such as teamwork, leadership, and sportsmanship. In addition, physical activity can act as an emotional regulator and bullying prevention agent (Garcia-Hermoso *et al.*, 2019); physical education should be a safe and enjoyable environment for students, free from any form of bullying (Guerra Bustamante *et al.*, 2021).

In view of the above, there are a number of problems. The rise of social media and online communication has made it easier for bullies to hide behind a screen and target their victims anonymously (Lee *et al.*, 2021) because it allows them to say things they would not normally say in person (Lee *et al.*, 2021; Wigati *et al.*, 2020), making it difficult for educators to identify and address the issue. As educators, it's important to understand the significant impact that cyberbullying can have on a student's mental health (Mahanta & Khatoniyar, 2019; Niederauer Flôres *et al.*, 2022) and academic performance (Farhangpour *et al.*, 2019). This means that more needs to be done to raise awareness of the issue, provide support systems for victims, and educate individuals on how to prevent cyberbullying from occurring in the first place (Yüksel & Çekiç, 2019). To combat cyberbullying, it is also important for parents, educators and tech companies to work together (Marzano & Lizut, 2018) and to take proactive measures to prevent it (Hsieh *et al.*, 2023; Pyżalski *et al.*, 2022). It is essential a comprehensive approach to tackling cyberbullying in schools can not only promote a safer and more inclusive learning environment, but also equip students with the knowledge to combat it (Estellés *et al.*, 2023). This includes regular monitoring of students' online behavior, providing support services to affected students and enforcing consequences for perpetrators of cyberbullying (Mishna *et al.*, 2020). In this sense, PE has an advantage over the other subjects in identifying this type of behavior. The dynamics of physical education allow us to see the relationships that students have and how they relate to each other, making it easier to see if there is any case of provoked isolation or actions with malice (Benítez-Sillero *et al.*, 2021).

There are several instruments available to measure cyberbullying, such as questionnaires and surveys. One such instrument is the European Cyberbullying Intervention Project Questionnaire (ECIPQ) (Del Rey *et al.*, 2015). The ECIPQ is a validated instrument that is used to assess cyberbullying among adolescents in Europe (Del Rey *et al.*, 2015). It consists of 22 items divided into two dimensions that measure different aspects of cyberbullying, including the frequency, duration, and severity of cyberbullying behaviors. The first dimension corresponds to cyber-victimization, whereas the second is cyber-aggression. The questionnaire also includes items that measure the emotional and behavioral responses of victims of cyberbullying. The ECIPQ is a useful tool for assessing the prevalence and impact of cyberbullying among adolescents in Europe. It is also available in a Spanish version (Ortega-Ruiz *et al.*, 2016). However, it should be noted that no single instrument can capture the full complexity of cyberbullying, and additional measures may be needed to fully understand this phenomenon.

The main objective of this study was to analyze cyberbullying in primary and secondary school classrooms, analyzing these results according to sex, age, school stage, demographic location, and body mass index (BMI) to identify elements that determine the roles of victim/offender and develop preventive measures, such as education on Internet safety and responsible use of technology, so that students learn to protect themselves (Machado *et al.*, 2022) and the educational community can guide their cyberbullying preventive policies (Ramírez & Hernández, 2017).

Materials and Methods

Participants

The sample included 1232 students from the Community of Extremadura, enrolled in Primary Education, Secondary Education or Baccalaureate. To select the participants, as shown in Table 1, a non-probability convenience sampling technique was used (Salkind *et al.*, 1999). The research had a sample of 1232 students from Extremadura, exceeding the minimum subjects to achieve a confidence level of 95% and maintain a margin of error of ±5%. To collect the sample, a series of steps were followed as described below. Likewise, participants in this study reported spending an average of 4.14 hours per day in front of an electronic device, with a standard deviation (SD) of 2.25, and devoting an average of 1.52 hours per day to physical activity (PA), with a SD of 0.81.

Table 1. The sample's sociodemographic composition (N = 1232)

Variables	Categories	N	%
Sex	Male	605	49.1
	Female	627	50.9
Age	8-11 years	64	5.2
	12-15 years	752	61.0
	16-18 years	416	33.8
Do you have a smartphone?	Yes	1206	97.9
	No	26	2.1

Table 1. The sample's sociodemographic composition (N = 1232) (cont.)

Variables	Categories	N	%
Do you have a computer, tablet or other device with internet connection?	Yes	1118	90.7
	No	19	1.5
	Sometimes	95	7.7
Do you think there is cyberbullying in your school?	Yes	261	21.2
	No	270	21.9
	I don't know	701	56.9
Have you ever suffered a situation of cyberbullying by a classmate?	Yes	118	9.6
	No	1114	90.4
Do you think that people who suffer cyberbullying have a negative influence on their academic performance?	Yes	1097	89.1
	No	22	1.8
	I don't know	113	9.2

N: number, %: percentage.

Instruments

For the sociodemographic characterization, the questionnaire included twelve questions in total: 1) five questions on sex, age, height, weight, and school location 2) three on the use of electronic devices; 3) three about cyberbullying; and 4) finally one to know the amount of PA they perform daily. BMI was determined using self-reported weight and height.

In addition, the Spanish version of the European Cyberbullying Intervention Project Questionnaire (ECIPQ) was used (Ortega-Ruiz *et al.*, 2016). This instrument consists of 22 questions (Annex 1), divided into two dimensions. Dimension 1: cybervictimization (11 items) and Dimension 2: cyberaggression (11 items). In the questionnaire, each score obtained is based on a Likert scale (0-4), where 0 means never and 4 means always, with reliability indices of 0.87 for victimization and 0.88 for aggression. The authors reported validity and fit indices with the following values: Satorra Bentler's χ^2 = 495.93, p = .00, NNFI = .98, CFI = .98, IFI = .98, RMSEA = .042, and SRMR = .065.

Procedure

To collect the sample, access was obtained to the database of the Department of Education and Employment of the Regional Government of Extremadura, in order to find out the schools where PE is taught from primary education to baccalaureate (from 8 to 18 years of age). The form of contact chosen was by e-mail to the PE teachers at these schools, who were also asked to reply, by the same means, if they were willing to make an appointment for a researcher to come to the school to administer the questionnaire to those pupils who had the parents' informed consent. The email explained the objectives of the investigation, the informed consent of the parents and the model of the instrument used: ECIPQ. If the teachers agreed to collaborate, they had to reply to the email by making an appointment for a researcher to come to the school and, after collecting parental consent, apply the questionnaire on cyberbullying to the students. To start the questionnaire, the students were given a tablet on which they could access it through a Google form, and each question was explained to them one by one so that they would not have any doubts when answering. Once all questionnaires were recorded, the researchers performed data curation, processing, and

anonymization. Subsequent analyses were performed blindly by another researcher. In order to carry out this research, a protocol was adhered to following the considerations of the Declaration of Helsinki and this protocol was approved by the Biosafety and Bioethics Committee of the University of Extremadura in Spain (Registration Code 72/2022).

Statistical Analysis

The statistical program IBM SPSS for MAC, version 23 (Chicago, IL, USA) was used to process the data. The Kolmogorov-Smirnov test was used to first examine the assumption of normality in the distribution of the data of the continuous variables. The incorrectness of this assumption led to the adoption of nonparametric statistical tests. Sex and environment were examined using the Mann-Whitney U test, and age, educational level and BMI using the Kruskal-Wallis test. The same variables were then examined in addition to five nominal sociodemographic questions differentiated according to the two dimensions of the questionnaire. The correlation between the dimension scores and four continuous sociodemographic questions was then examined using Spearman's Rho test. The correlation values were interpreted using the Mondragon-Barrera norms of 0.00 (no correlation), 0.01-0.10 (low correlation), 0.11-0.50 (medium correlation), 0.51-0.75 (considerable correlation), 0.76-0.90 (very high correlation), and 0.91-1.00 (perfect correlation) (Barrera, 2014). Each instrument's dependability was evaluated using the Cronbach's alpha coefficient. Nunnally and Bernstein's (Nunnally & Bernstein, 1994) reference intervals of 0.70 (poor), 0.71-0.90 (good), and > 0.91 (excellent) were used to explain the reliability test findings.

Results

In this study, age was also analyzed, but given that significant differences were found in the same items as in educational level, it was decided to choose the educational stage since it is marked by the age ranges, the different maturity stages of the students and the social groups when carrying out activities. Table 2 displays the significant differences according to sex and educational level, also showing the descriptive values of the items as the value of the mean (M) and SD. Significant differences in sex can be found in items 2, 7, 15, 17, 18, 19 and 20 with a significance value of $p < 0.01$ and in items 4, 10 and 14, with a $p < 0.05$. With respect to educational level, differences are found in items 1, 2, 3, 12, 13, 14 with a significance value of $p < 0.01$ and in items 8 and 9 with a $p < 0.05$.

Table 2. Differences in questionnaire items according to sex and educational level

Items	Total	Variables						
		Sex		*p*	Educational level			*p*
		Male	Female		Primary Education	Secondary Education	Baccalaureate	
1	1.45 (0.86)	1.46 (0.96)	1.44 (0.75)	0.60	1.18 (0.56)	1.45 (0.90)	1.51 (0.77)	<0.01**
2	1.56 (0.80)	1.51 (0.80)	1.61 (0.81)	<0.01**	1.19 (0.54)	1.56 (0.81)	1.65 (0.84)	<0.01**
3	1.34 (0.72)	1.35 (0.72)	1.33 (0.72)	0.34	1.14 (0.48)	1.34 (0.74)	1.38 (0.72)	<0.01**
4	1.12 (0.47)	1.16 (0.54)	1.09 (0.40)	0.02*	1.10 (0.45)	1.13 (0.49)	1.11 (0.44)	0.70
5	1.13 (0.47)	1.15 (0.51)	1.12 (0.42)	0.79	1.13 (0.47)	1.14 (0.47)	1.11 (0.45)	0.41

Table 2. Differences in questionnaire items according to sex and educational level (cont.)

Items	Total	Variables						
		Sex		*p*	Educational level			*p*
		Male	Female		Primary Education	Secondary Education	Baccalaureate	
6	1.15 (0.49)	1.16 (0.49)	1.14 (0.49)	0.15	1.18 (0.58)	1.15 (0.50)	1.13 (0.45)	0.72
7	1.16 (0.50)	1.20 (0.56)	1.12 (0.43)	<0.01**	1.14 (0.58)	1.16 (0.48)	1.17 (0.53)	0.45
8	1.14 (0.48)	1.16 (0.51)	1.12 (0.45)	0.05	1.18 (0.60)	1.16 (0.51)	1.06 (0.33)	0.01*
9	1.16 (0.52)	1.18 (0.55)	1.14 (0.49)	0.08	1.17 (0.57)	1.18 (0.55)	1.09 (0.38)	0.03*
10	1.43 (0.78)	1.39 (0.81)	1.47 (0.76)	0.02*	1.44 (1.39)	1.43 (0.72)	1.42 (0.75)	0.25
11	1.27 (0.65)	1.25 (0.64)	1.29 (0.65)	0.11	1.14 (0.56)	1.28 (0.67)	1.27 (0.60)	0.06
12	1.37 (0.66)	1.41 (0.70)	1.34 (0.61)	0.22	1.26 (0.64)	1.35 (0.63)	1.47 (0.73)	<0.01**
13	1.38 (0.69)	1.37 (0.71)	1.39 (0.67)	0.18	1.18 (0.60)	1.35 (0.65)	1.52 (0.79)	<0.01**
14	1.15 (0.49)	1.18 (0.55)	1.11 (0.43)	0.01*	1.09 (0.44)	1.13 (0.46)	1.22 (0.57)	<0.01**
15	1.07 (0.39)	1.11 (0.49)	1.04 (0.27)	<0.01**	1.06 (0.41)	1.08 (0.40)	1.06 (0.36)	0.52
16	1.04 (0.28)	1.05 (0.32)	1.03 (0.23)	0.33	1.08 (0.42)	1.04 (0.26)	1.05 (0.29)	0.25
17	1.15 (0.49)	1.11 (0.43)	1.18 (0.54)	<0.01**	1.09 (0.44)	1.14 (0.47)	1.18 (0.56)	0.42
18	1.05 (0.29)	1.07 (0.36)	1.02 (0.21)	<0.01**	1.05 (0.36)	1.05 (0.29)	1.05 (0.28)	0.95
19	1.06 (0.34)	1.09 (0.42)	1.04 (0.25)	<0.01**	1.12 (0.49)	1.06 (0.33)	1.06 (0.33)	0.23
20	1.10 (0.41)	1.14 (0.48)	1.06 (0.31)	<0.01**	1.20 (0.63)	1.10 (0.39)	1.10 (0.39)	0.22
21	1.21 (0.54)	1.21 (0.56)	1.22 (0.52)	0.22	1.16 (0.54)	1.22 (0.54)	1.22 (0.53)	0.45
22	1.14 (0.46)	1.15 (0.51)	1.12 (0.41)	0.34	1.18 (0.62)	1.13 (0.46)	1.13 (0.43)	0.93

*Differences are significant at ** p < 0.01; * p < 0.05. Each score obtained in the dimensions is based on a Likert scale (0-4) where 0 is never and 4 is always.*

Table 3 presents the differences according to BMI and environment for each ECIPQ question based on the M and SD value. It is observed that there are significant differences according to BMI for items 2, 7, and 21 with a significance value of p < 0.05 and item 14 with a p < 0.01. In the environment the items that have a significant difference are item 4 with a p value <0.01 and in items 8, 11, and 22 with one of p < 0.05 respectively.

Table 3. Differences in questionnaire items according to BMI and environment

Items	Variables						
	BMI			*p*	Environment		*p*
	Underweight (<18.5)	Healthy weight (18.5 – 24.9)	Overweight (=>25)		Rural	Urban	
1	1.46 (0.93)	1.44 (0.83)	1.44 (0.83)	0.90	1.51 (1.04)	1.42 (0.77)	0.13
2	1.48 (0.77)	1.60 (0.81)	1.53 (0.83)	0.01*	1.55 (0.78)	1.56 (0.82)	0.76
3	1.32 (0.76)	1.33 (0.69)	1.40 (0.78)	0.27	1.30 (0.67)	1.35 (0.74)	0.45
4	1.12 (0.51)	1.12 (0.45)	1.13 (0.53)	0.64	1.08 (0.39)	1.14 (0.50)	<0.01**
5	1.16 (0.52)	1.11 (0.42)	1.22 (0.60)	0.06	1.11 (0.45)	1.15 (0.48)	0.05
6	1.15 (0.53)	1.14 (0.47)	1.19 (0.56)	0.60	1.13 (0.47)	1.15 (0.50)	0.52
7	1.15 (0.50)	1.14 (0.46)	1.29 (0.70)	0.02*	1.12 (0.44)	1.17 (0.53)	0.10
8	1.15 (0.52)	1.12 (0.44)	1.21 (0.60)	0.09	1.10 (0.40)	1.15 (0.51)	0.03*

Items	Variables						
	BMI			*p*	Environment		*p*
	Underweight (<18.5)	Healthy weight (18.5 – 24.9)	Overweight (=>25)		Rural	Urban	
9	1.20 (0.61)	1.12 (0.43)	1.24 (0.67)	0.25	1.16 (0.53)	1.16 (0.51)	0.85
10	1.46 (0.93)	1.42 (0.71)	1.38 (0.71)	0.79	1.42 (0.70)	1.43 (0.81)	0.77
11	1.26 (0.66)	1.27 (0.64)	1.28 (0.68)	0.70	1.21 (0.59)	1.29 (0.67)	0.03*
12	1.31 (0.60)	1.40 (0.67)	1.38 (0.71)	0.10	1.34 (0.60)	1.39 (0.68)	0.43
13	1.32 (0.65)	1.40 (0.69)	1.44 (0.76)	0.06	1.34 (0.63)	1.39 (0.71)	0.47
14	1.12 (0.46)	1.15 (0.50)	1.23 (0.55)	<0.01**	1.11 (0.44)	1.16 (0.51)	0.08
15	1.07 (0.41)	1.07 (0.38)	1.10 (0.44)	0.45	1.06 (0.35)	1.08 (0.41)	0.52
16	1.03 (0.24)	1.05 (0.29)	1.07 (0.34)	0.21	1.04 (0.28)	1.04 (0.28)	0.37
17	1.13 (0.44)	1.15 (0.50)	1.18 (0.58)	0.94	1.14 (0.47)	1.15 (0.50)	0.61
18	1.04 (0.26)	1.05 (0.30)	1.08 (0.35)	0.28	1.04 (0.27)	1.05 (0.30)	0.59
19	1.06 (0.36)	1.06 (0.33)	1.10 (0.40)	0.31	1.05 (0.31)	1.07 (0.36)	0.19
20	1.12 (0.43)	1.09 (0.39)	1.15 (0.44)	0.14	1.08 (0.37)	1.11 (0.42)	0.08
21	1.24 (0.59)	1.19 (0.49)	1.31 (0.62)	0.04*	1.19 (0.51)	1.23 (0.55)	0.11
22	1.14 (0.46)	1.12 (0.44)	1.24 (0.61)	0.05	1.10 (0.40)	1.15 (0.49)	0.03*

*Differences are significant at ** p < 0.01; * p < 0.05. Each score obtained in the dimensions is based on a Likert scale (0-4) where 0 is never and 4 is always.*

Table 4 analyzed the sociodemographic variables differentiating according to the two dimensions of the questionnaire. In both dimensions, the same significant differences were found with a p-value <0.01 in educational level, in the belief of cyberbullying in their school and in the question of whether they have suffered cyberbullying by a classmate. In addition, in dimension two a significant difference was also found in relation to the availability of a smartphone with a significance of p < 0.05.

Table 4. Differences in dimensions according to variables and sociodemographic questions

Variables		Dimensions			
		Dimension 1 (cybervictimization)		Dimension 2 (cyberaggression)	
		M (SD)	*p*	M (SD)	*p*
Sex	Male	13.96 (4.97)	0.15	12.91 (4.13)	0.56
	Female	13.84 (4.24)		12.56 (2.82)	
Educational level	Primary Education	13.01 (5.12)	<0.01**	12.47 (4.56)	<0.01**
	Secondary Education	13.97 (4.70)		12.65 (3.45)	
	Baccalaureate	13.91 (4.16)		13.05 (3.44)	
BMI	Underweight	13.92 (5.13)	0.23	12.57 (3.52)	0.25
	Healthy weight	13.82 (4.14)		12.72 (3.41)	
	Overweight	14.32 (5.73)		13.28 (4.21)	
Environment	Rural	13.71 (4.26)	0.88	12.49 (3.38)	0.19
	Urban	13.98 (4.75)		12.83 (3.59)	
Do you have a smartphone?	Yes	13.92 (4.62)	0.08	12.74 (3.49)	0.02*
	No	12.85 (3.54)		12.29 (4.75)	

Table 4. Differences in dimensions according to variables and sociodemographic questions (cont.)

Variables		Dimensions			
		Dimension 1 (cybervictimization)		Dimension 2 (cyberaggression)	
		M (SD)	*p*	M (SD)	*p*
Do you have a computer, tablet or other device with internet connection?	Yes	13.88 (4.62)	0.66	12.78 (3.61)	0.12
	No	14.53 (4.65)		11.58 (0.96)	
	Sometimes	14.06 (4.43)		12.29 (2.61)	
Do you think there is cyberbullying in your school?	Yes	16.04 (5.89)	<0.01**	13.72 (4.60)	<0.01**
	No	13.07 (4.88)		12.33 (3.47)	
	I don't know	13.42 (3.61)		12.51 (2.97)	
Have you ever suffered a situation of cyberbullying by a classmate?	Yes	19.41 (7.34)	<0.01**	14.40 (5.06)	<0.01**
	No	13.31 (3.77)		12.55 (3.27)	
Do you think that people who suffer cyberbullying have a negative influence on their academic performance?	Yes	13.84 (4.43)	0.73	12.63 (3.26)	0.21
	No	18.24 (11.40)		16.71 (10.30)	
	I don't know	13.75 (3.80)		13.00 (3.21)	

*Note: M = mean value; SD = standard deviation. Differences are significant at ** p < 0.01; * p < 0.05. Each score obtained in the dimensions is based on a Likert scale (0-4) where 0 is never and 4 is always.*

Table 5 provides the correlation between the total score of cybervictimization and cyberaggression and the total rating of the questionnaire with four sociodemographic variables. The results have shown a significance of p < 0.01 in the questionnaire overall with age and time spent by students in front of electronic devices. These values have a medium correlation except for age in dimension 1, which is low (Barrera, 2014).

Table 5. Scores' correlations with sociodemographic factors

Variables	ECIPQ		
	Σ ECIPQ	Σ Dimension 1 (cybervictimization) (*p*)	Σ Dimension 2 (cyberaggression) (*p*)
How many hours a day do you spend in front of the computer/tablet/mobile phone?	0.236 (<0.01)**	0.188 (<0.01)**	0.233 (<0.01)**
How many hours a day do you play sports?	-0.038 (0.22)	-0.37 (0.23)	-0.021 (0.50)
BMI	0.025 (0.37)	0.020 (0.49)	0.017 (0.56)
Age	0.128 (<0.01)**	0.092 (<0.01)**	0.144 (<0.01)**

*Note: Differences are significant at ** p < 0.01. Each score obtained in the dimensions is based on a Likert scale (0-4) where 0 is never and 4 is always.*

Cronbach's alpha was used to calculate the reliability scores of the ECIPQ items, and the result was values of 0.874 for dimension 1, 0.879 for dimension 2, and 0.920 for the questionnaire in general, which Nunnally and Berstein (Nunnally & Bernstein, 1994) consider as good for the dimensions and excellent for the questionnaire.

Discussion

The desire to understand the cyberbullying in PE experienced by or perpetrated by students in the Community of Extremadura between the ages of eight and eighteen gave rise to the necessity for this study. Nine sociodemographic questions that may have an impact as well as ECIPQ instrument questions were examined for this reason.

First, no significant differences were found in the sex analysis of the ECIP-Q, as shown in Table 4. However, other research found contrary results, where the female sex participated more in cyberbullying than in traditional bullying, probably because this sex participates more in indirect bullying (Whittaker & Kowalski, 2015). Additionally, other studies have found that women are more likely to become cybervictims, whereas men are more likely to perpetrate these behaviors (Cross *et al.*, 2016; Garaigordobil *et al.*, 2019; Lee & Shin, 2017; Palermiti *et al.*, 2017). Consequently, women experience more stress when they perceive a tendency to become targets of cyberbullying (Fenaughty & Harré, 2013; Redondo Pacheco, 2022). This may be due to sex roles and social beliefs. More recent studies dictate, after conducting their work, that it is not possible to determine the roles of aggressors or victims by sex (Tajahuerce Ángel *et al.*, 2018). One of the reasons why other studies establish this relationship of roles by sex is the traditional view of bullying, in which the most aggressive and disruptive direct behaviors are associated with the male sex, and those behaviors that are certainly indirect and relational (such as premeditated exclusion or social isolation) are associated with the female sex (Cross *et al.*, 2016; Navarro, 2016). However, Cortés Alfaro (2020) guarantees that cyberbullying can be carried out equally, with no obvious sex variations.

Second, significant differences were found according to the educational level of the students, with the highest scores among the high school students in both dimensions. Research on this variable has also shown differences. According to the results obtained in this study, some researchers find that the incidence of cyberbullying, including the two dimensions, is higher in secondary education and Baccalaureate (del Rey *et al.*, 2018; Ordóñez & Prado, 2019). In contrast, other research has found that the youngest secondary school students (11 to 14 years of age), coinciding with the change in school, are those who experience cyberbullying the most (Garaigordobil *et al.*, 2019; Herrera-López *et al.*, 2017), girls aged 13–15 being the most prone to this type of behavior (Yudes-Gómez *et al.*, 2018). The importance of these results, regardless of the age and cycle of the students, lies in the fact that one-third of the students experience this form of bullying (UNICEF, 2019), as it is a form of real violence with a terrible psychological impact, undermining their self-esteem and social interactions (Dennehy *et al.*, 2020; Morales Reynoso *et al.*, 2016), which worsened as a result of COVID-19, increasing its incidence to 98% of the total bullying produced by confinement, making a simple prank could end tragically (Chavez Chayña & Segura Mendez, 2021). The heterogeneity in the studies may be due to the multitude of sociocultural factors in each context in which the research was conducted.

Third, additional variables could have an impact on victimization rates. BMI did not differ significantly between the groups in our study. However, the findings show that obese youngsters are more likely than their classmates to be victim-aggressors rather than just aggressors or victims (Jansen *et al.*, 2014). When young people are overweight, there are inconsistencies because sometimes there are no differences in the likelihood of being bullied compared to their healthy weight peers (Jansen *et al.*, 2014), while in other cases, it appears to depend on sex, so that only

in males would be overweight be related to high rates of physical victimization, and in females, this would only occur if there is obesity (Wang *et al.*, 2010). Therefore, it is important to consider both being underweight and having a high BMI. Underweight girls experience more relational victimization and underweight guys experience more physical bullying than men of average weigh (Wang *et al.*, 2010).

Fourth, it has been projected that there are no significant differences with respect to the students' environment (rural or urban). According to certain studies (Bergmann & Baier, 2018), it is possible for victims to experience many types of bullying at once, which suggests that there is no difference in the overall prevalence of victimization, but there is when we examine the percentages separately. Yet, prior research (Leadbeater *et al.*, 2013; Smokowski *et al.*, 2013) shows that physical bullying as well as verbal bullying and exclusion are more common in rural schools. On the other hand, as research (Álvarez García *et al.*, 2011) has shown that the prevalence is higher in urban schools when the role of the aggressor is taken into account. In the rural setting, they tend to focus more on their classmates, while in the urban context, they tend to concentrate more on individuals outside the school (Álvarez García *et al.*, 2011). This might be because they use the network to conceal themselves while harassing people (Rodríguez Álvarez *et al.*, 2022). In this sense, when victims are unaware of the perpetrators in the online world, anonymity is one of the key characteristics that encourage people to engage in cyberbullying. According to other authors (Barlett, 2015), anonymity enhances cyberbullying behavior, which leads to an increase in cyberbullying offenses. Wolke and Samara (2004), social level, family structure, and cyberbullying all have a connection. Furthermore, in this regard, the reviewed research has shown that while family conflicts have a positive relationship with an individual's likelihood to engage in cyberbullying behaviors, family sponsorship, family closeness, parenting style, and family values have a negative relationship with individuals' cyberbullying behavior (Fang *et al.*, 2020; Kanwal & Jami, 2020; Martínez-Monteagudo *et al.*, 2020). In short, the scientific context thus exposes the multitude of factors involved in the development of this behavior, including social, personal and cultural factors, among others, that could cause it. In addition, demographic location could be said to condition the way cyberbullying is carried out, in accordance with Álvarez García *et al.*, 2011.

As for the continuous sociodemographic questions, although some of them did not show statistical differences, certain relevant aspects will be considered. To begin with, in the first two questions related to the availability of a smartphone and Internet connection in Table 4, the study by Álvarez-García *et al.* (Álvarez-García *et al.*, 2015) on risk factors associated with cybervictimization in adolescents adds that having one's own cell phone, playing online games and frequency of Internet use are factors of cybervictimization. In the same way, it has been noted that aspects of the technological surroundings, such as access to technology and self-efficacy, are predictors of cyberbullying behavior (Bashir Shaikh *et al.*, 2020). Interesting differences in student responses to the question "Do you think cyberbullying exists in your school?" were discovered. These differences in student responses may be attributable to a lack of knowledge about what constitutes cyberbullying or even the possibility that some students may mistake it for a "joke" or be unaware of what the rest of their classmates do (Zysman, 2017). However, three out of every four pupils have experienced peer bullying (Gaeta González *et al.*, 2020). Finally, no statistical differences were discovered in Table 4's final sociodemographic query. Bullying and cyberbullying in the educational process, however, have been one of the contributing factors to subpar academic achievement, and this should not be forgotten. Due to the challenges they offer during learning, this prevents students from achieving their potential in the classroom (Bastidas Velandia *et al.*, 2021).

Practical Implications

This study will provide data on the status of cyberbullying in educational institutions in order to prevent cyberbullying in schools, so it is essential to establish clear expectations and rules around technology use (Gunnlaugsson *et al.*, 2020). Moreover, physical activity acts as a protective agent in both dimensions and is the fundamental pillar of any cyberbullying prevention and awareness program in schools. This can include guidelines on the responsible use of fitness apps and social media platforms. The guidelines should outline appropriate behavior and highlight the consequences for not complying with the rules (Azeez *et al.*, 2021). In addition, it is important to create a safe and inclusive culture in the classroom where all students feel valued and respected (Machado *et al.*, 2022). This can be achieved by encouraging positive interactions among students and promoting understanding of the negative impact that cyberbullying can have on mental health and promoting physical activity both in and out of the PE classroom. It is important to highlight the prosocial value that physical activity fosters, making physical education classes a fundamental mean of preventing these negative practices. In addition, physical education is a subject in which it is easier for teachers to identify this type of behavior. The promotion of physical activity can regulate aggressors and be a fundamental factor in the prevention of cyberbullying (Rojo-Ramos *et al.*, 2024).

Limitations and future lines of research

As in other projects, this research also has a number of limitations or barriers. First, since only students from Extremadura were included in the sample, there are factors that could have influenced the results obtained, such as the sociodemographic questions. In addition, the participants were chosen by non-probabilistic convenience sampling, so caution should be exercised when presenting the results. Finally, it should be noted that despite the amount of information that is available about cyberbullying and other types of abuse, the number of students who are involved in this practice is increasing. Therefore, as possible future lines of research would be to expand the sample to a national level, to know the reasons that the aggressors have to commit abuse (family relationships or problems, self-esteem, lack of attention ...), as well as educate students from primary education to high school in relation to new technologies, the advantages and disadvantages they have, and, of course the influences that can be exerted on a person to receive abuse so that everyone is aware and internalize how harmful they can be, even for mental health. Consequently, it is essential to reach a consensus with other researchers from different communities to collect all the necessary data, in addition to the involvement of all educational agents to eradicate cyberbullying and other types of abuse.

Conclusions

This study has shown that there are several factors that influence cyberbullying such as educational level - age and the hours spent on social networks by the participants. There are other sociodemographic variables that have also influenced to a lesser extent, i.e., in some items, in addition to those mentioned such as sex, BMI and environment. It should be noted that there were sociodemographic questions that also reported surprising and relevant results such as the belief that cyberbullying does not negatively affect academic performance and that everyone to a

greater or lesser extent has suffered some type of bullying by classmates. With respect to this low knowledge about what cyberbullying can influence in their lives, it would be interesting if prevention and educacommunication programs with respect to new information technologies were approved in the administrations and school institutions, as well as detailing how harmful this type of abuse and others can be. Given that adolescence is when there is an upsurge of this practice, it is necessary to involve the entire educational community including family members, making them understand what are jokes and the importance of respect among peers and in society in general.

Supplementary Materials: Appendix A.

Author Contributions: All authors have read and agreed to the published version of the manuscript.

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Appendix A

Table A1. ECIPQ items in Spanish version.

Items	Scores				
	0	1	2	3	4
CybV1 Alguien me ha dicho palabras malsonantes o me ha insultado usando el email o SMS					
CybV2 Alguien ha dicho a otras personas palabras malsonantes sobre mí usando internet o SMS					
CybV3 Alguien me ha amenazado a través de mensajes en internet o SMS					
CybV4 Alguien ha pirateado mi cuenta de correo y ha sacado mi información personal					
CybV5 Alguien ha pirateado mi cuenta y se ha hecho pasar por mí					
CybV6 Alguien ha creado una cuenta falsa para hacerse pasar por mí					
CybV7 Alguien ha colgado información personal sobre mí en internet					
CybV8 Alguien ha colgado vídeos o fotos comprometidas mías en internet					
CybV9 Alguien ha retocado fotos mías que yo había colgado en internet					
CybV10 He sido excluido o ignorado de una red social o de chat					
CybV11 Alguien ha difundido rumores sobre mí por internet					
CybB1 He dicho palabras malsonantes a alguien o le he insultado usando SMS o mensajes en internet					
CybB2 He dicho palabras malsonantes sobre alguien a otras personas en mensajes por internet o por SMS					
CybB3 He amenazado a alguien a través de SMS o mensajes en internet					
CybB4 He pirateado la cuenta de correo de alguien y he robado su información personal					
CybB5 He pirateado la cuenta de alguien y me he hecho pasar por él/ella					
CybB6 He creado una cuenta falsa para hacerme pasar por otra persona					
CybB7 He colgado información personal de alguien en internet					
CybB8 He colgado vídeos o fotos comprometidas de alguien en internet					
CybB9 He retocado fotos o vídeos de alguien que estaban colgados en internet					
CybB10 He excluido o ignorado a alguien en una red social o chat					
CybB11He difundido rumores sobre alguien en internet					

Resumen

Ciberacoso en el entorno escolar: analizando factores sociodemográficos en estudiantes españoles en el contexto de la Educación Física

INTRODUCCIÓN. El ciberacoso es un problema creciente de gran preocupación social. Los estudiantes de hoy en día se enfrentan a una gran amenaza cibernética, a pesar de estar más conectados que nunca. Este peligroso comportamiento puede tener graves consecuencias para la salud mental y el rendimiento académico de los afectados. Sabiendo que la Educación Física tiene un impacto directo en estos comportamientos, el objetivo de este estudio es analizar el ciberacoso en el aula de Educación Física a partir de nueve variables sociodemográficas

y 22 preguntas del Cuestionario del Proyecto Europeo de Intervención en Ciberacoso en una muestra de 1232 estudiantes españoles (de 8 a 18 años). MÉTODO. Para determinar el tamaño de la muestra se utilizó un método no probabilístico basado en la conveniencia. Para validar el supuesto de normalidad en el análisis estadístico, se utilizó la prueba de Kolmogorov-Smirnov. Se utilizaron pruebas no paramétricas cuando no se cumplía este supuesto. Se examinaron las mismas variables que en las diferencias según los ítems del cuestionario, además de cinco preguntas sociodemográficas nominales diferenciadas según las dos dimensiones del cuestionario. Se observaron diferencias significativas entre los grupos. A continuación, se examinó la correlación entre las puntuaciones de las dimensiones y las cuatro preguntas demográficas continuas mediante la prueba rho de Spearman. Por último, se utilizó el alfa de Cronbach para evaluar la consistencia interna. RESULTADOS. Aunque existen variables determinantes del ciberacoso, el sexo no parece ser una de ellas, aunque otros estudios han mostrado una amplia gama de resultados, estableciendo que el contexto determina esta conducta. La edad y el ciclo escolar presentan evidencias más homogéneas en este aspecto, tanto en la victimización como en la parte agresora. El acceso a *smartphones* e Internet juega un papel determinante. CONCLUSIONES. En este estudio se ha comprobado que son varios los factores que influyen en el ciberacoso. Sería interesante que en las administraciones e instituciones escolares se aprobaran programas de prevención y comunicación educativa sobre las nuevas tecnologías de la información, además de detallar lo perjudicial que puede ser este tipo de abuso y otros.

Palabras clave: *Ciberacoso, Educación Física, Actividad física, Adolescentes, Niños, IMC.*

Résumé

Cyberintimidation en milieu scolaire : Analyse des facteurs sociodémographiques chez les élèves espagnols dans le contexte de l'Éducation Physique

CONTEXTE. La cyberintimidation est un problème croissant qui suscite de vives inquiétudes au sein de la société. Les élèves d'aujourd'hui sont confrontés à une énorme menace cybernétique, bien qu'ils soient plus connectés que jamais. Ce comportement dangereux peut avoir de graves conséquences sur la santé mentale et les résultats scolaires des personnes concernées. Sachant que l'éducation physique a un impact direct sur ces comportements, l'objectif de cette étude est d'analyser la cyberintimidation dans la classe d'éducation physique en se basant sur neuf variables sociodémographiques et 22 questions du questionnaire du projet européen d'intervention contre la cyberintimidation dans un échantillon de 1 232 élèves espagnols (âgés de 8 à 18 ans). MÉTHODOLOGIE. Une méthode non probabiliste basée sur la commodité a été utilisée pour déterminer la taille de l'échantillon. Le test de Kolmogorov-Smirnov a été utilisé pour valider l'hypothèse de normalité dans l'analyse statistique. Des tests non paramétriques ont été utilisés lorsque cette hypothèse n'était pas respectée. Les mêmes variables que pour les différences selon les items du questionnaire ont été examinées, plus cinq questions socio-démographiques nominales différenciées selon les deux dimensions du questionnaire. Des différences significatives ont été observées entre les groupes. La corrélation entre les scores des dimensions et les quatre questions démographiques continues a ensuite été examinée à l'aide du test rho de Spearman. Enfin, l'alpha de Cronbach a été utilisé pour évaluer la cohérence interne. RÉSULTATS. Bien qu'il existe des variables déterminantes de la cyberintimidation, le sexe ne semble pas être l'une d'entre elles, même si d'autres études ont

montré un large éventail de résultats, établissant que le contexte détermine ce comportement. L'âge et le cycle scolaire montrent des résultats plus homogènes à cet égard, tant en ce qui concerne les victimes que les agresseurs. L'accès aux smartphones et à l'internet joue un rôle déterminant. CONCLUSIONS. Cette étude a montré que plusieurs facteurs influencent la cyberintimidation. Il serait intéressant que les administrations et les institutions scolaires approuvent des programmes de prévention et de communication éducative sur les nouvelles technologies de l'information, ainsi que sur la nocivité de ce type d'abus et d'autres.

Mots-clés *: Cyberintimidation, Éducation physique, Activité physique, Adolescents, Enfants, IMC.*

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