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Compliance with COVID-19 measures in adolescents and related sociodemographic and educational variables

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Keywords

Pandemic
Rules
School
Related factors
Minorities

Abstract

Increasing rule compliance in adolescents is one of the greatest challenges during the pandemic. Understanding how different variables are related to compliance with COVID-19 regulations in adolescents is needed to improve policy and practice against it. This study aims to analyze how sociodemographic and educational variables such as sex, age, socioeconomic status, being in a minority group, academic performance and failure, and problem behavior at school are related to the compliance with some COVID-19 regulations in a representative sample of 1,498 students (aged between 11 and 17 years M = 13.58, SD = 1.32) of compulsory secondary education in Andalusia (Spain). Results showed that almost one out of three participants never kept the recommended social distancing. In contrast, nearly 85% of the participants wore a mask every day when they spent time with their peers. A higher number of failed subjects and school suspensions were related to less compliance, younger adolescents complied more with the COVID-19 measures and ethnic minorities were less compliant than the majorities. Regression analysis showed that the higher school performance, male sex, young age, being part of a sexual minority and feeling bad about the pandemic were uniquely related to more compliance with preventive measures. Programs to promote equalitarian education and programs to promote school success could be useful to increase the compliance in adolescents.

Cumplimiento de medidas COVID-19 en adolescentes y variables sociodemográficas y educativas relacionadas

Palabras clave

Pandemia
Normas
Escuela
Factores relacionados
Minorías

Resumen

Incrementar el cumplimiento de las normas en los adolescentes es uno de los mayores desafíos durante la pandemia. La comprensión de cómo las diferentes variables se relacionan con el cumplimiento de las normas de COVID-19 en los adolescentes es necesaria para mejorar las políticas y prácticas. Este estudio tiene como objetivo analizar cómo variables sociodemográficas y educativas como el sexo, la edad, el nivel socioeconómico, el pertenecer a un grupo minoritario, el rendimiento y fracaso académico y los problemas de conducta en la escuela se relacionan con el cumplimiento de algunas normas COVID-19 en una muestra representativa de 1,498 alumnos (edad entre 11 y 17 años M = 13.58, DT = 1.32) de Educación Secundaria Obligatoria en Andalucía (España). Los resultados mostraron que casi uno de cada tres participantes nunca mantuvo la distancia social recomendada. Por el contrario, casi el 85% de los participantes usaban una mascarilla todos los días cuando pasaban tiempo con sus compañeros. Un mayor número de materias suspendidas y expulsiones escolares se relacionaron con un menor cumplimiento, los adolescentes más jóvenes cumplieron más con las medidas COVID-19 y las minorías étnicas cumplieron menos que las mayorías. El análisis de regresión mostró que el mayor rendimiento escolar, el sexo masculino, la edad joven, ser parte de una minoría sexual y sentirse mal por la pandemia se relacionaron con un mayor cumplimiento de las medidas preventivas. Los programas para promover la educación igualitaria y para promover el éxito escolar podrían ser útiles para aumentar el cumplimiento en los adolescentes.

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Since spring of 2020, the world has been submerged in a pandemic that has changed people's lives. COVID-19 has drastically reduced the relational routines that people used to have (Gössling et al., 2020). Governments around the world have implemented different measures to slow down the spread of coronavirus and promote health. Among them, wearing a mask and maintaining social distance are two of the best known COVID-19 regulations and the effectiveness of these measures has been proven (Eikenberry et al, 2020). However, some people are not compliant with these recommendations, even though the pandemic could have several consequences for them and their families. Compliance with COVID-19 behavioral recommendations is a fundamental task nowadays, because it helps prevent the spread of COVID-19, increasing social wellbeing and reducing deaths (Oksanen et al., 2020).

Adolescents and young people have been identified as the least compliant age-group, perhaps because they have some characteristics that increase the risk of non-compliance such as a more active social lifestyle than other age groups (Nivette et al., 2021). At the same time, children and adolescents need social interaction for their adequate psychological and educational development, and COVID-19 regulations could have several consequences for young people such as psychological distress (Saurabh & Ranjan, 2020), or engaging in addictive behaviors (Savolainen et al., 2020).

It is possible that adolescents are more prone to be non-compliant and suffer, at the same time, some severe consequences of the pandemic. In a systematic review, Loades et al. (2020) argued that children and adolescents are at risk of depression and anxiety disorders during and after the pandemic. Girls, compared to boys, were found to be more likely to develop symptoms of depression and anxiety attributed to COVID-19 (Solomou & Constantinidou, 2020). Lieberoth et al. (2021) studied the relation between being concerned about the pandemic, the perceived stress, and the compliance in a sample of 48 countries, and they found that being concerned about the pandemic was related to more compliance but, at the same time, being concerned was related with more stress, which was related to less compliance. In contrast, Van Rooij et al. (2020) found that negative emotions in adults were predictors of compliance. However, little is known about the compliance with COVID-19 regulations among adolescents and variables related to low or high compliance with these regulations. This information is crucial for the promotion of health and control of the pandemic.

Regarding sex, in a large multicultural study focused on COVID-19, women were found to be more compliant than men with governmental pandemic regulations (Clark et al., 2020). Similarly, a study with young people from Switzerland showed that men were less compliant with COVID-19 regulations than women, and it was suggested that it could be related to a higher antisocial potential in men compared to women (Nivette et al., 2021). Nevertheless, sex differences regarding COVID-19 regulations compliance in adolescents still need to be discovered.

According to a report by the Public Health England, minorities are more affected by COVID-19 (Iacobucci, 2020). It is possible that the worse living conditions of minority communities predispose them to worse health conditions (Tai et al., 2020). In contrast, a study by Nivette et al. (2021) found that participants with non-migrant backgrounds were less compliant than migrants in COVID-19 hygiene measures, but no differences were found in social measures. Thus, ethnic-cultural minorities seem to be more vulnerable to COVID-19, even though some studies suggest that they may be more compliant with COVID-19 regulations.

Referred to sexual minorities, they have been facing social disadvantages prior to coronavirus disease, and with the pandemic, these differences are increasing, making them more vulnerable during the COVID-19 health crisis (Gibb et al, 2020). Research showed that sexual minority groups reported more psychological distress related to COVID-19 in comparison to their heterosexual peers (Peterson et al., 2020) Even though there is some evidence of an increased vulnerability of sexual minorities during the COVID-19 pandemic, it is still necessary to discover if there are differences between minority and majority groups in compliance with the COVID-19 regulations.

Low socio-economic status (SES) can also be related to a higher vulnerability to COVID-19. In the US, residents in socioeconomically disadvantaged areas were less compliant with lockdown measures compared to those living in more advantaged areas (Wright et al., 2020). This difference remained significant after controlling for some covariates such as population density, exposure to disputes or unemployment. Therefore, it is not clear how the SES could be related to an increased risk of COVID-19 and more studies are needed to describe the compliance with COVID-19 regulations concerning SES.

Compliance with COVID-19 regulations in adolescents could be related to their school performance. On the one hand, compliance with school rules has been related to their academic performance (Vecchione & Schwartz, 2022) and low academic performance was found to be related to high antisocial behavior (Farrington, 2005). On the other hand, teachers can influence student compliance and academic behaviors (Matheson & Shriver, 2005) and, at the same time, teacher-student relationships are a protective factor against antisocial behaviors (Obsuth et al., 2021). Changes in teaching and learning strategies during the pandemic were related to decreased school performance (Oyinloye, 2020). It is possible that students with low school performance and problem behavior at school complied less with COVID-19 regulations. It is also possible that adolescents with higher school performance and better behavior at school are more influenced by their teachers who taught them about the importance of COVID-19 regulations. However, it is still necessary to discover if school performance, failure, and problem behavior are related to compliance with COVID-19 regulations.

The current study

COVID-19 is a public health emergency around the world. Although the vaccine is now broadly available (Weintraub et al., 2021), compliance with COVID-19 measures is still the most important tool that exists against the pandemic. Adolescents are

the group that has been identified as the least compliant with the COVID-19 regulations (Nivette et al., 2021). However, it is not clear how sociodemographic and educational variables such as sex, age, socioeconomic status, being in a minority group, academic performance and failure, and problem behavior at school are related to the compliance with COVID-19 regulations. This study aims to analyze these relations in a representative sample of Andalusian (Spain) adolescents together with the level of compliance with different COVID-19 regulations. Understanding how these variables relate to compliance with COVID-19 regulations in adolescents will help better understand the situation and will bring new insights on adolescent health during the pandemic, and ways to improve policy and practice against COVID-19.

At the same time, this study would contribute to the knowledge of how socioeconomic and educational factors influence compliance with governmental measures in the society. In this way, it aimed at identifying factors that could influence compliance in other contexts in adolescents, such as family or school. According to scientific literature, it is expected to find sociodemographic and educational variables related to less compliance with the governmental recommendations, such as having a lower socioeconomic status, male sex, or poor academic performance. In contrast, it is hypothesized that minorities could be more compliant than the majority group, and older adolescents more compliant than pre-adolescents.

Method

Participants

The sample was composed of 1,498 students. Among them, 51.4% were girls and 48.6% were boys, aged between 11 and 17 years (M = 13.58, SD = 1.32). Regarding nationality, 94.4% were Spanish and 5.6% had other nationalities. Ethnically, 89.4% of the sample were from the Spanish majority group, 2.5% were Roma, 0.3% Sub-Saharan, 4.3% Latin-American, 1.9% Maghrebis, and 1.6% others. Regarding sexual orientation, 86.8% of the sample was heterosexual, 1.2% was homosexual, 6.3% bisexual, 5.2% were doubting, and 0.6% reported other sexual orientations. The perceived family socioeconomic status of the participants was 0.1% very poor, 2% poor, 93.4% neither rich nor poor, 4.1% rich and 0.3% very rich. The perceived socioeconomic status of the living area was 0.7% very poor, 6.9% poor, 84.7% neither rich nor poor, 7.2% rich and 0.5% very rich.

Instruments

The sociodemographic information about the participants was collected through a questionnaire. Sex was measured by choosing between male and female. Responding to an open question, the participants indicated their age, nationality, and number of failed subjects. By checking a box, participants informed about their socioeconomic status, ethnic background, immigrant status (first generation immigrants) and sexual orientation. They were asked to indicate if they ever repeated the year (*yes* / *no*), and about their average mark. Problem behavior at school was measured by asking if they have ever been suspended (*yes* / *no*).

Compliance with the COVID-19 regulations was measured with three items. These items were: Since the pandemic began, 1) *how often do you hug and/or kiss your friends?*; 2) *how often do you wear a mask when you spend time with your friends?*; and 3) *how often do you maintain social distancing when spending time with your friends?* This questionnaire was created ad hoc taking into account the objectives of the current study. These items were answered on a five-point Likert scale ranging from 0 (*never*) to 4 (*all the time*). This questionnaire showed a polychoric reliability $\alpha = .66$ and $\Omega = .67$

Feeling bad about COVID-19 pandemic was measured ad hoc with one item *How often do you feel bad in relation to COVID-19 pandemic*. This item was answered on a five-point Likert scale ranging from 0 (*never*) to 4 (*all the time*).

Design and procedure

The sample was randomly selected from the population of 399,553 compulsory secondary education students (2019/2020) in Andalusia, Spain. Multi-stage stratified random sampling was used considering the proportion of students in each province. Schools were considered clusters and it was estimated that selecting one line from each grade (1-4) in each school would give at least 80 students in each school (20 per classroom). With all these considerations, twenty-one schools were randomly selected to be included in this study. The total number of students was 1,498, being representative of the population of compulsory secondary education with 95% of reliability and a sampling error of 2.5%. The participants were equally distributed by grades 1 (27.6%), 2 (23.2%), 3 (25.7%), and 4 (23.5%).

Schools were randomly selected from all eight provinces of Andalusia (Spain). Headteachers of each school were contacted at the beginning of the 2020 / 2021 school year and the objectives of the study were explained. After the school boards approved participation, parental consent for each participant were obtained. Participants were informed that the study was anonymous and confidential, and that the participation was voluntary.

Almost all the questionnaires (92.2%) were administered as a paper-and-pencil survey in a quiet environment during regular classroom hours for around 45 minutes. Students were supervised by the researchers who collected the questionnaires without any intervention from the teacher to ensure that the conditions were the same in every school and to protect the privacy of the students. The teachers did not have access to the individual questionnaires or data of the students.

There were two schools (7.1%) that decided to participate but were only able to do this online. In these two schools, the questionnaire was filled in online under the supervision of a teacher from the school. Guidelines were provided to ensure the homogeneity of the data collection. The study was approved by the Ethics Committee of the Universidad de Córdoba and followed all the national and international ethical stan-

Table 1

Percentages of compliance of different COVID-1- prevention measures

Since the beginning of the pandemic:	Never	Sometimes in a month	Sometimes in a week	Every day	All the time
How often do you kiss or hug your friends?	28.2%	25.6%	29.9%	12.1%	4.1%
How often do you wear a mask when you spend time with your friends?	3.7%	4.5%	6.9%	28.8%	56.1%
How often do you keep social distancing with your friends?	31%	15.4%	23.2%	20.9%	9.4%
How often do you feel bad regarding the COVID-19 pandemic?	25.1%	21.8%	24%	14%	15.3%

Table 2

Predictors of COVID-19 regulations compliance

	B	SE	*p*
Feeling bad about pandemic	.08	.02	.01
Sex (male)	.09	.05	.01
Age	-.15	.02	.00
Ethnic Minority	-.07	.09	.05
Sexual Minority	.08	.07	.01
Immigrants	.07	.1	.03
Family SES	-.05	.1	.12
Neighborhood SES	-.02	.06	.44
Number of failed subjects	-.1	.02	.01
Number of suspensions	-.03	.03	.29
Year repeater	.12	.09	.01
Average mark	.14	.04	.00

dards, including Helsinki Declaration and personal data protection laws. The data was collected in all the schools between the end of October and the beginning of December of 2020.

Data analysis

Data analyses were carried out using the PASW IBM 24 software. Descriptive analyses were conducted to describe the level of compliance with the COVID-19 measures and the presence of negative feelings related to the pandemic. Pearson and Spearman's correlations were performed to explore relations between COVID-19 compliance and sociodemographic factors. Student's *t*-test was performed to analyze the relationship between compliance with prevention measures and dichotomous variables and Cohen's *d* was calculated. To create the minority and majority groups including ethnic-cultural diversity, sexual orientation, and nationality, variables were dichotomized. Ethnic-cultural group was dichotomized as 0 = *Spanish majority* and 1 = *minority including Roma, Sub-Saharan, Latin-American, Maghrebi and others*. Sexual orientation was dichotomized as 0 = *heterosexual* and 1 = *homosexual, bisexual, doubting and other*. Nationality was dichotomized as 0 = *Spanish*, and 1 = *Other*.

Results

Table 1 shows the frequency of compliance with COVID-19 regulations including kissing or hugging, wearing a mask and keeping social distancing with peers.

Spearman correlation analyses showed that a higher number of school suspensions was related to less compliance (r = -.11; p < .001), no evidence of a relation with *feeling bad about the pandemic* (r = .04; p = .09) *family socioeconomic status* (r = -.03; p = .26) and *socioeconomic status of the living area* (r = .01; p = .93) was found. Pearson correlation analyses showed that younger participants complied more with the COVID-19 measures (r = - .12; p < .001) and there was a relation between compliance with the *average mark* (r = .16; p = .00). Similarly, participants with a higher *number of failed subjects* were less compliant (r = -.13; p < .001). No evidence of a relation between *compliance with COVID-19 regulations* with *being a year repeater* (r = -.02; p = .37) was found.

The relation of dichotomous variables and the compliance with prevention measures was explored through Student's t-test. The relations between compliance and *sex* differences (males M = 3.55, SD = 0.91 versus females M = 3.47 SD = 0.86; t = 1.76; p = .08; Cohen's d = .09; 95% CI = -0.01, 0.19), *national minority* (M = 3.48, SD = 0.91) versus *national majority* (M = 3.51 , SD = 0.88; t = .41; p = .68, Cohen's d = -0.03; 95% CI = -0.2, 0.14) were nonsignificant. *Sexual minorities* (M = 3.63, SD = 0.81) were found to be more compliant than the *sexual majorities* (M = 3.49, SD = 0.89; t = -2.18; p = .02 Cohen's d = .1;6 95% CI = 0.02, 0.3). *Ethnic minorities* were found to be less compliant (M = 3.38, SD = 0.93) than the *ethnic majorities* (M = 3.53, SD = 0.87; t = -2.4; p = .02; Cohen's d = -.17; 95% CI = -0.31, 0.03).

Table 2 shows the results of a linear regression including feeling bad about the pandemic, sex, age, ethnic, national and sexual minorities, SES, and school performance and suspension as predictors of COVID-19 regulations compliance (F(12) = 7.20; p < .01; R^2 = .08).

Discussion

Increasing compliance to contain COVID-19 during the pandemic has been a priority of different governments around the world. This research study aimed to investigate how different sociodemographic and educational factors were linked to the compliance with COVID -19 measures, which is crucial to develop better prevention programs for the youth. Also, the relation between feeling bad about the pandemic and compliance with preventive measures among adolescents was explored.

The results showed that approximately one out of four adolescents never felt bad about the pandemic. Previous research indicated that loneliness was related to mental health issues in children and adolescents (Loades et al., 2020). It is possible that, since data from this research project have been collected in a relative normality for the students —COVID-19 prevention measures were relatively flexible and students were attending the school in person—, only some of them were affected by the pandemic. This research finds that negative feelings associated with the pandemic are a predictor of more compliance with keeping social distance, wearing a mask and not kissing or hugging friends. In this sense, Miguel et al. (2021) found that lower levels of empathy were related to lower compliance and Harper et al. (2020) found that fear of the virus was a strong predictor of compliance. Although having negative feelings is a predictor of compliance, it has risks for adolescents, such as psychological distress (Saurabh & Ranjan, 2020). Therefore, programs to increase empathy but controlling for psychological distress could be helpful to improve the compliance in adolescents.

Almost one out of three participants never kept the recommended social distancing in the present study. Previous studies found that culture could influence the level of compliance with social distancing during the pandemic (Huynh, 2020). In contrast, compliance with wearing a mask was high, with nearly 85% of the participants who wore a mask every day when they spent time with their peers. The differences in compliance rates among these two preventive measures could be related to the developmental period and sociocultural factors. First, the use of face masks in the general population is new in most countries and it is considered a signal of health (Martinelli et al., 2020). Social distancing could be against some cultural values, where physical contact is important for some cultures such as the Spanish and consequently, people may be less compliant with this measure (Huynh, 2020). Previous studies with Spanish participants reported multiple connections between infections and social behavior (Gualda et al., 2021). Furthermore, adolescence is a period where social contact is fundamental for the adequate development (Orben et al., 2020) and it could be expected that adolescents look for it. Therefore, it may be easier for the society to perceive and reject people who avoid using face masks than keeping the social distancing. Nevertheless, more research is needed to clarify the reasons for the difference in compliance among those protective measures in adolescents.

The predictive model showed that girls were less compliant than boys. This result is contrary to the study by Clark et al. (2020) which found that women tend to be more compliant than men in preventive measures against COVID-19. The disparities within that study could be related to the major tendency of girls to support social touching (Suvilehto et al., 2015), especially in Spain, which may result in an increased score for girls in the item that asked for the frequency of kissing and hugging peers. Also, girls tend to have an earlier pubertal maturation than boys. Puberty is related to more externalizing behaviors (Ullsperger & Nikolas, 2017) and, probably, the higher maturation is related to less compliance, as previous studies about age suggest. Nevertheless, more studies are needed to clarify to what extent sex is related to compliance and to better understand if other variables, such as age or maturational factors, mediate the relation among sex and compliance.

Being younger was related to more compliance with the COVID-19 measures. It is a normative fact that children tend to comply more with the rules than adolescents (Darling et al., 2008). The promotion of civic actions could be achieved by educating children about social responsibility values, which may increase prosocial behaviors (Wray-Lake & Syvertsen, 2011). In that sense, education is essential at school and homes to prevent uncivil behaviors (Espejo-Siles et al., 2020). Therefore, promoting social responsibility at school may be worthwhile to engage adolescents in compliant behaviors.

In this study, low school performance and school suspension predicted lower compliance with COVID-19 regulations. Previously, a study found that changes in the process of teaching and learning during the pandemic were related to a decreased school performance (Oyinloye, 2020), and low school performance was found to be related to more antisocial behaviors (Farrington, 2005). Academic performance in students is affected by inequalities in educational requirements (Ogbu & Simons, 1998), and online education during the pandemic could increase this gap (Engzell et al., 2021). A worldwide study of the effectiveness of governments' interventions revealed that school closures had several consequences on children, and governments should weigh the benefits and consequences of this measure (Haug et al., 2020). The results of this study highlight the importance of education for compliance.

This study found that immigrant teenagers were more compliant than native teenagers, but adolescents from ethnic minority groups were found to be less compliant. Socioeconomic and cultural disparities may influence this finding, e.g., living in multi-generational and crowded houses makes it difficult to comply with social distancing (Greenaway et al., 2020). Furthermore, ethnic minorities tend to have a poorer school performance due to several reasons (Kurtz-Costeset et al., 2014) and poor school performance was related uniquely to less compliance in this study. Regarding immigrants, it is possible that some of the students could come from countries where physical contact is not as frequent as in Spain, and this may be reflected in a greater compliance. Nevertheless, more research is needed to determine to what extent ethnic minorities are less compliant and national minorities are more compliant for other mediational reasons, such as culture, socioeconomic status, or school performance.

Differences in SES were not significant for the level of compliance. In contrast, previous research has found that people living in socioeconomically less advantaged environments tend to be less compliant with social distancing (Jay et al., 2020). Age and occupational differences may influence these results. However, the number of participants with low and high SES was low in our study, and the relation between SES and compliance should be studied in more diverse samples.

Being a part of a sexual minority was a predictor of more compliance. Peterson et al. (2020) found that sexual minority groups had more psychological distress related to COVID-19 than heterosexuals. Furthermore, a research found that homosexual males have more empathy than heterosexual males (Sergeant et al., 2006). In this study, the concerns about the pandemic were related uniquely to more compliance. Therefore, the higher compliance found in sexual minorities could be influenced by their concerns about the pandemic. More research is needed to clarify whether other variables, such as empathy, mediate the relation between the sexual orientation and the concern about the pandemic with the compliance in adolescents.

This study has some limitations. Self-reports could include biases even though the study was anonymous, and questionnaires were filled in in a quiet environment. This is a cross-sectional study, and no longitudinal predictors were studied. Although some questions were answered, more research is needed to better understand the factors related to a greater compliance in adolescents to promote social well-being. For example, compliance could be related to online interpersonal interactions, and problem behaviors such as cyberbullying and cybergossip (Bravo et al., 2022) should be explored in relation to COVID-19.

Despite its limitations, this study has several strengths. Data were collected as paper-and-pencil survey in most of the cases, guaranteeing high quality of the responses in the participants, together with anonymity and homogeneity that were promoted in every data collection. The target population consisted of adolescents aged between 11 and 17 years old and data were collected with a representative sample, therefore, results of this study can be broadly generalized. To our knowledge, there are no studies focused on behaviors related to COVID-19 with these characteristics including this population. The current study is particularly interesting because children and adolescents are considered the least compliant age group and results of this study could be helpful for future similar situations.

This study has important implications for policy and practice. Around one in three teenagers never keep social distancing with friends, in contrast, nearly 85% of participants wore a face mask when spending time with friends. The low compliance regarding social distancing in adolescents, compared to wearing a mask, may be influenced by evolutive and sociocultural factors. Therefore, cultural factors may influence the extent of rule compliance in a society, and this should be considered in future situations where following government measures is needed for the improvement of the society. The negative feelings associated with the pandemic were a predictor of greater compliance in adolescents. Therefore, the promotion of empathy among youngers could increase a positive concern about the pandemic, and consequently, their compliance. In addition, programs to promote social and emotional competencies could be helpful for improving empathy.

The number of failed subjects and being a course repeater were predictors of non-compliance, while the higher average mark was a predictor of greater compliance with the local preventive measures. Rule breaking behaviors are frequent in adolescence. Therefore, the information on which socioeconomic and educational factors are related to greater compliance during the pandemic may help to understand which factors could be related to a greater compliance in other contexts, such as family and school in the promotion of equalitarian and inclusive education could be essential for COVID-19 prevention, or similar problems, and for the engagement in adequate social behaviors.

Conflict of interest

The authors have no conflicts of interest to declare.

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