Prevalence of parents' non-intention to vaccinate their children and adolescents against COVID-19: a comparative analysis in Colombia and Peru

Vicente A. Benites-Zapata, Percy Herrera-Añazco, Jerry K. Benites-Meza, Karen Bonilla-Aguilar, Diego Urrunaga-Pastor, Guido Bendezu-Quispe, Angela Uyen-Cateriano, Alfonso J. Rodriguez-Morales, Adrian V. Hernández

1 **Prevalence of parents' non-intention to vaccinate their children and**

2 **adolescents against COVID-19: a comparative analysis in Colombia and**

3 **Peru**

4 Vicente A. Benites-Zapata,[1,2,*] Percy Herrera-Añazco,[2,3,4] Jerry K. Benites-

5 Meza,[5,6] Karen Bonilla-Aguilar,[2] Diego Urrunaga-Pastor,[2,7] Guido Bendezu-

6 Quispe,[3,8] Angela Uyen-Cateriano,[9] Alfonso J. Rodriguez-Morales,[10,11] Adrian V.

7 Hernandez,[12,13]

8 **Affiliations**

9 [1]Unidad de Investigación para la Generación y Síntesis de Evidencias en Salud,

10 Universidad San Ignacio de Loyola, Lima, Peru.

11 [2]Instituto de Evaluación de Tecnologías Sanitarias en Salud e Investigación –

12 IETSI, EsSalud, Lima, Peru.

13 [3]Red Internacional en Salud Colectiva y Salud Intercultural, Mexico, Mexico.

14 [4]Universidad Privada San Juan Bautista, Lima, Peru.

15 [5]Sociedad Científica de Estudiantes de Medicina de la Universidad Nacional de

16 Trujillo, Trujillo, Peru.

17 [6]Grupo Peruano de Investigación Epidemiológica, Unidad de Investigación para

18 la Generación y Síntesis de Evidencias en Salud, Universidad San Ignacio de

19 Loyola, Lima, Peru

20 [7]Universidad Científica del Sur, Lima, Peru

21 [8]Universidad Privada Norbert Wiener, Centro de Investigación Epidemiológica en

22 Salud Global, Lima, Peru.

9 Medecins Sans Frontieres, Health Politics Teams, Brussels, Belgium.

10 Latin American Network of COVID-19 Research (LANCOVID), Pereira, Risaralda, Colombia.

11 Grupo de Investigación Biomedicina, Faculty of Medicine, Fundación Universitaria Autónoma de las Americas, Pereira, Risaralda, Colombia.

12 Health Outcomes, Policy, and Evidence Synthesis (HOPES) Group, University of Connecticut School of Pharmacy, Storrs, CT 06269, USA.

13 Unidad de Revisiones Sistemáticas y Metaanálisis, Guías de Práctica Clínica y Evaluaciones Tecnológicas Sanitarias, Universidad San Ignacio de Loyola (USIL), Lima, Peru.

Corresponding Authors:

vbenites@usil.edu.pe

ORCID of the authors:

Vicente A. Benites-Zapata   https://orcid.org/0000-0002-9158-1108

Percy Herrera-Añazco   https://orcid.org/0000-0003-0282-6634

46   Jerry K. Benites-Meza   https://orcid.org/0000-0002-6085-7431

47   Karen Bonilla-Aguilar   https://orcid.org/0000-0002-4166-9654

48   Diego Urrunaga-Pastor   https://orcid.org/0000-0002-8339-162X

49   Guido Bendezu-Quispe   https://orcid.org/0000-0002-5140-0843

50   Angela Uyen-Cateriano   https://orcid.org/0000-0003-3583-6513

51   Alfonso J. Rodriguez-Morales   https://orcid.org/0000-0001-9773-2192

52   Adrian V. Hernandez   https://orcid.org/0000-0002-9999-4003

53 **ABSTRACT**

54 We aimed to estimate the prevalence and factors associated with parents' non-

55 intention to vaccinate their children and adolescents against COVID-19 in

56 Colombia and Peru. We performed a secondary analysis using a database

57 generated by the University of Maryland and Facebook (Facebook, Inc). We

58 included adult (18 and over) Facebook users residing in LAC who responded to

59 the survey between May 20, and November 5, 2021. We included

60 sociodemographic characteristics, comorbidities, mental health, economic and

61 food insecurity, compliance with mitigation strategies against COVID-19, and

62 practices related to vaccination against this disease. We estimated crude (cPR)

63 and adjusted (aPR) prevalence ratios with their respective 95%CI. We analyzed

64 a sample of 44,678 adults from Colombia and 24,302 from Peru. The prevalence

65 of parents' non-intention to vaccinate their children and adolescents against

66 COVID-19 was 7.41% (n=3,274) for Colombia and 6.64% (n=1,464) for Peru. In

67 Colombia, age above 35 years old, compliance with physical distancing, use of

68 masks, having economic insecurity, anxiety symptoms, having a chronic

69 condition or more comorbidities, and being vaccinated were associated with a

70 lower prevalence of non-intention to vaccinate children and adolescents against

71 COVID-19. In Peru, gender, compliance with physical distancing, use of masks,

72 having economic insecurity, anxiety symptoms, having a chronic condition or

73 more comorbidities, having had COVID-19, and being vaccinated were

74 associated with a higher probability of vaccinating children against COVID-19.

75 Living in a town, a village, or a rural area was associated with a higher prevalence

76 of non-intention to vaccinate children and adolescents against COVID-19. About

77 9 out of 10 parents in Colombia and Peru intend to vaccinate their children and

78   adolescents against COVID-19. This intention is associated with some factors

79   which are similar between the two countries, as well as other factors and

80   variations among the different regions of each country.

81   **Keywords:** COVID-19; SARS-CoV-2; COVID-19 Vaccines; Vaccination Refusal;

82   Vaccination; Child; Adolescent; Parents; Colombia; Peru.

83

84 **Highlights**

85 • About 9 out of 10 parents in Colombia and Peru intend to vaccinate their
86 children and adolescents against COVID-19.

87 • In Colombia, being between 35 and 54 years old, adherent to maintaining
88 physical distance, using masks, having economic insecurity, having
89 symptoms of anxiety and comorbidities, and being vaccinated were
90 associated with a higher probability of vaccinating children against COVID-
91 19.

92 • In Peru, being female, an adherent to maintaining social distancing, using a
93 mask, having economic and food insecurity, having comorbidities, having
94 been vaccinated, and having had COVID-19 was associated with a lower
95 probability of not having the intention to vaccinate children. On the contrary,
96 living in a town or rural area was associated with a greater intention not to
97 vaccinate.

98 • Despite good general acceptance of vaccination against COVID-19, the
99 health authorities of each country must propose individualized strategies
100 depending on the context if the vaccination campaigns in this population group
101 are to achieve their objectives.

102

103 **INTRODUCTION**

104 The most cost-effective strategy for controlling the COVID-19 pandemic is to

105 achieve global vaccination coverage of at least 70 to 90% [1]. Vaccines against

106 COVID-19 are not only safe but have also been shown to reduce hospitalizations,

107 the use of ventilation, health care costs, mortality, as well as viral transmission [2–

108 5]. Although initially there was controversy about vaccination in the child

109 population due to the relatively low incidence, severity, and limited spread of the

110 disease in this age group, it is currently considered essential to achieve herd

111 immunity [6]. Similarly, it is necessary to ensure the return to regular school

112 learning and prevention against severe cases in children, as well as long-term

113 consequences such as post-COVID-19 syndrome [7].

114 In October 2021, the Food and Drug Administration authorized the BioNTech

115 vaccine for emergency use in children from 5 to 11 years of age [8]. Although this

116 vaccine remains under surveillance and continuous monitoring, it has been

117 demonstrated to be safe and effective in this population [9]. Nonetheless,

118 investigations at a world level have suggested that some parents reject

119 vaccination due to false information reported by the media [10,11], leading to

120 uncertainty regarding the safety and efficacy of the vaccines [12].

121 Although 9 out of 10 parents in Latin America and the Caribbean (LAC) intend to

122 vaccinate their children, there are factors associated with the non-intention to

123 vaccinate [13]. The proportion of parents who do intend to vaccinate their children

124 is encouraging despite being one of the continents with the highest degree of

125 misinformation and low adherence to the control recommendations of the

126 pandemic [14]. However, this vaccination intention varies among the regions of

127 each country, and each country has factors associated with its social

128 determinants or its health systems.

129 There are differences among the regions of Peru concerning the intention of the

130 adult population to be vaccinated against COVID-19 [15], being lower in older

131 adults [16]. A study in Colombia showed lower vaccination acceptance in adults

132 than in the Peruvian population [17], with important variations among its regions

133 as in Peru [18]. These results suggest that the intention to vaccinate in different

134 countries varies according to the sociodemographic context and age [19–23].

135 Likewise, fear, socioeconomic conditions, and institutional situations can also

136 intervene in compliance with vaccination [24,25].

137 Therefore, while some studies have evaluated the vaccination intention in LAC

138 countries [13], there may be variations within these countries that warrant

139 strategies to achieve adequate coverage in children and adolescents. Therefore,

140 the objective of the present study was to evaluate the factors associated with the

141 intention to vaccinate children and adolescents in Peru and Colombia and the

142 variations of this intention among the different regions of these two countries.

143   **METHODS**

144   **Study design**

145   We performed a secondary analysis using a database generated by the

146   University of Maryland and Facebook (Facebook, Inc). Both institutions designed

147   a survey to assess sociodemographic characteristics, comorbidities, mental

148   health, economic and food insecurity, compliance with mitigation strategies

149   against COVID-19, and practices related to vaccination against this disease.

150   Since April 23, 2020, this survey has been carried out daily in more than 200

151   countries and in the primary language of the territory. The sampling frame for the

152   random selection of participants included daily Facebook users over 18 years of

153   age from a particular region and country. The selection of the surveyed

154   participants was random based on the sampling frame that was recalculated

155   daily. If a Facebook user refused to participate, another was randomly invited

156   within the sampling frame. Participants could only answer the survey once within

157   an eight-week time frame. This survey has been used to develop previous studies

158   [26], and the survey methodology has been described in greater detail elsewhere

159   [27].

160   **Population and sample**

161   We included adult (18 and over) Facebook users residing in LAC who responded

162   to the survey between May 20 and November 5, 2021. We excluded participants

163   who did not have the variables of interest, who did not have children, those of

164   non-binary gender, and those over 54 years of age. We excluded participants

165   over 54 years of age to reduce the probability of not exclusively including parents

166   of children under 18 **(Figure 1)**.

167 **Variables and measures**

168 **Outcome variable:** The outcome variable was parents' non-intention to

169 vaccinate their children and adolescents against COVID-19.

170 We evaluated the parents' intention to vaccinate their children and adolescents

171 against COVID-19 using the survey question: Will you choose to get a COVID-19

172 vaccine for your child or children when they are eligible? This question has four

173 possible alternatives: yes, definitely; yes, probably; no, probably not; and no,

174 definitely not. Subsequently, we dichotomized the variable considering the first

175 two alternatives as to the parents' intention to vaccinate their children and

176 adolescents, while the last two were considered non-intention.

177 **Independent variables**

178 **Sociodemographic variables**

179 We included the following sociodemographic variables (the survey question

180 related to the study variables and the categories considered for these variables

181 in the study are shown in parenthesis): gender (What is your gender?; male,

182 female), age (What is your age?; 18 to 24 years, 25 to 34, 35 to 44, 45 to 54),

183 educational level (What is the highest level of education that you have

184 completed?; university post-graduate degree completed/university

185 completed/college/pre-university, secondary school completed/high school (or

186 equivalent) completed, primary school completed/less than primary school/no

187 formal schooling) and area of residence (Which of the following best describes

188 the area where you currently live?; city, town, village or rural area). Town was

189 defined as a populated area with fixed boundaries and a local self-government;

190 city was defined as an important or a large town; and village was defined as a

191   group of houses and other buildings, usually in the countryside, smaller than a

192   town.

193   **Comorbidities, personal and COVID-19 history**

194   Participants self-reported the following comorbidities (survey question: Have you

195   ever been told by a doctor, nurse, or another health professional that you have

196   any of the following medical conditions?): asthma, chronic obstructive pulmonary

197   disease (COPD) or chronic bronchitis or emphysema, cancer, diabetes, high

198   blood pressure, kidney disease, compromised or weakened immune system,

199   heart attack or another heart disease, and obesity. We created a variable that

200   grouped comorbidities in yes or no.

201   We also included self-reporting of being a smoker (yes, no), having had COVID-

202   19 (yes, no), and having been vaccinated against COVID-19 (yes, no).

203   **Compliance with community mitigation strategies**

204   The community mitigation strategies included were physical distancing and mask

205   use during the last seven days. We defined physical distancing as when a

206   participant reported having intentionally avoided contact with other people at least

207   at some point in the last seven days (survey question: In the past 7 days, how

208   often did you intentionally avoid contact with other people?). In addition, the use

209   of masks was defined if a participant reported wearing a mask in public at least

210   at some point during the last seven days (survey question: In the past 7 days,

211   how often did you wear a mask when in public?).

212   **Food and economic insecurity**

213   We assessed food insecurity with the survey question: How worried are you about

214   having enough to eat in the next week? This question had four possible answers:

215   very worried, somewhat worried, not too worried, and not worried at all. We

216   considered the first three responses as food insecurity.

217   We defined economic insecurity using the survey question: How worried are you

218   about your household's finances in the next month? There were four response

219   alternatives: very worried, somewhat worried, not too worried, and not worried at

220   all. We defined economic insecurity using the first three responses.

221   **Anxiety and depressive symptoms**

222   We evaluated anxiety symptoms using the survey question: During the last seven

223   days, how often did you feel so nervous that nothing could calm you down? This

224   question is part of the Kessler Psychological Distress Scale (K10), and the survey

225   has five response alternatives: all the time, most of the time, some of the time, a

226   little of the time, and none of the time. Therefore, we dichotomized the variable

227   considering the first four alternatives as to the presence of anxiety symptoms.

228   We evaluated depressive symptoms using the survey question: How often did

229   you feel so depressed that nothing could cheer you up in the past seven days?

230   This question is part of the Kessler Psychological Distress Scale (K10) and has

231   five response alternatives: all the time, most of the time, some of the time, a little

232   of the time, and none of the time. Therefore, we dichotomized the variable

233   considering the first four alternatives as to the presence of depressive symptoms.

234   **Statistical analysis**

235   We downloaded the databases in Microsoft Excel 2016 ® format and imported

236   them into the statistical package Stata/SE ® version 17.0 (StataCorp, TX, USA).

237   Then, we performed the statistical analysis considering the complex sampling of

238   the survey and the svy command.

239   We performed a descriptive analysis using absolute frequencies and weighted

240   proportions with their respective 95% confidence intervals (95%CI). We used the

241   Chi-square test with Rao-Scott correction to perform the bivariate analysis

242   between the independent variables and the parents' non-intention to vaccinate

243   their children and adolescents against COVID-19. Two generalized linear models

244   (crude and adjusted) of the Poisson family with a logarithmic link function were

245   used to estimate the factors associated with the parents' non-intention to

246   vaccinate their children and adolescents against COVID-19. Crude (cPR) and

247   adjusted (aPR) prevalence ratios with their respective 95%CI were estimated.

248   The adjustment for confounders was carried out according to an epidemiological

249   approach based on other studies [13], after evaluating the collinearity of the

250   associated factors included in the final adjusted model. We evaluated the

251   possible collinearity of the associated factors included in the final adjusted model.

252   A p-value less than 0.05 was considered statistically significant in all the

253   analyses.

254   **Ethical considerations**

255   All participants gave their informed consent before answering the survey. This

256   study analyzed a secondary database that collected data without identifiers and

257   did not violate the integrity of the participants. The database is not open access;

258   the authors of this study achieved access after obtaining a signed agreement with

259   the University of Maryland.

260   **RESULTS**

261   We analyzed a sample of 44,678 adults from Colombia and 24,302 adults from

262   Peru **(Figure 1)**.

263   *Colombia*

264   **Characteristics of the study sample in Colombia**

265   In the Columbia study sample, 55.44% were female, 33.19% were between 35 to

266   44 years old, 53% had completed secondary education or less, 60.88% lived in

267   a city, and 10.78% reported smoking. Regarding prevention measures, 89.45%

268   and 92.27% had complied with physical distancing and the use of a mask,

269   respectively. Food insecurity was reported by 72.49%, and 86.61% reported

270   having economic insecurity. In addition, 35.82% and 42.51% described having

271   anxiety and depressive symptoms, respectively; 65.27% of the participants did

272   not report comorbidities, 47.53% were not yet vaccinated against COVID-19, and

273   35.79% had had COVID-19 at some point. In Colombia, the prevalence of

274   parents' non-intention to vaccinate their children and adolescents against COVID-

275   19 was 7.41% **(Table 1)**.

276   **Prevalence of parents' non-intention to vaccinate their children and**

277   **adolescents against COVID-19 according to each region of Colombia**

278   In Colombia, the regions with the highest prevalence of parents´ non-intention to

279   vaccinate children against COVID-19 were Amazonas (14.95%), Putumayo

280   (13.72%), and Vichada (12.96%), while the lowest prevalence of non-intention to

281   vaccinate children against COVID-19 was in Vaupés (0%), San Andrés and

282   Providencia (0.27%), and Bolivar (5.33%) **(Figure 2a)**.

283 **Bivariate analysis according to parents' non-intention to vaccinate their**

284 **children and adolescents against COVID-19 in Colombia**

285 We found statistically significant differences for age, level of education,

286 compliance with physical distancing and use of a mask, economic insecurity,

287 anxiety symptoms, presenting comorbidities, and having been vaccinated **(Table**

288 **2)**.

289 **Factors associated with parents' non-intention to vaccinate their children**

290 **and adolescents against COVID-19 in Colombia**

291 In the adjusted regression model, we found that age groups between 35 and 44

292 years old (aPR=0.77; 95%CI: 0.66-0.90; p=0.001) and 45 to 54 years old

293 (aPR=0.78; 95%CI: 0.65-0.95; p=0.012) were associated with a lower prevalence

294 of non-intention to vaccinate children against COVID-19 compared to the age

295 group between 18 and 24 years. Likewise, compliance with physical distancing

296 (aPR=0.55; 95%CI: 0.49-0.61; p<0.001), use of masks (aPR=0.71; 95%CI: 0.65-

297 0.78; p<0.001), economic insecurity (aPR=0.72; 95%CI: 0.65-0.89; p<0.001),

298 anxiety symptoms (aPR=0.87; 95%CI: 0.79-0.95; p=0.003), was associated with

299 a lower prevalence of non-intention to vaccinate children against COVID-19.

300 Additionally, having one or more comorbidities (aPR=0.83; 95%CI: 0.75-0.91;

301 p<0.001) and being vaccinated against COVID-19 (aPR=0.17; 95%CI: 0.15-0.20;

302 p<0.001) were associated with a lower prevalence of non-intention to vaccinate

303 children against COVID-19 **(Table 3)**.

304 *Peru*

305 **Characteristics of the study sample in Peru**

306   In the Peruvian sample, 52.81% were female, 33.01% were between 35 to 44

307   years old, 51.48% had at least a full university post-graduate degree

308   completed/university completed/college/pre-university, 75.98% lived in a city, and

309   11.39% reported having smoked. In addition, 90.39% and 93.94% had complied

310   with physical distancing and the use of a mask, respectively. We found that

311   76.26% reported having food insecurity, while 89.95% reported having economic

312   insecurity. Anxiety and depressive symptoms were reported in 42.31% and

313   50.01%, respectively, and 62.81% of the participants did not report comorbidities,

314   53.71% were not yet vaccinated against COVID-19, and 45.91% had had COVID-

315   19 at some point. The prevalence of parents´ non-intention to vaccinate their

316   children and adolescents against COVID-19 was 6.64% **(Table 1)**.

317   **Prevalence of parents' non-intention to vaccinate their children and**

318   **adolescents against COVID-19 according to each region of Peru**

319   In Peru, the regions with the highest prevalence of non-intention to vaccinate

320   children against COVID-19 were Moquegua (13.73%), Madre de Dios (13.65%),

321   and Puno (11.83%). On the other hand, the regions with a lower prevalence of

322   non-intention to vaccinate children against COVID-19 were Pasco (4.10%), Lima

323   (4.82%), and Piura (5.03%) **(Figure 2b)**.

324   **Bivariate analysis according to parents' non-intention to vaccinate their**

325   **children and adolescents against COVID-19 in Peru**

326   We found statistically significant differences between the independent variables

327   and the intention of parents to vaccinate their children and adolescents against

328   COVID-19, except for smoking (p=0.797) **(Table 2)**.

Factors associated with parents' non-intention to vaccinate their children and adolescents against COVID-19 in Peru

In the adjusted regression model, we found female gender (aPR=0.81; 0.71-0.93; p=0.002) compared to male gender was associated with a lower prevalence of non-intention to vaccinate children against COVID-19. Likewise, compliance with physical distancing (aPR=0.45; 95%CI: 0.39-0.52; p<0.001), use of masks (aPR=0.71; 95%CI: 0.65-0.90; p=0.005), economic insecurity (aPR=0.66; 95%CI: 0.59-0.75; p<0.001), anxiety symptoms (aPR=0.82; 95%CI: 0.70-0.97; p=0.020) were associated with a lower prevalence of non-intention to vaccinate children against COVID-19. In addition, having one or more comorbidities (aRP=0.74; 95%CI: 0.63-0.86; p<0.001), being vaccinated against COVID-19 (aPR=0.24; 95%CI: 0.20-0.28; p<0.001) and having had COVID-19 (aPR=0.83; 95%CI: 0.73-0.94; p=0.006) were associated with a lower prevalence of non-intention to vaccinate children against COVID-19. On the other hand, living in a town (aPR=1.16; 95%CI: 1.00-1.35; p=0.048) and living in a village or rural area (aPR=1.51; 95%CI: 1.26-1.80; p<0.001) compared to living in the city was associated with a higher prevalence of non-intention to vaccinate children against COVID-19 **(Table 3)**.

DISCUSSION

Our main results show that about 9 out of 10 parents in Colombia and Peru intend to vaccinate their children and adolescents against COVID-19. In Colombia, being between 35 and 54 years old, adherent to maintaining physical distance, using masks, having economic insecurity, having symptoms of anxiety and comorbidities, and being vaccinated were associated with a higher probability of vaccinating children against COVID-19. In Peru, being female, an adherent to maintaining social distancing, using a mask, having economic and food insecurity, having comorbidities, having been vaccinated, and having had COVID-19 was associated with a lower probability of not having the intention to vaccinate children. On the contrary, living in a town or rural area was associated with a greater intention not to vaccinate.

Our results of the intention to vaccinate children and adolescents are similar to those found in the evaluation carried out between May and June 2021 in LAC [13]. This are good news in terms of public health because the Ministries of Health of Peru and Colombia have already scheduled or started vaccination against COVID-19 with different vaccines in children and adolescents [28,29]. This acceptance is expected to be reflected in the increase in population coverage of the vaccine to achieve the rate needed to obtain herd immunity. However, variations between the regions of the countries and in the case of Peru, according to the place of residence, require individualization of the vaccination programs based on the region.

As in other LAC countries, some factors associated with the socioeconomic and psychological consequences of the pandemic reduce the non-intention of vaccination[13]. Indeed, aspects such as stress[13], economic or food insecurity as

372 a result of the economic crisis during the pandemic and especially during the first

373 wave [30], possibly created a state of alert and the desire for such a situation not

374 to be repeated, being vaccination seen as an opportunity to achieve this [13].

375 Along the same line, adherence to community mitigation measures such as the

376 use of masks and social distancing may reflect a higher likelihood of complying

377 with vaccination. Similarly, the feeling of vulnerability [26] and the desire to avoid

378 this happening to their children may foster the positive view of vaccination and

379 reduce the probability of non-intention to vaccinate their children [13].

380 While some factors coincide among the different countries, some studies have

381 shown that some factors can be explained by social determinants and

382 socioeconomic differences between countries [19–24]. Although, to date, no study

383 has compared these differences, there may be several explanations. In a

384 previous study by our group evaluating food insecurity in LAC in the first stage of

385 the pandemic, it was found that food insecurity was higher in Peru than in

386 Colombia (83.9% vs. 76.8%, respectively), which may explain the results of the

387 present study [30]. Similarly, the impact of the pandemic was different in the two

388 countries, with the number of deaths registered until November 17, 2021, being

389 more than 200 thousand in Peru [31] and about 128 thousand in Colombia [32].

390 These differences might suggest that the fear of having had the infection and its

391 consequences have led to the desire of this not happening to their children and

392 an increase in the intention to vaccinate them. On the other hand, according to

393 the document "Distinctive features of health systems in the world, 2017" the

394 Colombian health system is better developed than the Peruvian [33]. Indeed, in

395 Peru, despite the improvements, structural problems and coverage of health

396   services in areas such as rural areas had a great impact on health care during

397   the pandemic and could explain our present results [34,35].

398   There were great variations in the intention to vaccinate among the different

399   regions of Peru. The regions with the least intention to vaccinate were Madre de

400   Dios, Puno, and Moquegua. In contrast, the regions of Lima and Lambayeque

401   had the highest intention to vaccinate children and adolescents against COVID-

402   19. The Madre de Dios and Moquegua regions presented the lowest fatality

403   during the pandemic, which may explain the lesser feeling of fear, commented

404   previously compared to Lambayeque, for example, which is one of the

405   departments with the highest fatality [31]. However, the complexity of the impact

406   of the pandemic in each region is far from being fully understood, which could

407   explain why, in the department of Puno, a region with low mortality, the intention

408   to vaccinate is low. However, it is likely that some aspects such as self-medication

409   [36], knowledge about the disease [37], and the reliability of the sites where

410   Peruvians obtain information [38] on the pandemic or the variation in prevention

411   practices among Peruvians [39], may explain the differences in intention to

412   vaccinate children among the different regions of Peru.

413   In Colombia, the departments with the highest vaccination intention were Vaupés,

414   San Andrés, Bolívar, Guainía, and Cundinamarca, being above 94%. Several of

415   these regions were significantly affected by COVID-19, especially in terms of

416   concentration of cases per inhabitant. In departments such as San Andrés, there

417   was deep state intervention in different aspects due to the initial level of

418   involvement of COVID, which might influence the subsequent vaccination

419   intention. Likewise, in the department of Bolívar, where the capital, Cartagena, is

420   located, there were also a considerable number of cases and deaths, which may

421   influence the intention of vaccination [40]. The vaccination program in Colombia is

422   led by a mass media campaign [41], having the support of scientific societies, such

423   as the Colombian Association of Infectious Diseases, which promotes information

424   based on evidence to both health personnel and the community, and this could

425   also contribute to the intention of vaccination [42].

426   Our study has some limitations. Since the respondents were users of a social

427   network, information was only obtained from people with access to the internet

428   and social networks, which could vary between the regions of the countries

429   evaluated and the rural population. We do not have the non-response rate, which

430   is relevant in the context of an online survey. The variables included in this

431   analysis were pre-established in the survey, and there could be relevant variables

432   not included in our analysis. The data were obtained by self-reporting and,

433   therefore, an underreporting of information is possible. Finally, due to the design

434   of the study, our results should only be interpreted in the context of associations

435   since causality among the variables evaluated could not be established.

436   However, this study presents the strength of analyzing a database with a large

437   representative sample of social network users widely used in Colombia and Peru.

438   In conclusion, about 9 out of 10 parents in Colombia and Peru intend to vaccinate

439   their children and adolescents against COVID-19. This intention is associated

440   with some factors which are similar between the two countries, as well as other

441   factors and variations among the different regions of each country. This means

442   that despite good general acceptance of vaccination against COVID-19, the

443   health authorities of each country must propose individualized strategies

444   depending on the context if the vaccination campaigns in this population group

445   are to achieve their objectives. This includes not only broadening the target

446   groups of both unvaccinated and vaccinated but also achieving high coverage

447   with an additional booster or complementary doses. Finally, scientific evidence

448   must be communicated to the public, including aspects that may affect confidence

449   in vaccines, such as the new variants of concern, including the Omicron variant,

450   among other aspects.

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617 **FIGURES**

618 **Figure 1. Flowchart of the selection of the study sample.**

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              ┌─────────────────────────────┐
              │  Adults surveyed from LAC   │
              │        n=4,093,991          │
              └─────────────────────────────┘
                           │
                           │      ┌─────────────────────────────┐
                           ├─────→│ Missing data(n=3,120,415)   │
                           │      │ Had no children (n=121,275) │
                           ↓      └─────────────────────────────┘
              ┌─────────────────────────────┐
              │ Adults surveyed with children│
              │        n=852,301            │
              └─────────────────────────────┘
                           │
                           │      ┌─────────────────────────────┐
                           ├─────→│ Non-binary gender (n=6,415) │
                           │      │ Over 54 years (n=105,685)   │
                           │      │ Missing data (n=64,526)     │
                           ↓      └─────────────────────────────┘
              ┌─────────────────────────────┐
              │      Adults surveyed        │
              │        n=675,675            │
              └─────────────────────────────┘
                           │
                           │      ┌─────────────────────────────┐
                           ├─────→│ 606,695 people excluded for │
                           │      │ not living in Colombia or Peru│
                           │      └─────────────────────────────┘
```

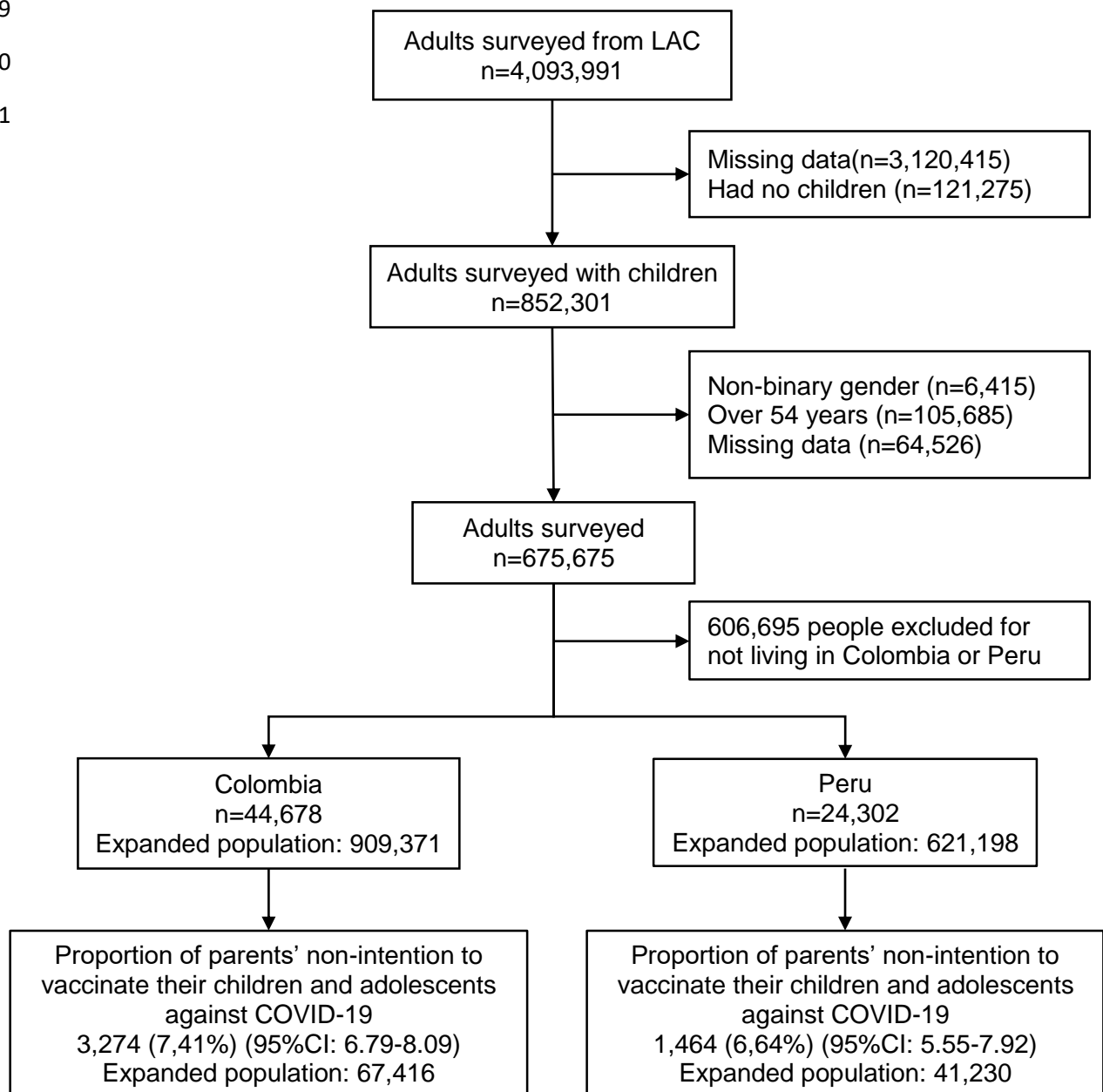| Colombia n=44,678 Expanded population: 909,371	Peru n=24,302 Expanded population: 621,198
Proportion of parents' non-intention to vaccinate their children and adolescents against COVID-19 3,274 (7,41%) (95%CI: 6.79-8.09) Expanded population: 67,416	Proportion of parents' non-intention to vaccinate their children and adolescents against COVID-19 1,464 (6,64%) (95%CI: 5.55-7.92) Expanded population: 41,230

622 **Figure 2. Prevalence of parents' non-intention to vaccinate their children**
623 **and adolescents against COVID-19 in the regions of Colombia and Peru.**

624

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626
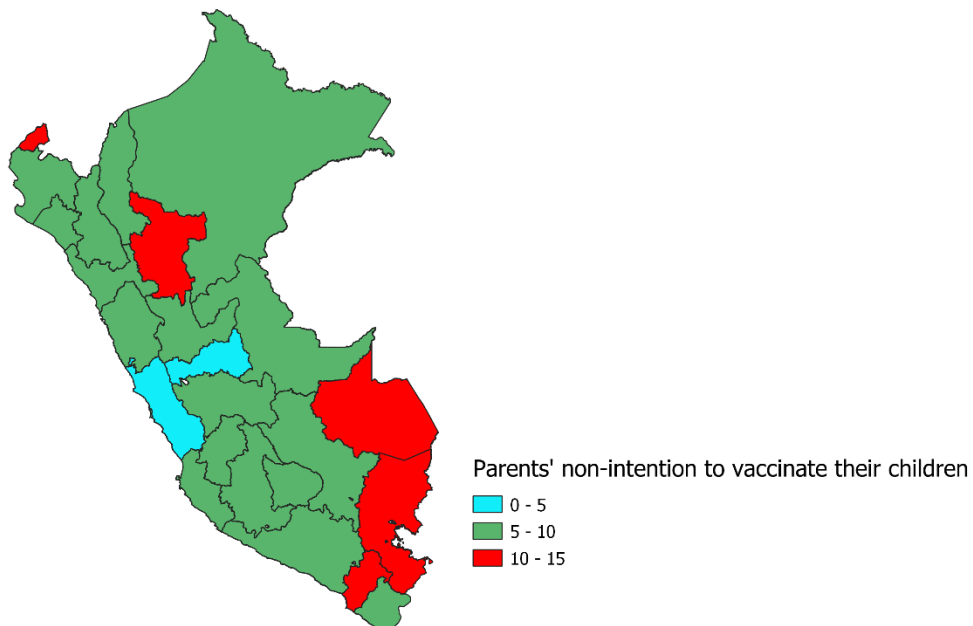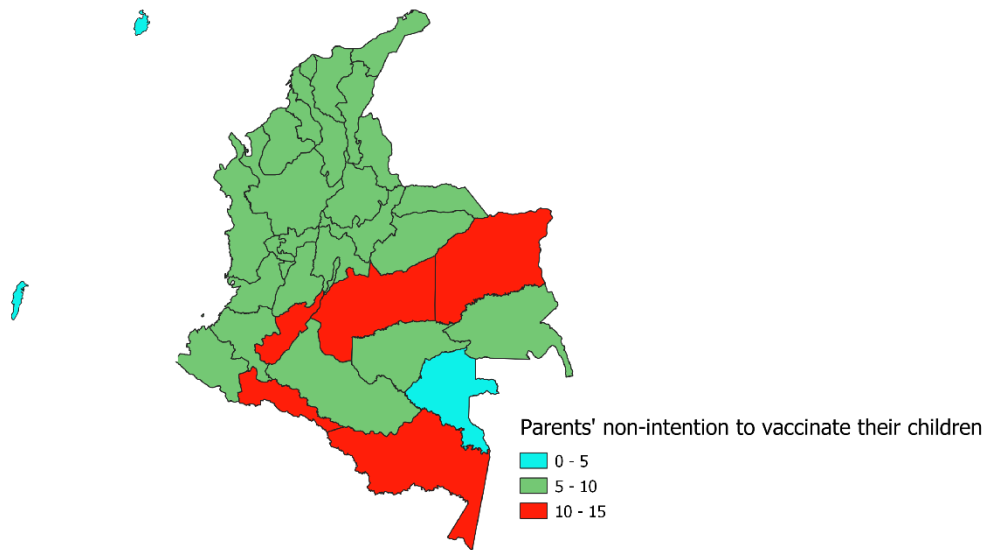
627 **TABLES**

Table 1. Descriptive analysis of the study samples in Colombia (n = 44,678; N = 909,371) and Peru (n = 24,302; N = 621,198).

Characteristics	Colombia			Peru		
	Absolute frequency of participants surveyed	Weighted proportion according to each category		Absolute frequency of participants surveyed	Weighted proportion according to each category	
	n	%	95%CI	n	%	95%CI
Gender						
Male	18,933	44.56	43.51-45.63	11,716	47.18	43.43-50.98
Female	25,745	55.43	54.37-56.49	12,586	52.81	49.02-56.57
Age (years)						
18-24	4,167	11.69	11.14-12.26	2,837	10.95	10.07-11.90
25-34	13,269	30.89	29.97-31.84	6,793	28.99	28.01-30.00
35-44	17,129	33.19	32.62-33.76	8,184	33.00	32.19-33.83
45-54	10,113	24.22	23.06-25.43	6,488	27.04	25.68-28.45
Educational level						
University post-graduate degree completed/university completed/college/pre-university	18,796	36.97	34.74-39.26	13,243	52.00	47.92-55.02
Secondary school completed/High school (or equivalent) completed	22,023	52.99	51.22-54.75	10,402	45.1	41.49-48.77
Primary school completed/Less than primary school/No formal schooling	3,859	10.03	9.23-10.90	657	3.41	2.74-4.25
Area of residence						
City	30,156	60.88	50.67-70.22	19,340	75.97	66.21-83.62
Town	10,578	28.68	21.63-36.95	2,793	13.24	8.67-19.73
Village or rural area	3,944	10.43	8.00-13.50	2,169	10.77	7.84-14.63
Smoking						
No	39,321	89.21	86.37-91.53	21,365	88.60	87.79-89.38
Yes	5,357	10.78	8.47-13.63	2,937	11.39	10.62-12.21
Compliance with physical distancing						
No	4,396	10.54	9.97-11.16	2,138	9.61	8.80-10.49
Yes	40,282	89.45	88.84-90.03	22,164	90.38	89.51-91.20
Compliance with mask use						
No	3,188	7.72	6.99-8.52	1,337	6.06	5.33-6.89
Yes	41,490	92.27	91.48-93.01	22,965	93.93	93.11-94.67
Food insecurity						
No	13,202	27.50	0.25-0.30	6,145	23.73	21.98-25.59
Yes	31,476	72.49	0.70-0.75	18,157	76.26	74.41-78.02
Economic insecurity						
No	6,558	13.38	0.12-0.15	2,603	10.04	9.43-10.70
Yes	38,120	86.61	0.85-0.87	21,699	89.95	89.30-90.57
Anxiety symptomatology						
No	28,196	64.17	0.63-0.65	14,040	57.68	55.88-59.47
Yes	16,482	35.82	0.35-0.36	10,262	42.31	40.53-44.12
Depressive symptomatology						
No	25,303	57.48	0.56-0.59	12,227	49.99	48.43-51.56
Yes	19,375	42.51	0.41-0.44	12,075	50.00	48.44-51.57
Comorbidities						
No	28,544	65.27	0.64-0.66	14,852	62.81	60.38-65.18
Yes	16,144	24.87	0.24-0.26	9,450	26.00	25.11-28.02
Vaccinated						
No	22,311	47.52	0.46-0.49	13,340	53.70	50.54-56.85
Yes	22,367	52.47	0.51-0.54	10,962	46.29	43.15-49.46
Had COVID-19						
No	28,949	64.20	0.62-0.66	13,438	54.08	52.14-56.02
Yes	15,729	35.79	0.34-0.38	10,864	45.91	43.98-47.86
Parents´ intention to vaccinate their children and adolescents against COVID-19						
Yes	41404	92.59	91.91-93.21	22838	93.36	92.08-94.45
No	3274	7.41	6.79-8.09	1464	6.64	5.55-7.92

95%CI: 95% Confidence Intervals

628

Table 2. Bivariate analysis of the characteristics of the study sample according to parents´ intention to vaccinate their children and adolescents against COVID-19 in Colombia and Peru.

Characteristics	Colombia							Peru						
	Parents' intention to vaccinate their children adolescents against COVID-19							Parents' intention to vaccinate their children and adolescents against COVID-19						
	Yes			No				Yes			No			
	Absolute frequency of participants surveyed	Weighted proportion according to each category		Absolute frequency of participants surveyed	Weighted proportion according to each category		p-value	Absolute frequency of participants surveyed	Weighted proportion according to each category		Absolute frequency of participants surveyed	Weighted proportion according to each category		p-value
	n	%	95%CI	n	%	95%CI		n	%	95%CI	n	%	95%CI	
Gender							0.457							<0.001
Male	17,642	92.75	92.02-93.43	1,291	7.24	6.57-7.98		10,916	92.22	90.61-93.57	800	7.77	6.43-9.39	
Female	23,762	92.44	91.59-93.23	1,983	7.55	6.77-8.41		11,922	94.38	93.44-95.20	664	5.61	4.80-6.56	
Age (years)							<0.001							<0.001
18-24	3,698	89.29	87.64-90.75	469	10.7	9.25-12.36		2,642	92.07	89.46-94.09	195	7.92	5.91-10.54	
25-34	12,075	91.10	90.30-91.85	1,194	8.89	8.15-9.70		6,312	91.75	89.95-93.26	481	8.24	6.74-10.05	
35-44	16,056	93.58	92.85-94.24	1,073	6.41	5.76-7.15		7,732	93.98	92.81-94.97	452	6.01	5.03-7.19	
45-54	9,575	94.69	93.79-95.48	538	5.30	4.52-6.21		6,152	94.85	93.95-95.62	336	5.14	4.38-6.05	
Educational level							<0.001							0.018
University post-graduate degree completed/university completed/college/pre-university	17,619	93.55	92.97-94.10	1,177	6.44	5.90-7.02		12,505	93.88	92.81-94.80	738	6.11	5.20-7.19	
Secondary school completed/High school (or equivalent) completed	20,294	92.12	91.41-92.78	1,729	7.87	7.22-8.59		9,736	92.96	91.31-94.32	666	7.03	5.68-8.69	
Primary school completed/Less than primary school/No formal schooling	3,491	91.46	89.50-93.09	368	8.53	6.91-10.50		597	90.86	86.78-93.78	60	9.13	6.22-13.22	
Area of residence							0.054							<0.001
City	28,051	92.94	92.13-93.67	2,105	7.05	6.32-7.87		18,291	94.09	93.11-94.94	1,049	5.90	5.06-6.89	
Town	9,735	91.90	91.03-92.69	843	8.09	7.31-8.97		2,590	92.41	91.05-93.58	203	7.58	6.42-8.95	
Village or rural area	3,618	92.38	91.17-93.45	326	7.61	6.55-8.83		1,957	89.38	86.70-91.57	212	10.61	8.43-13.30	
Smoking							0.104							0.797
No	36,460	92.71	92.08-93.29	2,861	7.28	6.70-7.92		20,071	93.34	92.05-94.44	1,294	6.65	5.56-7.95	
Yes	4,944	91.55	89.70-93.10	413	8.44	6.90-10.30		2,767	93.49	91.80-94.86	170	6.50	5.14-8.20	
Compliance with physical distancing							<0.001							<0.001
No	3,850	88.10	86.27-89.73	546	11.89	10.27-13.73		1,817	84.58	81.22-87.44	321	15.41	12.56-18.78	
Yes	37,554	93.11	92.48-93.70	2,728	6.88	6.30-7.52		21,021	94.29	93.21-95.21	1,143	5.70	4.78-6.79	
Compliance with mask use							<0.001							<0.001
No	2,801	86.88	85.53-88.13	387	13.11	11.87-14.46		1,203	87.34	82.07-91.23	134	12.65	8.77-17.93	
Yes	38,603	93.06	92.40-93.68	2,887	6.93	6.32-7.60		21,635	93.75	92.70-94.66	1,330	6.24	5.34-7.30	
Food insecurity							0.908							0.004
No	12,237	92.61	91.50-93.60	965	7.38	6.40-8.49		5,701	91.85	89.71-93.58	444	8.14	6.42-10.29	
Yes	29,167	92.57	91.97-93.13	2,309	7.42	6.87-8.03		17,137	93.83	92.63-94.85	1,020	6.16	5.15-7.37	
Economic insecurity							0.007							<0.001
No	5,996	91.39	89.97-92.62	562	8.60	7.37-10.03		2,341	89.18	86.50-91.39	262	10.81	8.61-13.50	
Yes	35,408	92.77	92.14-93.36	2,712	7.22	6.64-7.86		20,497	93.82	92.62-94.85	1,202	6.17	5.15-7.38	
Anxiety symptomatology							0.032							<0.001
No	25,981	92.29	91.48-93.04	2,215	7.70	6.96-8.52		13,108	92.53	90.83-93.95	932	7.46	6.05-9.17	
Yes	15,423	93.10	92.42-93.73	1,059	6.89	6.27-7.57		9,730	94.49	93.52-95.32	532	5.50	4.68-6.48	
Depressive symptomatology							0.575							<0.001

	N	%	95%CI	n	%	95%CI	p-value	N	%	95%CI	n	%	95%CI	p-value
No	23,408	92.51	91.76-93.20	1,895	7.48	6.80-8.24		11,389	92.47	90.92-93.78	838	7.52	6.22-9.08	
Yes	17,996	92.68	91.93-93.37	1,379	7.31	6.63-8.07		11,449	94.25	93.12-95.20	626	5.74	4.80-6.87	
Comorbidities							<0.001							<0.001
No	26,216	91.72	90.92-92.46	2,328	8.27	7.54-9.08		13,832	92.40	91.02-93.50	1,020	7.59	6.41-8.98	
Yes	15,188	94.05	93.13-94.87	946	5.94	5.13-6.87		9,006	95.12	94.21-95.89	444	4.87	4.11-5.79	
Vaccinated							<0.001							<0.001
No	19,559	86.91	85.81-87.94	2,752	13.08	12.06-14.19		12,127	89.71	87.94-91.26	1,213	10.28	8.74-12.06	
Yes	21,845	97.72	97.30-98.08	522	2.27	1.92-2.70		10,711	97.59	97.15-97.96	251	2.40	2.04-2.85	
Had COVID-19							0.467							0.002
No	26,834	92.49	91.81-93.13	2,115	7.50	6.86-8.19		12,593	92.61	90.85-94.05	845	7.38	5.95-9.15	
Yes	14,570	92.74	91.88-93.51	1,159	7.25	6.48-8.12		10,245	94.24	93.29-95.08	619	5.75	4.92-6.71	

95%CI: 95% Confidence Intervals

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Table 3. Factors associated with parents' non-intention to vaccinate their children and adolescents against COVID-19 in Colombia and Peru.

	Colombia						Peru					
	Parents' non-intention to vaccinate their children and adolescents against COVID-19						Parents' non-intention to vaccinate their children and adolescents against COVID-19					
Characteristics	cPR	Crude 95%CI	p-value	aPR	Adjusted 95%CI	p-value	cPR	Crude 95%CI	p-value	aPR	Adjusted 95%CI	p-value
Gender												
Male	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
Female	1.04	0.93-1.16	0.452	1.06	0.94-1.10	0.318	0.72	0.64-0.81	<0.001	0.81	0.71-0.93	**0.002**
Age (years)												
18-24	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
25-34	0.83	0.74-0.93	0.003	0.92	0.82-1.03	0.178	1.04	0.84-1.28	0.703	1.15	0.92-1.43	0.218
35-44	0.60	0.51-0.70	<0.001	0.77	0.66-0.90	**0.001**	0.76	0.61-0.95	0.018	0.92	0.73-1.16	0.488
45-54	0.49	0.40-0.61	<0.001	0.78	0.65-0.95	**0.012**	0.65	0.52-0.81	<0.001	0.96	0.73-0.27	0.776
Educational level												
University post-graduate degree completed/university completed/college/pre-university	Reference	-	-	Reference	-	-	Reference	-	-			
Secondary school completed/High school (or equivalent) completed	1.22	1.14-1.32	<0.001	0.95	0.87-1.02	0.165	1.15	1.01-1.31	0.033	0.94	0.83-1.05	0.258
Primary school completed/Less than primary school/No formal schooling	1.32	1.11-1.58	0.003	0.92	0.77-1.09	0.320	1.49	1.07-2.07	0.018	1.06	0.82-1.37	0.635
Area of residence												
City	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
Town	1.15	1.02-1.30	0.028	1.09	1.00-1.10	0.060	1.28	1.10-1.50	0.002	1.16	1.00-1.35	**0.048**
Village or rural área	1.08	0.92-1.26	0.331	0.94	0.81-1.00	0.426	1.80	1.51-2.14	<0.001	1..51	1.26-1.80	**<0.001**
Smoking												
No	Reference	-	-		Not included *		Reference	-	-		Not included *	
Yes	1.16	0.97-1.38	0.095				0.98	0.82-1.16	0.794			
Compliance with physical distancing												
No	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
Yes	0.58	0.51-0.66	<0.001	0.55	0.49-0.61	**<0.001**	0.37	0.32-0.42	<0.001	0.45	0.39-0.52	**<0.001**
Compliance with mask use												
No	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
Yes	0.53	0.48-0.58	<0.001	0.71	0.65-0.78	**<0.001**	0.49	0.38-0.64	<0.001	0.71	0.56-0.90	**0.005**

	cPR	95%CI	p	aPR	95%CI	p	cPR	95%CI	p	aPR	95%CI	p
Food insecurity												
No	Reference	-	-	Not included *			Reference	-	-	Not included *		
Yes	1.01	0.91-1.12	0.907				0.76	0.64-0.90	0.002			
Economic insecurity												
No	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
Yes	0.84	0.74-0.95	0.005	0.72	0.65-0.80	**<0.001**	0.57	0.49-0.66	<0.001	0.66	0.59-0.75	**<0.001**
Anxiety symptomatology												
No	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
Yes	0.89	0.81-0.99	0.028	0.87	0.79-0.95	**0.003**	0.74	0.64-0.84	<0.001	0.82	0.70-0.97	**0.020**
Depressive symptomatology												
No	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
Yes	0.98	0.90-1.06	0.570	1.00	0.91-0.10	0.949	0.76	0.70-0.84	<0.001	0.92	0.82-1.03	0.162
Comorbidities												
No	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
Yes	0.72	0.64-0.80	<0.001	0.83	0.75-0.91	**<0.001**	0.64	0.54-0.76	<0.001	0.74	0.63-0.86	**<0.001**
Vaccinated												
No	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
Yes	0.17	0.15-0.20	<0.001	0.17	0.15-0.20	**<0.001**	0.23	0.20-0.28	<0.001	0.24	0.20-0.28	**<0.001**
Had COVID-19												
No	Reference	-	-	Reference	-	-	Reference	-	-	Reference	-	-
Yes	0.97	0.86-1.06	0.462	0.95	0.87-1.03	0.256	0.78	0.67-0.90	0.001	0.83	0.73-0.94	**0.006**

95%CI: 95% confidence intervals; cPR: Crude prevalence ratio; aPR: Adjusted prevalence ratio.

*Not included due to not having a statistically significant association in the crude model.

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Supplemental Material

Table S1. Proportion of parents´ intention to vaccinate children and adolescents against COVID-19 according to regions in Colombia.

	Colombia			
	Parents´ intention to vaccinate children and adolescents against COVID-19			
	Yes		No	
	Weighted proportion		Weighted proportion	
Region	%	95%CI	%	95%CI
Vaupés	100	-	0	-
San Andrés y Providencia	99.73	98.11-99.96	0.27	0.04-1.89
Bolivar	94.67	93.58-95.58	5.33	4.42-6.42
Guainía	94.29	68.66-99.20	5.71	0.80-31.34
Cundinamarca	94.18	93.15-95.06	5.82	4.94-6.85
Caldas	93.98	91.61-95.70	6.02	4.29-8.39
Antioquia	93.86	93.08-94.56	6.14	5.44-6.92
Sucre	93.72	91.69-95.28	6.28	4.72-8.31
Bogotá	93.37	92.79-93.90	6.63	6.10-7.20
Nariño	93.2	91.48-94.60	6.8	5.40-8.51
Córdoba	93.16	91.50-94.52	6.84	5.48-8.50
Quindío	93.16	90.77-94.97	6.84	5.03-9.23
Atlántico	92.93	91.80-93.91	7.07	6.08-8.20
Guaviare	92.84	81.98-97.36	7.16	2.64-18.02
Chocó	92.65	86.29-96.19	7.35	3.81-13.71
La Guajira	92.6	90.14-94.47	7.4	5.53-9.86
Boyacá	92.54	90.49-94.18	7.46	5.82-9.51
Magdalena	92.28	90.47-93.77	7.72	6.23-9.53
Cesar	92.1	90.31-93.58	7.9	6.42-9.69
Risaralda	91.86	89.83-93.52	8.14	6.48-10.17
Arauca	91.71	87.87-94.41	8.29	5.59-12.13
Norte de Santander	91.64	90.01-93.03	8.36	6.97-9.99
Tolima	91.31	89.48-92.86	8.69	7.14-10.52
Cauca	91.13	89.20-92.73	8.87	7.26-10.80
Santander	91.13	89.92-92.20	8.87	7.80-10.08
Valle del Cauca	90.62	89.62-91.53	9.38	8.47-10.38
Casanare	90.5	87.53-92.82	9.5	7.18-12.47
Caquetá	90.4	86.77-93.12	9.6	6.88-13.23
Huila	89.62	87.10-91.69	10.38	8.31-12.90
Meta	89.01	86.75-90.92	10.99	9.08-13.25
Vichada	87.04	65.33-95.99	12.96	4.01-34.67
Putumayo	86.28	81.23-90.14	13.72	9.86-18.77
Amazonas	85.05	74.49-91.72	14.95	8.27-25.51

95%CI: 95% Confidence Intervals

Table S2. Proportion of parents´ intention to vaccinate children and adolescents against COVID-19 according to regions in Peru.

	Peru			
	Parents´ intention to vaccinate children and adolescents against COVID-19			
	Yes		No	
	Weighted proportion		Weighted proportion	
Region	%	95%CI	%	95%CI
Pasco	95.9	89.93-98.39	4.1	1.61-10.07
Lima	95.18	94.72-95.61	4.82	4.39-5.28
Piura	94.97	93.64-96.04	5.03	3.96-6.36
Callao	94.4	92.94-95.57	5.6	4.43-7.06
Lambayeque	94.18	92.41-95.55	5.82	4.45-7.59
Ancash	93.95	92.22-95.32	6.05	4.68-7.78
Ica	93.9	92.04-95.35	6.1	4.65-7.96
Huancavelica	93.75	88.51-96.69	6.25	3.31-11.49
La Libertad	93.68	92.07-94.97	6.32	5.03-7.93
Cajamarca	93.42	91.22-95.10	6.58	4.90-8.78
Junín	93.09	91.27-94.55	6.91	5.45-8.72
Huánuco	92.61	88.44-95.36	7.39	4.64-11.56
Arequipa	92.26	90.75-93.55	7.74	6.45-9.25
Tacna	92.16	88.59-94.69	7.84	5.31-11.41
Loreto	92.14	88.83-94.52	7.86	5.48-11.17
Ayacucho	91.61	87.01-94.68	8.39	5.32-12.99
Apurímac	91.56	84.85-95.45	8.44	4.55-15.15
Cusco	91.43	89.22-93.21	8.57	6.79-10.78
Amazonas	91.25	86.37-94.49	8.75	5.51-13.63
Ucayali	90.78	87.22-93.43	9.22	6.57-12.78
San Martín	89.95	86.78-92.43	10.05	7.57-13.22
Tumbes	89.85	81.34-94.73	10.15	5.27-18.66
Puno	88.17	84.92-90.79	11.83	9.21-15.08
Madre de Dios	86.35	78.93-91.44	13.65	8.56-21.06
Moquegua	86.27	71.79-93.94	13.73	6.06-28.21

95%CI: 95% Confidence Intervals

This preprint was submitted under the following conditions: