Knowledge, attitudes and practices regarding COVID-19 among the Greek general population

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ABSTRACT
INTRODUCTION: Countries worldwide have adopted unprecedented infection control and prevention measures to curtail the spread of the COVID-19 virus. The success of these measures depends on the knowledge, attitudes, and practices (KAP) of the general population toward COVID-19. The objective of this study was to measure the KAP of adult Greek residents toward COVID-19. **METHODS:** A cross-sectional nationwide survey (n=1,004) was conducted during between April 28,2020 to May 03,2020 using a mixed methodology for data collection: Computer Assisted Telephone Interviewing (CATI) and Computer Assisted web Interviewing (CAWI). A proportionate stratified by region systematic sampling procedure was used to ensure a nationally representative sample of the urban/rural population. Data were collected using a structured questionnaire. **RESULTS:** 35% of respondents reported correctly the five most commonly related to COVID-19 symptoms (i.e. cough, fever, shortness of breath, gastrointestinal symptoms and myalgia). Most respondents (>90%) knew that coronavirus can be transmitted by droplets from human-to-human and contaminated surfaces. Avoiding touching the face with one's hands and social distancing were identified as the most appropriate prevention and control measures against COVID-19 by over 95% of respondents. The median (IQR) of the total knowledge score was 17 (16-19). 45.6% of respondents believed that the novel coronavirus was developed by humans in laboratories, and 79.4% and 69.0% believed that novel coronavirus is more contagious and more lethal than flu virus H1N1, respectively. 41.1% of respondents stated that they had proceeded to social distancing before government measures were taken. **CONCLUSION:** Overall, the Greek general population had adequate knowledge of the symptoms, transmission routes and prevention measures of the COVID-19, although there is undoubtedly still room for improvement. *Pneumon 2020, 33(4):1-19.*

INTRODUCTION

Coronavirus disease 2019 (COVID-19), which quickly became a global health emergency in March 2020, is a respiratory disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), a virus subsumed in a large family of zoonotic RNA single stranded viruses known as corona viruses.[1] It was first detected in December 2019 in Wuhan, China.[2] The major clinical symptoms of COVID-19 include fever, dyspnea, fatigue, dry cough, and myalgia.[3] COVID-19 is characterized by rapid transmission and can occur mainly through air droplets, close contact with infected persons, contaminated surfaces and mucus secretions from nose, mouth or eyes, and some studies are also suggestive of digestive tract transmission.[4–6] COVID-19 has spread widely and rapidly, with the total number of confirmed cases having reached at 23,677,221 and deaths at 813,789 worldwide as of August 26th, 2020.[7]

Greece reported its first confirmed case on February 26th, 2020 [8]. Up until August 26th, 8,819 people have been diagnosed with COVID-19 and 242 have died.[8] The Greek Government preemptively announced a series of strict measures, including the early adoption of a lockdown (in mid-March), and immediately started a nation-wide public information campaign regarding COVID–19 prevention emphasizing the importance of adopting disease control measures during the lockdown in order to limit the spread of COVID-19.[9] These measures led Greece to the lowest number of 30-day mortality per million population after Norway and Finland. In contrast, other Southern Europe countries with similar statistics to Greece regarding Gross Domestic Health Expenditure and age distribution, but which delayed initiating lockdown, suffered some of the highest losses from the pandemic.[10]

Given the fact that there is neither an effective cure nor a vaccine available for COVID-19,[11] a second more massive pandemic wave is expected,[12] even in countries like Greece.[13] Proper adherence by the general population to preventive measures established by the government is expected to play the most important role in preventing the second wave. Adherence is likely to be influenced by the public's knowledge and attitudes toward COVID-19. Evidence shows that public knowledge is critical to tackle pandemics.[12,14] Studies that assess the knowledge, attitudes, and practices (KAP) of the general population can provide useful insights to public health officials to design public health interventions pertaining to COVID-19 outbreaks. Such studies have already been conducted in Asia and Africa and have shown that the majority of participants in each study had adequate levels of knowledge, displayed positive attitudes and followed appropriate practices.[15–20] However, to the best of researchers' knowledge, such data for the Greek general population are completely lacking from the international literature.

Thus, the primary objective of the present study was to examine the KAP of adult Greek residents toward COVID-19 during the peak of the first wave of the pandemic. The secondary objective was to determine potential factors that might influence the KAP of Greek general population toward COVID-19, helping public health officials identify highest-leverage demographic groups to be target for prevention interventions.

METHODS

Study design and study participants

The study design was a cross-sectional survey conducted among the adult general population of Greece between April 28, 2020 to May 03, 2020 (last week of lockdown), using a mixed methodology for data collection: Computer Assisted Telephone Interviewing (CATI) and Computer Assisted web Interviewing (CAWI). To calculate the sample size for this survey, we hypothesized that at a 99% confidence interval, 50% of the respondents would have a satisfactory knowledge level of COVID-19 at a margin of error ±5%. Using a sample size calculator, the target sample size was found to be around 1,000 respondents. To ensure a nationally representative sample of the urban/rural population according to the Greek census 2011 (www.statistics.gr), a proportionate stratified by region systematic sampling procedure was used to recruit participants. Half of the total target sample size was met by CATI (502 interviews) and the other half (502 interviews) by CAWI. For CATI, a random-digit dialed (RDD) sample of 9,977 landline-telephone households was conducted, 74% of whom were excluded due to unavailability (e.g. no answer, busy etc) but 26% of whom (2,597) led to handled calls. Of those 2,597, 1,434 refused to participate in this survey, 50 asked for the interview to be terminated before screening was complete, 219 did not meet an age criterion, 228 calls were reached businesses/commercial spaces instead of households and 142 communications were not possible. To complete 502 interviews with the CAWI method, 1,497 invitations were sent to adults.

To ensure the external validity and the greater generalizability of the study, survey weights were used to adjust

for differences in age and gender between survey sample and country population data, obtained from the Greek census 2011 (www.statistics.gr).The survey weights were calculated with the rake method (also known as 'rim').

Prior to completion of the survey, all patients were informed about the purpose of the study, were assured about the confidentiality and anonymity of the answers told they could terminate the interview at any time. According to the Greek legislation (Law 2328/1995, Presidential Decree 310/1996, Law 3603/2007, Law 2472/1997, Law 3471/2006) there is no need for ethics approval in telephone and internet surveys such the one presented here (Association of Opinion Polls and Survey Organizations - www.sedea.gr). Therefore, the study protocol was not submitted to the ethical committee of any institution for approval. All procedures were conducted in line with the Declaration of Helsinki [21].

Data collection

Data collection was guided through a structured questionnaire (Additional file 1) consisting of four main themes: 1) demographics which surveyed participants' socio-demographic information, including gender, age, area of residence, occupation, educational status, marital status, number of persons living in the house, number of children living in the house, and whether the interviewee or someone else living in the same house belongs to a vulnerable group (aged ≥65 years or being pregnant or having at least one of the following diseases: diabetes mellitus, chronic cardiovascular disease, chronic respiratory problems, malignancy, immunosuppression); 2) knowledge about COVID-19; 3) attitudes toward COVID-19; and 4) practices relevant to COVID-19. The survey was conducted in Greek and took 9-12 minutes to complete. The questionnaire was pre-validated by three independent reviewers, and a pre-test study was conducted with 6 individuals. The responses from the pre-test were not included in the analysis.

To measure knowledge about COVID-19, 23 questions were used. Five questions measured participants' knowledge about clinical presentations, 5 questions about transmission routes and 13 questions about prevention and control of COVID-19. A correct response to a question was assigned 1 point, while an incorrect/ not sure response was assigned 0 points. The total score for knowledge ranged from 0 to 23, with a higher score indicating better knowledge of COVID-19. The answers considered correct per question are presented in Ad-

ditional file 2. The internal consistency of the questions used in the total score was assessed using Cronbach's alpha coefficient that was found to be 0.580, indicating "poor" internal reliability. Participants were also asked about their most commonly used sources of information regarding COVID-19.

Attitudes towards COVID-19 were measured through 8 questions: a) whether the coronavirus was developed in a laboratory; b) how contagious or lethal they considered the coronavirus to be, compared to the flu virus H1N1 (extremely/very likely, somewhat likely, slightly likely/ not likely at all); c) what they expected would best limit the spread of coronavirus (when a large percentage of the population has become infected or when a vaccine is developed or when a treatment is found); d) whether there will be other COVID-19 epidemic waves in our country (extremely/very likely, somewhat likely, slightly likely/ not likely at all); and e) how this pandemic will influence their future attitude toward vaccination and adherence to infection prevention measures.

To examine practices relevant to COVID-19 control 7 questions were asked, assessing: a) whether participants had already taken to/adopted/opted for social distancing/voluntarily socially distanced before the government took any measures along with any reasons for doing so, b) how frequently participants wash their hands on a daily basis, and c) whether participants had been vaccinated for the flu the previous year and whether they were planning to have the flu vaccine in the coming all/winter or the COVID-19 vaccine when and if it becomes available.

Statistical Analysis

Participant's responses are presented with absolute and relative frequencies (%). Knowledge score is described with median and interquartile range (IQR). Chi-square test of independence was applied to identify possible factors (social and demographic) associated with participant's knowledge, attitudes and practices towards COVID-19. Mann-Whitney and Kruskal-Wallis tests were used to identify possible factors related to knowledge score. Binary logistic regression was performed to estimate the identify factors independently associated with participant's KAP. Results are presented with Odds Ratios (OR) and 95% Confidence intervals (CI). Generalized Linear Model (GLM) with Inverse Gaussian function and log link was also performed to estimate the impact of factors on knowledge score. Results are presented with β coefficients and 95% CI. The level of statistical

significance was set to 5%. Analysis was conducted with SPSS statistical package v.25.

RESULTS

Characteristics of participants

The baseline characteristics of the respondents are presented in Table A Additional file 3. The mean age of all respondents was 41.7 years (over range: 18-99 years, SD: 17.7). Of all respondents, 51.0% were female, 59.8% had received college or above education and 63.8% were married (Table A in Additional file 3). Almost 35.0% of respondents reported that they belonged to vulnerable group, while 41.2% lived with someone who belonged to vulnerable group.

Knowledge related to COVID-19

Most of the respondents (53.7%) stated mass media as their major source of knowledge followed by official national and state websites (18.5%). Overall, 35% of respondents reported correctly the five most common COVID-19 related symptoms (i.e. cough, fever, shortness of breath, gastrointestinal symptoms and myalgia) (Table 1). Multiple logistic regression analysis showed that women and those aged more than 24 years old were more likely to correctly state the 5 most common COVID-19 related symptoms compared to their counterparts (Table 2).

With regards to transmission routes, most respondents (>90%) knew that the coronavirus can be transmitted by droplets from human to human and through contaminated surfaces. It should be noted, however, that 27.6% wrongly answered that transmission could occur through food and almost 11% by animals/mosquitos. Overall, 20.6% of the respondents provided the correct answer to all the questions regarding transmission routes (Table 1). Highly educated participants (undergraduate and above) were more likely to answer correctly to questions as compared to those with lower education (primary school) (23.2% vs 16.9%).

Most of the respondents seemed to know the appropriate COVID-19 prevention and control measures, with more than 95% answering that they need to avoid touching the face with hands and practice social distancing. In addition, 82% and 88% of respondents reported correctly that the use of gloves/mask and the regular hand washing, respectively, are prevention and control measures. Only 20% of respondents reported that handwashing with sanitizer is better than soap and water (Table 1), while the

correct answer regarding the appropriate way of hand washing with soap and water was provided by 40% of respondents. Finally, almost 80% of respondents answered that the first thing they would do in case they experienced COVID-19 related symptoms was to contact their family doctor or the National Public Health Organization, while only 4.7% would first visit a COVID-19 reference center; the remaining 14.4% would first isolate themselves from the rest of the family. Overall, 15.8% of the respondents provided the correct answer to the questions regarding appropriate prevention measures (Table 1). After multiple logistic regression, middle age participants and those with higher level of education were more likely to know the appropriate prevention measures (Table 2). Moreover, women, those aged older than 24 years old, married and those belonging to vulnerable group were more likely to know the first thing they had to do in case they experienced COVID-19 related symptoms compared to their counterparts (Table 2).

Overall, the median (IQR) total knowledge score was 17 (16-19). Univariate analyses, revealed that the total knowledge score was statistically significantly lower among respondents aged less than 25 years old, those that had received only primary education, those with no children, those who are single and belonging to a vulnerable group as well as single ones compared to their counterparts. Multiple generalized linear regression analysis showed that educational status and age were statistically significantly associated with the total knowledge score (Table B in Additional file 4).

Attitudes related to COVID-19

Of all respondents, 45.6% believed that the novel coronavirus is man-made and has been developed in a laboratory. Moreover, 79.4% and 69.0% of respondents believed that novel coronavirus is more contagious and more lethal than flu virus H1N1, respectively (Table 1). With respect to controlling and eliminating the novel coronavirus, 52.5% of respondents believed that it will stop spreading once a vaccine is developed and another 18.2% once a large percentage of the population has become infected.

Multiple logistic regression revealed that women, those aged 25-64 years old and those living in urban areas were more likely to believe that novel coronavirus was developed by humans in laboratories. Similarly, those with college and above education were almost 60% less likely to believe that the novel coronavirus was developed in laboratories compared to those who had received only

TABLE 1. Knowledge, attitudes and practices of Greek population for COVID-19 (n=1004)

	Yes	No	Don't know
	N (%)	N (%)	N (%)
Knowledge:			
Symptoms			
Gastrointestinal symptoms	492(49.0%)	358(35.6%)	154(15.4%)
Cough	943(93.9%)	38(3.8%)	23(2.3%)
Shortness of breath	944(94.1%)	29(2.9%)	31(3.1%)
Fever	975(97.1%)	16(1.6%)	13(1.3%)
Myalgia (muscle and skeletal pain)	604(60.1%)	249(24.8%)	152(15.1%)
Overall correct answer regarding symptoms	352(35.0%)	652(65.0%)	
Transmission route			
by air	560(55.7%)	347(34.5%)	98(9.7%)
by droplets from human to human	983(97.9%)	10(1.0%)	11(1.1%)
by contaminated surfaces	951(94.7%)	33(3.3%)	21(2.0%)
by animals/mosquitos	113(11.2%)	687(68.5%)	204(20.3%)
by food products	277(27.6%)	586(58.3%)	141(14.1%)
Overall correct answer regarding transmission route	206(20.6%)	798(79.4%)	
Prevention measures			
Use of gloves	824(82.0%)	163(16.2%)	17(1.7%)
Use of mask	885(88.2%)	97(9.7%)	21(2.1%)
Regular handwashing with soap/alcoholic solution	985(98.1%)	14(1.4%)	5(0.5%)
Avoiding touching your face with your hands	984(98.0%)	18(1.8%)	2(0.2%)
Avoiding contact with animals	178(17.7%)	713(71.0%)	113(11.3%)
Physical distancing (2m)	972(96.8%)	22(2.2%)	10(1.0%)
Homeopathic remedies	97(9.7%)	665(66.2%)	242(24.1%)
Flu vaccine	193(19.3%)	645(64.2%)	166(16.5%)
Using antibiotics	95(9.5%)	797(79.3%)	112(11.1%)
Regular exercise & healthy diet	597(59.5%)	341(33.9%)	66(6.6%)
Overall correct answer regarding Prevention measures	158(15.8%)	846(84.2%)	
Is handwashing with antiseptic/alcoholic solution better than soap and water?	197(19.7%)	675(67.3%)	131(13.1%)
Attitudes:			
Do you believe that the novel coronavirus was developed by humans in laboratories?	458(45.6%)	307(30.6%)	239(23.8%)

	Extremely/ Very likely	Somewhat likely	Slightly likely / Not likely at all
	N (%)	N (%)	N (%)
How much more contagious is the novel coronavirus compared to the flu virus H1N1?	757(79.4%)	160 (16.8%)	36(3.8%)
How much more lethal is the novel coronavirus compared to the flu virus H1N1?	647(69.0%)	186(19.9%)	104(11.1)
How likely do you think it is to have other waves of coronavirus outbreaks in our country?	702(72.9%)	190(19.7%)	72(7.4%)

	Yes N(%)	No N(%)	Don't know N(%)
Practices:			
Did you socially distance before government measures were taken?	412(41.1%)	573(57.1%)	19(1.9%)

	<5 times N(%)	5-10 times N(%)	≥10 times N(%)
On average how many times do you wash your hands on a daily basis?	124(12.4%)	458(46.5%)	410(40.8%)

TABLE 2. Associations between participants characteristics and knowledge

	Symptoms[§]		Prevention Measures[§]		First "go-to" action in case of symptoms (contact with National Public Health Organization or my doctor)	
	Row%	ORm(95%CI)	Row%	ORm(95%CI)	Row%	ORm(95%CI)
Gender						
Male	31.3%	1.00	16.8%	NU	77.9%	1.00
Female	39.0%	1.38(1.04-1.83)*	14.7%		83.6%	1.39(0.98-1.96)
Age (years)						
18 - 24	9.2%	1.00	9.2%	1.00	67.6%	1.00
25 - 34	24.7%	2.44(1.14-5.22)*	13.1%	1.42(0.64, 3.15)	72.4%	1.20(0.66-2.16)
35 - 44	33.0%	3.38(1.55-7.37)*	24.7%	3.20(1.54, 6.65)*	83.1%	1.76(0.90-3.44)
45 - 54	44.6%	5.15(2.32-11.44)*	23.6%	3.07(1.46, 6.46)*	82.3%	1.62(0.80-3.28)
55 - 64	38.7%	3.61(1.58-8.25)*	10.6%	1.29(0.56, 3.01)	83.8%	1.57(0.73-3.40)
65+	47.0%	4.70(2.00-10.99)*	11.2%	1.51(0.70, 3.27)	88.2%	2.64(1.22-5.75)*
Education level						
Primary school	40.2%	NU	3.3%	1.00	86.8%	1.00
Middle school	32.4%		15.3%	4.34(1.08, 17.34)*	84.5%	1.26(0.53-3.01)
College and above	35.3%		17.4%	4.92(1.24, 19.48)*	77.7%	0.73(0.32-1.70)
Marital status						
Single	21.0%	1.00	15.4%	NU	70.5%	1.00
Married/Cohabitation	39.7%	1.21(0.78-1.86)	16.9%		85.9%	1.73(1.09-2.74)*
Divorced/Separated/Widowed	44.8%	1.25(0.69-2.29)	10.5%		77.2%	0.74(0.38-1.48)
Vulnerable group (Self and/or housemate)						
No	30.1%	1.00	17.4%	NU	80.2%	NU
Yes	39.4%	1.25(0.89-1.74)	14.5%		81.3%	
Were you actively working, before government measures were taken						
No	39.0%	1.00	13.7%	NU	83.1%	NU
Yes	31.7%	0.93(0.66-1.32)	17.9%		78.8%	
Source of Information						
Social media	21.4%	1.00	12.3%		73.3%	1.00
Official national and state websites	31.0%	1.42(0.81-2.48)	20.0%	NU	83.7%	1.53(0.85-2.75)
Mass Media	39.1%	1.35(0.80-2.28)	15.4%		83.8%	1.06(0.63-1.80)
Internet	37.6%	1.59(0.86-2.91)	16.9%		72.1%	0.72(0.39-1.32)

[§]knwoledge of symptoms and prevention measures as noted in the Appendix

ORm: odds ratio obtained from multivariate logistics regression analysis using univariately significant variables

NU: not significant in the univariate analysis

*p<0.05

primary education (Table 3). Women, respondents aged more than 65 years old and those who knew symptoms and prevention measures correctly were more likely to believe that coronavirus is more lethal than H1N1 virus

(Table 3). Also, elderly respondents (65+) and those who knew the correct first "go-to" action in case of symptoms were less likely to believe that elimination of the novel coronavirus will be achieved when a large percentage of

To the best of our knowledge, this is the first survey examining the KAP toward COVID-19 in the first epidemic wave among the general Greek population.

In this study, 56.8 % of respondents correctly provided cough, shortness of breath, fever, and myalgia in the most common COVID-19 symptoms; a percentage much lower than that provided in previously conducted studies in

Asia[15–17] and Africa[18] where this percentage ranged between 85%[18] and 98.02%[17]. It should be noted that, in contrast to earlier KAP studies, we added the gastrointestinal symptoms in the question regarding the five most common COVID-19-related symptoms, because they are included in the updated COVID-19 case definition. The percentage of participants who knew that the COVID-19 virus spreads

TABLE 3. Associations between participants characteristics and attitudes

	Coronavirus was developed by humans in laboratory		Coronavirus is more lethal than H1N1		Elimination of coronavirus spread will be achieved when a large percentage of the population has become infected		Next coronavirus outbreaks in Greece	
	Row%	ORm(95%CI)	Row%	ORm(95%CI)	Row%	ORm(95%CI)	Row%	ORm(95%CI)
Gender								
Male	53.7%	1.00	64.5%	1.00	19.0%	NU	68.4%	1.00
Female	66.4%	1.60(1.18-2.19)*	73.5%	1.44(1.06-1.95) *	20.9%		77.3%	1.46(1.07-1.99) *
Age (years)								
18 - 24	47.1%	1.00	53.5%	1.00	26.3%	1.00	60.0%	1.23(0.71-2.12)
25 - 34	57.7%	1.89(1.07-3.34) *	57.5%	1.10(0.63-1.92)	29.6%	1.28(0.70-2.34)	68.6%	1.34(0.73-2.47)
35 - 44	63.0%	2.06(1.17-3.61) *	67.3%	1.44(0.79-2.63)	29.0%	1.34(0.71-2.52)	74.0%	1.46(0.76-2.81)
45 - 54	60.3%	1.92(1.08-3.43) *	64.1%	1.11(0.60-2.08)	22.4%	0.98(0.51-1.87)	78.4%	1.35(0.66-2.76)
55 - 64	78.0%	3.46(1.81-6.61) *	76.5%	1.88(0.96-3.71)	12.5%	0.49(0.24-1.01)	78.4%	1.04(0.52-2.07)
65+	53.1%	1.12(0.63-1.99)	85.3%	2.92(1.41-6.02) *	5.4%	0.26(0.12-0.60) *	74.6%	
Area								
Athens	51.4%	1.00	70.8%	NU	20.8%	NU	74.1%	1.00
Thesssaloniki	60.4%	1.33(0.82-2.14)	65.9%		21.8%		70.1%	0.85(0.53-1.37)
Urban area	65.7%	1.71(1.17-2.48)*	68.4%		17.2%		74.8%	1.02(0.71-1.47)
Semi-urban	62.9%	1.44(0.82-2.53)	67.1%		28.7%		61.2%	0.53(0.31-0.89) *
Rural area	69.0%	1.44(0.79-2.62)	71.8%		14.8%		75.8%	1.07(0.61-1.88)
Education level								
Primary school	74.4%	1.00	83.5%	1.00	11.6%	NU	69.4%	NU
Middle school	69.9%	0.83(0.43-1.57)	68.5%	0.43(0.17-1.09)	18.1%		72.2%	
College and above	52.8%	0.41(0.22-0.76)*	66.5%	0.40(0.16-1.01)	22.2%		73.8%	
Marital status								
Single	54.1%	NU	59.5%	1.00	24.1%	NU	65.5%	1.00
Married/Cohabitation	62.5%		71.3%	1.05(0.70-1.59)	18.0%		75.5%	1.36(0.86-2.13)
Divorced/Separated/ Widowed	57.7%		82.4%	1.52(0.75-3.07)	20.7%		79.8%	1.67(0.82-3.38)
Children								
0	59.3%	NU	71.0%	NU	17.4%	1.00	73.1%	1.00
1	62.2%		64.9%		26.3%	1.07(0.68-1.68)	65.0%	0.59(0.38-0.91) *
≥2	60.7%		64.5%		24.3%	0.93(0.56-1.52)	80.4%	1.27(0.75-2.16)

TABLE 3. Associations between participants characteristics and attitudes

	Coronavirus was developed by humans in laboratory		Coronavirus is more lethal than H1N1		Elimination of coronavirus spread will be achieved when a large percentage of the population has become infected		Next coronavirus outbreaks in Greece	
	Row%	ORm(95%CI)	Row%	ORm(95%CI)	Row%	ORm(95%CI)	Row%	ORm(95%CI)
Vulnerable group (Self and/or housemate)								
No	57.8%	NU	62.6%	1.00	25.4%	1.00	73.2%	NU
Yes	61.7%		74.4%	1.08(0.78-1.50)	15.2%	0.82(0.56-1.18)	72.9%	
Were you actively working, before government measures were taken								
No	60.5%	NU	75.8%	1.00	13.3%	1.00	73.8%	NU
Yes	59.0%		62.7%	0.84(0.59-1.19)	25.8%	1.22(0.81-1.83)	72.1%	
Knowledge of symptoms								
No	59.7%	NU	64.5%	1.00	22.0%	1.00	68.8%	1.00
Yes	60.0%		77.2%	1.56(1.13-2.17) *	16.2%	0.86(0.58-1.26)	80.4%	1.63(1.17-2.29) *
Knowledge of prevention measures								
No	61.3%	NU	67.1%	1.00	21.0%	NU	71.8%	NU
Yes	52.6%		78.8%	2.13(1.38-3.29) *	14.7%		78.7%	
Knowledge that sanitizer is better than washing with soap & water								
No	58.5%	NU	68.6%	NU	19.2%	NU	74.4%	1.00
Yes	64.7%		70.8%		23.0%		66.9%	0.91(0.63-1.32)
Knowledge of first "go-to" action in case of symptoms								
No	55.2%	NU	65.1%	NU	31.1%	1.00	70.2%	NU
Yes	61.0%		70.4%		17.4%	0.56(0.38-0.83) *	73.5%	

ORm: odds ratio obtained from multivariate logistics regression analysis using univariately significant variables

NU: not significant in the univariate analysis

*p<0.05

the population has become infected. Finally, women and those who knew the correct symptoms of COVID-19 were more likely to believe that there will be future epidemic waves of theinfection. Also more likely to believe in future COVID-19 epidemic were those with no children and those living in Athens, as opposed to respondents with 1 children and people living in semi-urban areas (Table 3).

Practices related to COVID-19

Among all respondents, 41.1 % stated that they had started practicing social distancing before it was enforced by the local authorities. Reasons motivating them were: fearing for their own life (54.3%), fear of transmitting the virus to people of a vulnerable group (88.6%), helping to minimize the spread (86.9%) and helping protect the healthcare system from collapse (68.2%). Moreover, 12.4%

reported that they wash their hands less than 5 times/day (Table 1). Multiple logistic regression revealed that women and those aged more than 55 years old were more likely to wash their hands more than 10 times per day (Table 4).

DISCUSSION

COVID-19 is a rising infectious disease that constitutes a serious threat to public health. Given the significant threats posed by COVID-19 and the absence of a CO-VID-19 vaccine, community preventive measures play a decisive role in reducing infection and morbidity rates and controlling the spread of the disease. This indicates the importance of the public's adherence to preventive and control measures, which, in turn, is affected by their KAP. In Europe, Greece's response to the first wave of the

TABLE 4. Associations between participants characteristics and practices

	Social distancing before the government measures were applied (% yes)		In average how many times do you wash your hands every day? (% >10 times)	
	Row%	OR$_m$(95%CI)	Row%	OR$_m$(95%CI)
Gender				
Male	39.6%	NU	31.0%	1.00
Female	44.1%		52.2%	2.32(1.75-3.08)*
Age (years)				
18 - 24	50.0%	1.00	26.7%	1.00
25 - 34	48.2%	0.88(0.52-1.48)	26.8%	0.95(0.52-1.74)
35 - 44	47.3%	0.94(0.55-1.64)	41.8%	1.59(0.85-2.98)
45 - 54	35.4%	0.57(0.32-1.02)	43.8%	1.67(0.87-3.20)
55 - 64	41.4%	0.84(0.46-1.55)	54.9%	2.20(1.12-4.31)*
65+	34.3%	0.63(0.35-1.14)	48.3%	1.90(0.96-3.75)
Education level				
Primary school	26.8%	1.00	55.3%	1.00
Secondary school	40.9%	1.70(1.03-2.82)*	41.7%	0.79(0.44-1.42)
Undergraduate level and above	45.1%	1.98(1.23-3.21)*	38.5%	0.71(0.40-1.26)
Marital status				
Single	48.6%	1.00	27.2%	1.00
Married/Cohabitation	39.5%	0.87(0.60-1.26)	46.6%	1.42(0.94-2.13)
Divorced/Separated/Widowed	38.9%	1.00(0.57-1.77)	44.1%	1.00(0.55-1.81)
Before the government measures were taken. were you actively working?				
No	43.6%	NU	44.9%	1.00
Yes	40.2%		38.1%	1.02(0.73-1.42)
Knowledge of symptoms				
No	41.1%	NU	38.0%	1.00
Yes	43.2%		47.5%	1.23(0.93-1.65)
Knowledge that sanitizer is better than washing with soap&water				
No	41.6%	NU	43.7%	1.00
Yes	42.9%		31.7%	0.81(0.56-1.16)
Knowledge of first go-to action in case of symptoms				
No	41.3%	NU	33.4%	1.00
Yes	42.2%		43.3%	1.23(0.85-1.76)

OR$_m$: odds ratio obtained from multivariate logistics regression analysis using univariately significant variables
NU: not significant in the univariate analysis
*p<0.05

pandemic has been hailed as a "success story", especially considering that Greece has been suffering significant public health system shortages as a result of the recent economic crisis.[9] The country's success in minimizing the spread of the virus is largely due to the early adoption of a 'lock-down' (in the middle of March) and the immediate implementation of a nation-wide communication campaigns on COVID–19 and good prevention practice.

via respiratory droplets of infected individuals (97.9%) is comparable with two studies that took place in China (97.8%)[15] and Tanzania (92%),[18] and higher than those of two other Asian studies (81.9% and 50.1%, respectively).

According to the current survey, knowledge score was statistically significant across age and marital status, a finding that is supported by other COVID-19 related KAP studies,[15,19,20] while we found that the number of people living in house was significant predictor of participants' knowledge, which is a factor that has not yet been explored for possible association with the knowledge score in other studies. Our findings suggest that greater emphasis should be placed on the implementation of awareness raising interventions through mass media, to targeting young people, singles, and one-person households, to improve public knowledge on the CO-VID-19 pandemic.

Regarding attitudes, it was found that respondents who received college and above education was almost 60% less likely to believe that the novel coronavirus was developed in laboratories compared to those who had received only primary education. We consider that this is primarily due to the fact that because of the seriousness of the pandemic and the overwhelming news reports on this public health emergency, this population group would actively search for reliable information for this infectious disease from various sources of information such as the official websites of the National Public Health Organization and the Hellenic Ministry of Health and other medical sites and find evidence-based researches that prove wrong this point of view.[22,23] This aforementioned significant negative association supports this speculation.

Another interesting finding is that participants correctly identified symptoms and prevention measures correctly were more likely to believe that coronavirus is more lethal than H1N1 virus. A reason for this might be that this population group is more aware of the seriousness of COVID-19 pandemic, which leads to the search for reliable epidemiological data regarding COVID-19 morbidity and its comparison with H1N1.[24]

Concerning practices, only 41.1% of the respondents were in the process of social distancing before the government measures were applied, in contrast to the study of Azlan et al,[16] in which the 82.7% of the participants avoided going to crowded places such as weddings in the week before lockdown. This indicates the lack of willingness from participants to make behavioral changes in the face of the COVID-19 pandemic unless faced with government mandates. However, the vast majority of the participants in our survey (87.3%), wash their hands five or more times every time, finding that is on the line with the Malaysian KAP study, where the 87% of the respondents answered that they did proper hand hygiene by frequently washing their hands and using hand sanitizer. A remarkably interesting finding was that men were significantly less likely than women to wash their hands by more than ten times per day. This finding is consistent with previous studies showing that, in response to Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS), men were significantly less likely take preventive and protective measures than women.[25,26] This suggests that targeted health education interventions should be directed towards men, for example health information can be sent to women who live with men, which may in turn influence men's practices positively.

The strength of this study lies in its study design. In previous KAP studies, data collection was conducted using online self-reported questionnaires that have the disadvantage of limiting the participation of vulnerable groups, such as illiterate and rural people, without access to the internet and online health information resources. In our survey, a mixed methodology for data collection was used (CATI and CAWI) ensuring a random sample with greater generalizability in terms of age, gender and residence area. It should be mentioned that, to our knowledge, this is the first KAP study that was conducted in Europe, contributing to the determination of the knowledge, perceptions and practices of the general population of a European country with different culture and way of life comparing with a country from another continent.

Despite the strengths of this study, several limitations should be acknowledged, as well. First of all, telephone and web-based surveys are characterized by a low response rate compared to face-to-face ones, affecting the representativeness of the sample. However, using weights, we ensured the representativeness by age and gender. Moreover, this kind of surveys may suffer from poor response quality compared to face-to-face ones (reporting bias).[27] Finally, the low internal validity of knowledge score indicates that we should interpret cautiously the results related to this score.

CONCLUSIONS

In summary, during the pandemic spike, the Greek

general population had good knowledge of COVID-19 symptoms, transmission routes and prevention measures, although there is still great potential for improvement. The results of this study suggest that the educational/informative programs should place more emphasis on young people, singles, those with lower levels of educational attainment and men. KAP studies are important tools and should be repeated at regular intervals to detect changes over time. This way, targeted public health initiatives can be adapted and adjusted based on the needs of the public.

ΠΕΡΙΛΗΨΗ

Γνώσεις, αντιλήψεις και πρακτικές αναφορικά με την Covid-19 μεταξύ του γενικού ελληνικού πληθυσμού

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Εισαγωγή: Χώρες από όλο τον κόσμο έχουν υιοθετήσει πρωτοφανή πρόληψης και ελέγχου λοιμώξεων για τον περιορισμό της εξάπλωσης της λοίμωξης COVID -19. Η επιτυχία αυτών των μέτρων εξαρτάται από τη γνώση, τις αντιλήψεις και τις πρακτικές του γενικού πληθυσμού απέναντι στη COVID-19. Ο σκοπός αυτής της μελέτης ήταν η αξιολόγηση των γνώσεων, των πεποιθήσεων και των αντιλήψεων των ενηλίκων κατοίκων της Ελλάδας έναντι της COVID-19. *Μεθοδολογία:* Πραγματοποιήθηκε συγχρονική πανελλαδική έρευνα (n=1.004) το χρονικό διάστημα μεταξύ 28 Απριλίου 2020 και 03 Μαΐου 2020 χρησιμοποιώντας μικτή μεθοδολογία για τη συλλογή των δεδομένων: τη τηλεφωνική υποβοηθούμενη από ηλεκτρονικό υπολογιστή συνέντευξη (CATI) και τη συνέντευξη μέσω διαδικτύου (CAWI). Χρησιμοποιήθηκε αναλογική, στρωματοποιημένη ανά περιοχή, συστηματική διαδικασία δειγματοληψίας, για να εξασφαλιστεί αντιπροσωπευτικό δείγμα του αστικού/αγροτικού πληθυσμού της Ελλάδας. Τα δεδομένα συλλέχθηκαν με τη χρήση δομημένου ερωτηματολογίου. *Αποτελέσματα:* Το 35% των ερωτηθέντων ανέφερε σωστά τα πέντε πιο συχνά συμπτώματα σχετιζόμενα με τη COVID -19 (π.χ. βήχας, πυρετός, δύσπνοια, συμπτώματα από το γαστρεντερικό και μυαλγία). Οι περισσότεροι ερωτηθέντες (>90%) ήξεραν ότι ο νέος κορωνοϊός (SARS-CoV-2) μπορεί να μεταδοθεί μέσω σταγονιδίων από άνθρωπο σε άνθρωπο και από μολυσμένες επιφάνειες. Η αποφυγή του αγγίγματος του προσώπου με τα χέρια και η κοινωνική αποστασιοποίηση, προσδιορίστηκαν ως τα καταλληλότερα μέτρα πρόληψης και ελέγχου έναντι της COVID-19 από πάνω από το 95% των ερωτηθέντων. Η διάμεση τιμή (ενδοτεταρτημοριακό εύρος-IQR) της συνολικής βαθμολογίας αναφορικά με το επίπεδο γνώσεων ήταν 17 (16-19). Το 45,6% των ερωτηθέντων πίστευαν ότι ο νέος κορωνοϊός κατασκευάστηκε σε εργαστήριο, ενώ το 79,4% και το 69,0% πίστευαν ότι ο νέος κορωνοϊός είναι πιο μεταδοτικός και πιο θανατηφόρος από τον ιό της γρίπης H_1N_1, αντίστοιχα. Το 41,1% των ερωτηθέντων δήλωσαν ότι είχαν προχωρήσει σε κοινωνική αποστασιοποίηση πριν τη λήψη μέτρων από τη κυβέρνηση. *Συμπεράσματα:* Συμπερασματικά, ο ελληνικός γενικός πληθυσμός είχε επαρκή γνώση των συμπτωμάτων, των οδών μετάδοσης και των μέτρων πρόληψης της COVID -19, αν και αναμφίβολα υπάρχουν ακόμη περιθώρια βελτίωσης

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Λέξεις - Κλειδιά: COVID-19, Γνώσεις, Αντιλήψεις, Πρακτικές, Λοιμώδη Νοσήματα, Γενικός Πληθυσμός, Ελλάδα

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Additional File 1

QUESTIONNAIRE- KNOWLEDGE, ATTITUDES AND PRACTICES (KAP) RELATED TO THE COVID-19 PANDEMIC AMONG THE GREEK GENERAL POPULATION

Good morning. My name is . . . and I work for (name of company), an independent organization of (clinical) research. We are conducting a research study regarding the novel coronavirus pandemic.

1. First of all, I would like to ask if you are over the age of 18 years old?

Yes □   No □   I do not answer □

If «NO» or «I DO NOT ANSWER» -> Thank him/her and close the phone
If «YES» -> read the informed consent.

"We are conducting a study in order to assess the knowledge, attitudes and behaviors of the general public regarding the novel coronavirus pandemic. We would like to inform you that all of the data collected during this survey will be anonymous and it will not be possible to identify you individually from your answers. The practices/methods of this study are in compliance with the law, Acts and provisions of the national data protection authorities/ European Data Protection Supervisor (EDPS). Each of your answers will be presented together with/ along with other participants' answers. The duration of this survey will be a few minutes.

Taking into consideration all of the above would you like to participate in this study?"
□ Yes (Continue)
□ No (Thank him/her and close the phone)

A. DEMOGRAPHIC CHARACTERISTICS

A1. Gender of Participant	Male □ Female □
A2. Age of Participant **(Note specific age)** _____	□ 18 – 29 □ 30 – 39 □ 40 – 49 □ 50 – 59 □ 60 – 69 □ 70 – 79 □ 80+
A3. Population wise in which of the following categories does your household belong?	□ Athens □ Thessaloniki □ Urban area, apart from Athens and Thessaloniki (> 10.000 citizens/inhabitants) □ Semi-urban □ Agricultural area
A3A. In which state/prefecture does your household belong?	List of states/prefectures
A4. Which is the status of your education?	□ Elementary school □ Junior high □ High school □ Higher education □ MSc and/or PhD student/holder

A5. Which of the following is your marital status?	□ Single □ Married □ Divorced - Separated □ Widower/ Widow □ Cohabitation
A6. Do you have under aged children living at home with you?	□ Yes □ No
A7. If yes, how many?	Define . . .
A8. How many people live in your household, including yourself?	………
A9A. Do you personally belong to α vulnerable group? (>65yo, pregnant, diabetes mellitus, chronic cardiovascular disease, chronic respiratory problems, malignancy, immunosuppression)	□ Yes □ No
A9B. Do you have other people living with you who belong to a vulnerable group? (>65yo, pregnant, diabetes mellitus, chronic cardiovascular disease, chronic respiratory problems, malignancy, immunosuppression)	□ Yes □ No
A10.α. Before the government measures were taken, were you actively working?	Yes □ No □
A10.β If yes, is your occupation any of the following?	□ Doctor □ Nurse □ Other health/healthcare profession □ Supermarket employee – other retail food store employee □ Employee in public transportation
A11. Which is your current employment status now that the measures to prevent the spread of the novel coronavirus into effect/in progress?	□ Suspension of contract/employment contract on hold □ Work from home □ Alternative work arrangements/flexible working options (rota) I am going to work by turns/alternately/in rotation □ I go to work as usual □ I was not employed before and I am not working now/ I was neither employed before nor am I now
A12.α Were you diagnosed with covid-19?	□ Yes □ No
A12.β If yes, did you need to hospitalize?	□ Yes □ No
A13. Was any member from your immediate family environment diagnosed with covid-19?	□ Yes □ No

B. Knowledge towards COVID-19

B1. Which are the most common symptoms of covid-19? (answer with yes, no, I don't know)	Yes No I do not know □ □ □ Gastrointestinal symptoms (e.g. vomiting, diarrhea) □ □ □ Cough □ □ □ Shortness of breath □ □ □ Cough □ □ □ Myalgia (muscle and skeletal pain) □ Other (Define) . . .
B2. With which of the following ways is the novel coronavirus transmitted? (answer with yes, no, I don't know)	Yes No I do not know □ □ □ By air □ □ □ By air conditioning □ □ □ By droplets from human to human □ □ □ By contaminated surfaces □ □ □ By animals/mosquitos □ □ □ By food products □ Other (Define) . . .
B3. In case you develop symptoms of the novel coronavirus, which is the first thing you will do? (Answer with yes, no, I don't know)	Yes No I do not know □ □ □ Contact the National Public Health Organization □ □ □ Contact my doctor □ □ □ Visit a coronavirus reference hospital □ □ □ Isolate from the rest of my family □ Other . . .
B4. Which of the following are considered measures to prevent the spread of the novel coronavirus? (Answer with yes, no, I don't know)	Yes No I do not know □ □ □ Use of gloves □ □ □ Use of mask □ □ □ Regular handwashing with soap/alcoholic solution □ □ □ Avoiding touching your face with your hands □ □ □ Avoiding contact with animals □ □ □ Physical distancing (keeping minimum 2 meters between you and others) □ □ □ Homeopathic remedies □ □ □ Getting the flu vaccine □ □ □ Using antibiotics □ □ □ Regular exercise & healthy diet
B5. Which of the following is the most appropriate way of hand washing with soap and water? (Choose one answer)	□ Washing of hands for 5" with soap and cold water □ Washing of hands with soap and warm water □ Washing of hands for at least 20" with soap and water □ Washing all parts of the hands with foam for 20" and dry □ I don't know
B6. Is handwashing with antiseptic/alcoholic solution better than soap and water?	□ Yes □ No □ I don't know

C. Sources of information about COVID-19

C1. Which source of information do you use more often regarding the current developments of the COVID-19 pandemic: (choose one answer)	□ Social media (Facebook, twitter etc.) □ Official national and state actors' websites (national organization of public health, ministries etc.) □ Mass Media (radio, television, newspapers, etc.) □ Internet □ Acquaintances and friends □ Other

D1. Attitudes towards COVID-19

D1. Do you believe that the novel coronavirus was developed by humans in laboratories?	□ Yes □ No □ I do not know/I do not answer
D2. How infectious is the novel coronavirus compared to the flu virus H1N1?	□ Extremely likely □ Very likely □ Somewhat likely □ Slightly likely □ Not likely at all
D3. How fatal is the novel coronavirus compared to the flu virus H1N1?	□ Extremely likely □ Very likely □ Somewhat likely □ Slightly likely □ Not likely at all
D4. When do you think that the spread of the novel coronavirus will be mitigated? (Choose the answer that represents you the most)	□ when a large percentage of the population has become infected (herd immunity) □ When the vaccine is developed □ When treatment is found □ I don't know/ I don't answer
D5. Which of the following characteristics of the novel coronavirus infection stresses you out the most? Choose one answer	□ That is highly contagious □ That it can cause death □ That there is no current treatment for the novel coronavirus □ That there is no vaccine for the novel coronavirus □ That the actual number of the people infected is unknown □ I don't know/ I don't answer
D6. How likely do you think it is to have other waves of coronavirus outbreaks in our country?	□ Extremely likely □ Very likely □ Somewhat likely □ Slightly likely □ Not likely at all □ I don't know/ I don't answer
D7. To what extent do you believe that this pandemic will influence you as far as compliance with preventative measures for infection is concerned in the future?	□ Strongly Agree □ Agree □ Mutual/Neither Agree nor Disagree □ Disagree □ Strongly Disagree

D8. To what extent do you believe that this pandemic will positively influence your attitude towards vaccination generally?	□ Extremely likely □ Very likely □ Somewhat likely □ Not likely at all □ I don't know/ I don't answer

E. Attitudes and Behaviors of Social Distancing

E1. Where you in the process of social distancing before the government measures were applied?	□ Yes □ No
E2. If yes, to what extent was your decision influenced by each of the following reasons? □ **Fear for my life** □ **Fear of getting infected and transmitting it to people in my close environment who belong to vulnerable groups** □ **To contribute to minimizing the spread of the virus to the community** □ **To avoid overloading and/or collapsing of the healthcare system**	□ Very much □ Much □Not so much □A little □Not at all □ I don't know/ I don't answer
E3. How many times the past week have you exiting the house for each of the following reasons? □ **Going to the pharmacy or doctor visit** □ **Going to the supermarket or any other essential goods store** □ **Going to the bank** □ **Helping people in need** □ **Going to a ceremony (e.g. funeral, wedding, baptism)** □ **Exercising outside or walking a pet** □ **Going to work**	□ Once a week □ 2-3 times a week □ 4-6 times a week □ Once a day □ > once a day □ None
E4. In average how many times do you wash your hands every day?	□ Less than 5 □ 5 to 10 □ 10 το 20 □ I do not know
E5. If there was a vaccine available for the novel coronavirus would you do it?	□ Yes □ No □ I do not know/ I do not answer
E6. Did you do the seasonal flu vaccine this year?	□ Yes □ No □ I do not know/ I do not answer
E7. Will you do it next year?	□ Yes □ No □ I do not know/ I do not answer
E8. During the pandemic did you avoid going to a doctor or a hospital for a severe or chronic health problem?	□ Yes □ No

Additional File 2

CORRECT ANSWERS FOR KNOWLEDGE SCORE:

Symptoms: YES at all these symptoms: Gastrointestinal symptoms, Cough, Shortness of breath, Fever, Myalgia (5 points)

Transmission route: YES by air, by droplets from human to human, by contaminated surfaces, NOT from animals/mosquitos and food products (5 points)

"Go-to" action in case of symptoms: contact EODY or contact my doctor or isolate from family, NOT visiting reference hospital (1 point)

Prevention measures: Use of gloves, Use of mask, Regular handwashing with soap/alcoholic solution, Avoiding touching your face with your hands, Physical distancing (2m), NOT avoiding contact with animals, homeopathic remedies, flu vaccine, use of abs and healthy diet (10 points)

ABHR better than soap and water, Hand washing 20sec and dry (2 points)

Additional File 3

TABLE A. respondents characteristics (n=1004)

	N	%		N	%
Gender			**Number of people living inside a house**		
Male	512	51.0%	1	108	10.8%
Female	492	49.0%	2	318	31.9%
Age (years)			≥3	572	57.3%
18 - 24	109	10.9%	**Children**		
25 - 34	170	16.9%	No	682	68.4%
35 - 44	185	18.4%	Yes	315	31.6%
45 - 54	166	16.5%	1	159	51.1%
55 - 64	142	14.1%	≥2	151	48.9%
65+	232	23.1%	**Do you personally belong to a vulnerable group?**		
Geographic area of residence			No	648	65.2%
Athens	353	35.2%	Yes	346	34.8%
Thessaloniki	138	13.7%	**Do you currently live with someone who belongs to a vulnerable group?**		
Urban area (> 10.000/inhabitants) $	328	32.6%	No	585	58.8%
Semi-urban (2.000-10.000 inhabitants)	89	8.8%	Yes	410	41.2%
Rural area (until 2.000 inhabitants)	96	9.6%	**Vulnerable group (Self and/or housemate)**		
Education level			No	453	45.5%
Primary school	116	11.6%	Yes	542	54.5%
Middle school	287	28.6%	**Working before government- imposed (lock-down) measures**		
College and above	601	59.8%	No	479	48.0%
Marital status			Yes	519	52.0%
Single	268	26.9%			
Married/Co-habitation	636	63.8%			
Divorced/Separated/Widowed	63	9.3%			

$excluding Athens and Thessaloniki

Additional File 4

TABLE B. Associations between demographics and knowledge score

	Median (IQR)	p-value	β coefficient (95% CI)
Age (years)		0.001	
18 - 24	16(14-18)		0.00
25 - 34	17(15-19)$^\$$		0.05(0.01, 0.10)
35 - 44	18(16-19)$^{*\$}$		0.09(0.05, 0.14)§
45 - 54	18(17-19)$^{*\$}$		0.11(0.07, 0.17)§
55 - 64	18(15-19)$^\$$		0.10(0.05, 0.15)§
65+	17(15-19)$^\$$		0.08(0.02, 0.14)§
Education level		0.001	
Primary school	16(14-17)$^¥$		0.00
Middle school	17(15-19)		0.05(0.00, 0.10)§
College and above	18(16-19)		0.09(0.05, 0.14)§
Marital status		0.022	
Single	17(15-19)		0.00
Married/Cohabitation	18(16-19) $^\#$		-0.01(-0.04, 0.03)
Divorced/Separated/Widowed	17(15-19)		-0.03(-0.08, 0.02)
Children		0.001	
0	17(15-19)		0.00
1	18(16-19)		0.01(-0.03, 0.04)
≥2	18(17-19) $^\&$		0.02(-0.02, 0.05)
Vulnerable group (Self and/or housemate)		0.001	
No	18(16-19)		0.00
Yes	17(15-19)		-0.01(-0.04, 0.01)

*statistically significant different from age category 65+, after Bonferroni correction
$^\$$statistically significant different from age category 18-24, after Bonferroni correction
$^¥$statistically significant different from all other categories, after Bonferroni correction
$^\#$statistically significant different from category single, after Bonferroni correction
$^\&$statistically significant different from category 0, after Bonferroni correction
§p<0.05