



COVID-19

Risk perception, knowledge about SARS-CoV-2, and perception towards preventive measures in Italy: a nationwide cross-sectional study

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Keywords

SARS-CoV-2 • Risk perception • Knowledge • Preventive measures

Summary

Introduction. After COVID-19 outbreak, governments adopted several containment measures. Risk perception and knowledge may play a crucial role since they can affect compliance with preventive measures. This study aimed to explore the extent and the associated factors of risk perception, knowledge regarding SARS-CoV2, and perception towards preventive measures among the Italian population.

Methods. A nationwide cross-sectional study involving adults was conducted in April-May 2021: an online survey was distributed through social media. The outcomes were: Knowledge Score (KS) (0 to 100%: higher scores correspond to higher COVID-19 related knowledge); Risk Perception Score (RPS) (1 to 4: higher values indicate higher concern); Preventive measures Perception Score (PPS) (1 to 4: higher values indicate higher confidence). Multivariable regression models were performed.

Results. A total of 1120 participants were included. Median KS was

79.5% (IQR = 72.7%-86.4%). Lower education and poor economic conditions were negatively associated with the KS. Median RPS was 2.8 (IQR = 2.4-3.2). Female gender, sharing house with a fragile person, suffering from a chronic disease, having a family member/close friend who contracted SARS-CoV-2 infection were positively associated with the RPS. Median PPS was 3.1 (IQR = 2.8-3.4). Lower educational level was negatively associated with the PPS. Vaccine hesitancy was negatively associated with all three outcomes. The three scores were positively associated with each other.

Conclusions. Fair levels of knowledge, risk perception and perception towards preventive measures were reported. Reciprocal relationships between the outcomes and a relevant relationship with vaccine hesitancy were highlighted. Further investigations should be focused on studying underlying determinants and consequences.

Introduction

Worldwide, the need to contain the COVID-19 pandemic has led to several measures implemented by the governments to control the spread, ranging from simple recommendations to forced lockdown measures, as done in Italy. Whatever the degree of stringency adopted by the various governments, these measures differ widely from usual habits.

Risk perception, knowledge of COVID-19 features, and trust in authorities' decisions may play a crucial role in the progression of the disease since they can affect the compliance with preventive measures [1, 2]. Evaluating the risk perception of the general population is fundamental to direct future policy and research about disease outbreaks [3]. Thus, this study aimed to explore the extent and the associated factors of risk perception, knowledge regarding SARS-CoV2, and perception towards adopted preventive measures among the Italian population one year after the beginning of the pandemic.

Methods

Between April and May 2021, a cross-sectional study was

performed among a convenience sample of adults resident throughout Italy. The survey was distributed through social media and informed consent was obtained from all participants. The Ethics Committee of the University of Turin approved the protocol. Participants were anonymous and received no compensation.

The questionnaire, developed by the researchers based on relevant literature [4, 5], was composed of four sections. In the first part, sociodemographic characteristics (e.g. gender, age, occupation, living condition), health condition and COVID-19 experience (e.g. having contracted SARS-CoV-2, COVID-19 vaccine hesitancy) were collected.

The second part explored the knowledge about SARS-CoV-2 through 44 specific questions about transmission, possible symptoms and preventive measures to be implemented. The Knowledge Score (KS) was calculated considering the percentage of right answers and could assume values ranging from 0 to 100%. Higher scores correspond to higher knowledge of proposed themes.

The third part measured risk perception: participants were asked to express their own worry about contracting and transmitting the virus, having severe symptoms and having a positive subject between close contacts using

a 4-point Likert scale (from 1 = “not worried at all” to 4 = “very worried”).

The last section explored the perception of preventive measures through a 4-point Likert scale (from 1 = “not useful at all” to 4 = “very useful”): participants were asked to express their own opinion regarding the effectiveness and usefulness of measures proposed by the Italian Health Ministry to prevent the transmission. Such measures included several actions: from recommendations of cleaning surfaces, washing hands and staying at home if symptomatic to implementation of lockdown measures. Both Risk Perception Score (RPS) and Preventive measures Perception Score (PPS) were calculated considering mean scores obtained through the 4-point Likert scale. Values could range from 1 to 4: higher values indicate higher concern and higher confidence in preventive measures effectiveness, respectively.

STATISTICAL ANALYSIS

The KS, RPS, and PPS were the outcomes of the present study, considered as continuous variables.

Multivariable linear regressions were conducted to assess the potential role of sociodemographic, health-related and COVID-19 experience variables. The covariates to be included in the model were selected using a stepwise forward selection process, with a univariable p -value < 0.250 as the main criterion [6]. Results of regressions were expressed as adjusted Coefficients (adjCoef.) with a 95% Confidence Interval (CI).

For all analyses, Stata software (version 16) was used and a p -value < 0.05 was considered statistically significant.

Results

A total of 1120 questionnaires were completed and included in the present paper. The median age was 41 (IQR = 28-54), females were 77% and the majority of the sample had a high school diploma or lower educational grade (55.1%). Over half of the sample had an occupation involving contact with other people (59.0%), 24.7% declared to be a healthcare worker/student and 37.4% had a family member/close friend working as healthcare professionals. Considering professional/education sectors other than healthcare, 9.5% declared to work/study in Information and Communication Technologies (ICT) and 1.4% in journalism. A total of 21.1% declared their household economic situation was insufficient/poor.

A small part of the sample declared to suffer from chronic disease (18.9%) or live with/be a caregiver of a fragile person (21.7%). Only 15.0% contracted the SARS-CoV2 infection and 25.0% had a family member/close friend who contracted the SARS-CoV-2 infection. Finally, 28.5% received at least one dose of vaccine while 11.6% of respondents were vaccine hesitant, i.e. they had not received any dose and had no intention to undergo vaccination.

The median KS was 79.5% (IQR = 72.7-86.4%). It was differently distributed across the following subgroups: lower education (median 77.3%, IQR = 70.5-84.1) vs higher (81.2%, IQR = 77.3-88.6) ($p < 0.001$); healthcare

field (84.1%, IQR = 77.3-88.6) vs ICT (77.3%, IQR = 70.4-84.1) vs journalism (79.5%, IQR = 68.2-84.1) vs other sectors (79.5%, IQR = 70.4-84.1) ($p < 0.001$); excellent/adequate household situation (81.8%, IQR = 72.7-86.4) vs insufficient/poor (77.3%, IQR = 68.2-84.1) ($p < 0.001$); family member working as an healthcare professional (81.8%, IQR = 72.7-86.4) vs no (79.5%, IQR = 70.5-84.1) ($p < 0.001$); COVID-19 vaccine hesitant people (72.7%, IQR = 65.9-79.5) vs non-hesitant participants (79.5%, IQR = 70.5-84.1) ($p < 0.001$).

The median RPS was 2.8 (IQR = 2.4-3.2). Its distribution was different across the following categories: women (median 3, IQR = 2.6-3.2) vs men (2.8, IQR = 2.4-3.2) ($p < 0.001$); participants suffering from a chronic disease (3, IQR = 2.6-3.2) vs those who did not (2.8, IQR = 2.4-3.2) ($p = 0.007$); participants who lived with/were caregivers of a fragile person (3, IQR = 2.6-3.4) vs those who did not (2.8; IQR = 2.4-3.2) ($p < 0.001$).

The median PPS was 3.1 (IQR = 2.8-3.4). It was differently distributed across the following subgroups: women (median 3.2, IQR = 2.8-3.4) vs men (3, IQR = 2.7-3.4) ($p = 0.007$); participants suffering from a chronic disease (3.3, IQR = 2.9-3.6) vs those who did not (3.1, IQR = 2.8-3.4) ($p < 0.001$); participants who lived with/were caregivers of a fragile person (3.2, IQR = 2.8-3.5) vs those who did not (3.1; IQR = 2.8-3.4) ($p = 0.010$); COVID-19 vaccine hesitant people (3.1, IQR = 2.8-3.4) vs non-hesitant participants (3.2, IQR = 2.9-3.5) ($p < 0.001$).

Table I shows the multivariable models.

Female gender, ICT and other background, being a caregiver or sharing house with a fragile person, suffering from a chronic disease, having a family member/close friend who contracted SARS-CoV-2 infection were positively associated with the RPS. Vaccine hesitancy and age were negatively associated with the RPS.

Lower educational level and vaccine hesitancy were negatively associated with the PPS. Age was positively associated with PPS. Considering the relationships between the outcomes, the three scores were positively associated.

Discussion

This work aimed to assess risk perception, knowledge about SARS-CoV2, and perception towards preventive measures and potentially associated characteristics.

Overall, the level of perception and knowledge was good, consistently with relevant reviews focused on general public knowledge and perceptions [2, 7]. In addition, our findings confirmed the research on the relationship between risk perception and gender, health status, and experience of COVID-19 [1, 7], as well as the relationship between knowledge and educational level or economic situation [7]. Interestingly, the scientific literature has been reporting conflicting results about the role of age and being a healthcare professional [1, 7], thus suggesting that more robust research is needed to investigate these issues. Remarkably, vaccine hesitancy was associated with all our

Tab. I. Multivariable regression models for: Knowledge Score, Risk Perception Score and Preventive Perception Score.

Variable	Knowledge Score		Risk Perception Score		Preventive Perception Score	
	adjCoef. (95% CI)	p-value	adjCoef. (95% CI)	p-value	adjCoef. (95% CI)	p-value
Age	0.023 (-0.017; 0.062)	0.266	-0.006 (-0.001; -0.005)	< 0.001	0.009 (0.007; 0.010)	< 0.001
Gender						
Man	Ref.		Ref.		Ref.	
Woman	1.027 (-0.285; 2.34)	0.125	0.110 (0.040; 0.181)	0.002	0.043 (-0.015; 0.101)	0.142
Education						
University or higher	Ref.		-	-	Ref.	
High school or lower	-2.250 (-3.395; -1.105)	< 0.001	-	-	-0.053 (-0.103; -0.002)	0.041
Main occupation involves contact with other people						
Yes	Ref.		-	-	Ref.	
No	0.609 (-0.529; 1.747)	0.294	-	-	-0.049 (-0.099; 0.001)	0.054
Household economic situation						
Excellent/adequate	Ref.		-	-	-	-
Insufficient/poor	-2.122 (-3.507; -0.743)	0.003	-	-	-	-
Family member or close people working as healthcare professional						
No	Ref.		-	-	-	-
Yes	0.803 (-0.355; 1.961)	0.174	-	-	-	-
Sharing a house or taking care of a fragile person						
No	Ref.		Ref.		Ref.	
Yes	0.102 (-1.220; 1.43)	0.880	0.105 (0.034; 0.177)	0.004	0.010 (-0.049; 0.069)	0.746
Vaccine hesitancy						
No	Ref.		Ref.		Ref.	
Yes	-4.494 (-6.325; -2.662)	< 0.001	-0.232 (-0.329; -0.134)	< 0.001	-0.261 (-0.340; -0.181)	< 0.001
Suffering from chronic conditions						
No	Ref.		Ref.		Ref.	
Yes	0.112 (-1.323; 1.550)	0.879	0.096 (0.019; 0.173)	0.015	0.028 (-0.035; 0.092)	0.380
Professional sector/education						
Health Care	Ref.		Ref.		Ref.	
Information and Communication Technologies	-5.052 (-7.223; -2.881)	< 0.001	0.210 (0.097; 0.324)	< 0.001	-0.061 (-0.157; 0.035)	0.214
Journalism	-7.060 (-11.819; -2.301)	0.004	0.157 (-0.099; 0.415)	0.229	-0.064 (-0.275; 0.147)	0.551
Other	-4.583 (-5.956; -3.215)	< 0.001	0.164 (0.092; 0.236)	< 0.001	-0.066 (-0.126; -0.006)	0.032
Having family members/friends who contracted SARS-CoV-2 infection						
No	-	-	Ref.		-	-
Yes	-	-	0.075 (0.007; 0.144)	0.031	-	-
Having contracted SARS-CoV-2 infection						
No	-	-	-	-	Ref.	
Yes	-	-	-	-	-0.019 (-0.086; 0.048)	0.582
Knowledge Score	-	-	0.003 (0.000004; 0.006)	0.050	0.003 (0.0004; 0.005)	0.021
Preventive Perception Score	1.548 (0.253; 2.842)	0.019	0.442 (0.377; 0.507)	< 0.001	-	-
Risk Perception Score	1.148 (0.088; 2.209)	0.034	-	-	0.298 (0.254; 0.342)	< 0.001

adjCoef.: adjusted Coefficient; CI: Confidence Interval. Lower educational level, worst economic conditions, vaccine hesitancy, and non-healthcare professional sector/education were negatively associated with the KS.

outcomes. Previous studies also reported higher levels of knowledge and risk awareness have been related to a higher willingness to be vaccinated against COVID-19 [1, 8]. Moreover, especially during the pandemic, the relationship between vaccination intention and trust in government, which can influence the perception towards the preventive measures, has also been highlighted as significant [8]. It should be noted that knowledge, risk perception, and perception towards measures were associated with each other, underling that they may have common determinants and consequences (in addition to the

above-mentioned reflections on vaccine hesitancy). Also these findings are in line with recent works that showed that COVID-knowledge, risk perception and positive attitudes toward risk reduction rules were linked [1, 9]. Overall, we argue that trust towards authorities may have a major role in determining perceptions of population [1], especially in this context of crisis, and future studies should focus on this relationship to identify potentially modifiable factors and develop interventions that can have a substantial impact on such factors. The monitoring of these issues should be

continuous as both the risk perception and the trust have been reported to change during the pandemic [1, 10]. It should be acknowledged that the present study had some relevant limitations, such as the cross-sectional design, the convenience sampling, and the exclusively online data collection.

Conclusions

Our study reported good levels of knowledge, risk perception and perception towards preventive measures. It also highlighted several associations between these issues and sociodemographic characteristics, in addition to a relevant relationship with vaccine hesitancy and reciprocal relationships between the considered outcomes. Therefore, further investigations should be focused on studying underlying determinants and consequences in order to plan and implement effective interventions addressed to subgroups of population that have low knowledge and altered perceptions.

Acknowledgments

The authors would like to thank Dr. Gianluca Colli for his contribution.

Conflict of interest statement

The authors declare no conflict of interest.

Funding

This research received no external funding.

Authors' contributions

RS, FB, EDV, TS, GLM: conceptualization. FB, GS, TS, GLM: methodology. TS, GS: formal analysis. SN, TS: investigation. GLM, TS, GS, SN: data curation. GLM, TS: writing, original draft preparation and visualization. GLM, FB, GS: writing, review and editing. RS, FB, EDV: supervision and project administration. All authors have read and agreed to the published version of the manuscript.

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Received on November 29, 2022. Accepted on March, 23, 2023.

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How to cite this article: Lo Moro G, Scaioli G, Nicolino S, Sinigaglia T, De Vito E, Bert F, Siliquini R. Risk perception, knowledge about SARS-CoV-2, and perception towards preventive measures in Italy: a nationwide cross-sectional study. *J Prev Med Hyg* 2023;64:E9-E12. <https://doi.org/10.15167/2421-4248/jpmh2023.64.1.2815>

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