



COVID-19 lockdown: The relationship between trait impulsivity and addictive behaviors in a large representative sample of Italian adults

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ABSTRACT

Background: The importance of trait impulsivity in development, continuation and escalation of addictive behaviors has long been recognized.

Methods: A cross-sectional population-based survey was conducted during the COVID-19 lockdown on 6003 Italian adults aged 18–74 years, representative of the Italian general population, to investigate the relationship between impulsivity (Barratt Impulsiveness Scale – BIS) and selected addictive behaviors (gambling habits, smoking status, cannabis use, average alcohol daily use).

Results: A statistically significant relationship was found between motor impulsivity and starting/increasing drinking and increasing gambling (high vs. low motor impulsivity: multivariate odds ratio, OR=3.12; 95% confidence interval, CI: 1.45–6.74; p for trend=0.004 for start and OR=1.53; 95% CI: 1.26–1.86; p for trend<0.001 for increase drinking, respectively; OR=2.09; 95% CI: 1.41–3.12; p for trend<0.001 for increasing gambling).

Limitations: Potential information and recall bias. The necessity to limit the length of the questionnaire not to reduce the quality of the answers of study participants.

Conclusions: The multifaceted nature of impulsivity, potentially either cause or effect, hampers the understanding of its proper role in addictive behaviors. If confirmed by future longitudinal studies, our findings might support the planning, implementation and monitoring of evidence-based preventive interventions, to reduce addictive behaviors during public health emergencies.

1. Introduction

On 9th March 2020, Italy was the first country imposing a nationwide stay-at-home order, as an attempt to contain the 2019 coronavirus disease (COVID-19) spread. This radical measure lasted for almost three months (from March 9 to May 4, 2020) and confined over 60 million people inside their homes (Odone et al., 2020a).

The pervasive impact of this unprecedented national lockdown on lifestyles, physical and mental health, and reinforced by uncertainty and inadequate information, promoted feelings of loneliness, hopelessness,

despair in the general population and led to marginalization of vulnerable subgroups (Amerio et al., 2020). In particular, national-level prevalence of depressive and anxiety symptoms doubled, getting to affect more than one third of the general adult population and the use of at least one psychotropic drug increased by 20% (Amerio et al., 2021).

As confirmed by recent studies (Avena et al., 2021), stress is a well-known risk factor for addictive behaviors. As well as stress, the importance of trait impulsivity in development, continuation and escalation of drinking, smoking, substance use and gambling leading to addiction has long been recognized (Albertella et al., 2021).

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Impulsivity can be classically described a ‘predisposition for rapid, unplanned actions, without considering potential negative consequences of these actions’, and it defines a stable personality trait, or a behavioral marker of actions and decision making (Moeller et al., 2001a).

The Barratt Impulsiveness Scale (BIS) is a widely used self-report questionnaire which measures impulsivity as a personality trait and is designed to assess three separable dispositions: (i) attentional impulsivity, defined as the (in-)ability to concentrate or focus attention; (ii) motor impulsivity, or the tendency to act without thinking; and (iii) non-planning impulsivity, or the lack of future planning and forethought (Patton et al., 1995). Evidence from the literature suggests a strong association between the motor impulsivity subscale and addictive behaviors (Moeller et al., 2001b).

To the best of our knowledge, original studies investigating the association between impulsivity and addictive behaviors during the COVID-19 pandemic are still scant and based on convenience samples (Albertella et al., 2021; Panno et al., 2020). This is the first cross-sectional multi-disciplinary consortium study conducted in Italy on a representative sample of the adult population to assess the relationship between impulsivity and the development/escalation of addictive behaviors during the ‘stay-at-home’ weeks.

2. Methods

Within the project LOfckdown and LifeSTyles IN ITALY (*Lost in Italy*), a web-based cross-sectional study was conducted on a large representative sample of Italian adults aged 18–74 years (approximately 73% of the Italian population) during the strictest phase of the Italian COVID-19 lockdown (April 27th and May 3rd 2020). Details on sampling methodology are available elsewhere (Amerio et al., 2021; Odone et al., 2020b; Carreras et al 2021; Lugo et al., 2021). Briefly, the fieldwork was carried out by Doxa, the Italian branch of the Worldwide Independent Network/Gallup International Association, in collaboration with the Italian National Institute of Health and the Mario Negri Institute for Pharmacological Research. The study protocol was approved by the ethics committee (EC) of the coordinating group (EC of Fondazione IRCCS Istituto Neurologico Carlo Besta, File number 71–73, April 2020) and consent to participate was collected by all study participants.

Overall, 6003 participants (2962 men and 3041 women) were included in this study. Recruited subjects filled out an online self-administered questionnaire, reporting information on demographic and socio-economic characteristics (e.g., sex, age, and level of education). The survey included information on selected addictive behaviors, such as gambling habits (including time/day spent playing and frequency of days/month spent playing), smoking status (including number of cigarettes/day), cannabis use (including frequency of use), average alcohol daily use.

All addicted behaviors were investigated with particular attention to their change during the lockdown, asking participants to indicate their habits both before the begin of the COVID-19 lockdown (baseline, reference time: early February 2020) and at the time of the interview (during the lockdown). A worsening in smoking status was defined either starting smoking for non-smokers at baseline, or increasing the number of cigarettes/day for smokers at baseline (Carreras et al., 2021). A worsening in cannabis use was defined either starting using cannabis for non-users at baseline, or increasing use for users at baseline. A worsening in gambling was defined either starting playing for non-gamblers at baseline, or increasing playing for gamblers at baseline (Lugo et al., 2021). A worsening in alcohol drinking habits was defined either starting drinking for non-drinkers at baseline, or increasing drinking for subjects reporting to drink at baseline.

A specific section of the questionnaire focused on motor impulsivity, commonly defined as the tendency to act without thinking, assessed using the 11 items of the BIS and then categorized in three levels of impulsivity according to tertiles (low: 0–7, intermediate: 8–10, and

high: 11–33) (Patton et al., 1995).

3. Statistical analysis

A statistical weight was applied to all the analyses to guarantee the representativeness of the national sample in terms of sex, age, socio-economic status, and geographic area.

Dichotomous variables of worsening each addictive behavior were the outcomes of this analysis and were obtained comparing the answers before and during lockdown. The relationship between worsening in addictive habits and motor impulsivity was evaluated estimating odds ratios (OR) and their corresponding 95% confidence intervals (CI) through unconditional multiple logistic models taking into account for statistical weights. All the models were adjusted for selected socio-demographic variables (sex, age, level of education and geographic area). All statistical analyses were performed using SAS 9.4 (Cary, North Carolina, USA).

To further investigate the role of motor impulsivity on each addictive behavior in specific age groups, we repeated the analyses stratifying by age class (18–44 and 45–74 years). In order to make the results more readable, for each addiction, we considered only one dichotomous variable of worsening, not distinguishing between starting and increasing.

4. Results

In general, all the considered addicted behaviors (i.e., smoking, alcohol drinking, cannabis use, and gambling) before lockdown were more frequently reported with increasing motor impulsivity (p for trend <0.001 ; data not shown in table).

Table 1.

Overall, 9.0% of participants worsened their smoking status during lockdown (0.6% started smoking and 8.5% increased the number of cigarettes/day). No statistically significant association was found between motor impulsivity levels and a worsening in smoking habit.

In total, 12.4% of participants worsened their alcohol drinking habits during lockdown (0.7% started drinking and 11.7% increased drinking). Worsening drinking habits was more frequently reported with increasing motor impulsivity (p for trend=0.004 for start and $p<0.001$ for increase drinking, respectively).

A worsening in cannabis use during lockdown was observed amongst 1.4% of participants (0.3% started and 1.1% increased using cannabis). We found no relationship between motor impulsivity level and worsening in cannabis use.

Overall, 4.1% of participants worsened their gambling habits during lockdown (0.9% started and 3.2% increased playing). Increasing gambling habits was more frequently reported with increasing motor impulsivity (p for trend <0.001).

The Supplementary Table 1 shows the stratification analysis by age group. Overall, apart for smoking, a worsening in the other addictive behaviors during lockdown was more frequently reported with increasing motor impulsivity in both age groups. In the case of smoking, a significant relationship between increased motor impulsivity and a worsening in smoking during COVID-19 lockdown was observed only in the group aged 18–44 years.

5. Discussion

This study lends support to the association between motor impulsivity, seen as reacting to internal or external stimuli without regards to the consequences, and addictive behaviors. With regard to the COVID-19 lockdown, having an addictive behavior (smoking, gambling, alcohol and cannabis use) was more frequently reported in those with higher levels of motor impulsivity. In particular, a statistically significant relationship was found between motor impulsivity and starting/increasing drinking and increasing gambling.

Table 1

Distribution of Italians having worsened (started or increased) selected addictive behaviors during the COVID-19 lockdown, by impulsivity levels. Corresponding odds ratios* (OR) and 95% confidence intervals (CI). Italy, 2020.

Impulsivity	Start a new addictive behavior during lockdown			Increase an addictive behavior during lockdown		
	N [^]	%	OR (95% CI)	N [#]	%	OR (95% CI)
	Starting smoking			Increasing smoking		
Low	1774	0.5	1.00 [°]	473	37.1	1.00 [°]
Intermediate	1413	0.8	1.81 (0.74–4.42)	397	33.9	0.86 (0.65–1.14)
High	1415	0.9	2.14 (0.90–5.14)	530	37.4	1.00 (0.77–1.30)
P for trend			0.087			0.989
	Starting drinking			Increasing drinking		
Low	468	2.5	1.00 [°]	1780	11.9	1.00 [°]
Intermediate	246	4.6	2.13 (0.90–5.05)	1565	13.4	1.15 (0.93–1.41)
High	276	7.4	3.12 (1.45–6.74)	1669	16.7	1.53 (1.26–1.86)
P for trend			0.004			<0.001
	Starting using cannabis			Increasing cannabis use		
Low	2198	0.3	1.00 [°]	49	9.0	1.00 [°]
Intermediate	1718	0.2	0.61 (0.17–2.26)	93	11.5	1.37 (0.41–4.56)
High	1666	0.5	1.47 (0.52–4.16)	279	17.1	1.83 (0.63–5.32)
P for trend			0.469			0.206
	Starting gambling			Increasing gambling		
Low	1985	1.0	1.00 [°]	262	15.9	1.00 [°]
Intermediate	1541	0.7	0.64 (0.30–1.37)	269	9.5	0.57 (0.34–0.98)
High	1496	1.7	1.78 (0.98–3.23)	449	28.0	2.09 (1.41–3.12)
P for trend			0.056			<0.001

* Estimated by multiple logistic regression models after adjustment for sex, age group, level of education and geographic area. Statistically significant estimates at 0.05 level are in bold.

[^] Number of subjects non-addicted to each addictive behavior at baseline (i.e., non-smokers, non-drinkers, cannabis non-users, and non-gamblers).

[#] Number of subjects addicted to each addictive behavior at baseline (i.e., smokers, drinkers, cannabis users, gamblers).

[°] Reference category

The stratification analysis revealed that, apart from smoking, whether we observed a significant relationship between increased motor impulsivity and a worsening in smoking during COVID-19 lockdown only in younger participants, for the other addictive behaviors, the relationship was similar in the two groups, but slightly more marked in younger participants. Once limiting the analysis to young people (aged 18–24 years) the estimates apparently increased, although based on a limited sample.

Our findings can be interpreted in light of the pervasive impact that national lockdown adopted to contain the spread of the infection may have had on lifestyles, physical and mental health of the general population, including inducing or exacerbating addictive behaviors as potential coping mechanisms (Avena et al., 2021).

The multifaceted nature of impulsivity, potentially either cause or effect, hampers the understanding of its proper role in addictive behaviors. From the one hand, impulsivity is recognized as an important risk factor, while, from the other hand, it seems to be also a result of an inhibitory control decrease.

Findings from our survey support the relationship between impulsivity and alcohol use, both in terms of starting and increasing drinking, without clarifying the direction of this association. Recent evidence

from the literature suggest that increased impulsivity predisposes to frequent alcohol use, while acute alcohol intoxication independently diminishes inhibitory control resources, which may lead to even heavier drinking episode (Herman et al., 2019; Costanza, et al., 2021).

As confirmed by our study, impulsivity represents a core element and a vulnerability marker of pathological gambling and it seems to be linked to the severity of the clinical picture. As recently described, impulsivity would be present as a latent phenotypic level, sort of a generalized tendency toward hasty, inappropriate, and premature actions, which would predispose toward pathological impulsive problems tend to co-occur within the same individual (Ioannidis et al., 2019).

Although not statistically significant, in line with the current literature (Kale et al., 2018; Rinehart et al., 2021), our findings also confirmed the association between motor impulsivity and the increased likelihood of being a smoker or a cannabis user, likely assessing recreational and pathological use and capturing both causative and substance-induced behaviors.

This study needs to be interpreted in the light of several strengths and limitations. amongst its strengths, the large sample size representative of the Italian adult population. Potential selection bias could be due to the online panel. However, a computer-assisted personal interviewing questionnaire was not possible during the COVID-19 lockdown, and a computer-assisted telephone interviewing questionnaire presented limited coverage in such a relatively young population. Limitations of our study include the possible information bias due to the self-reported responses and a possible recall bias. The choice to consider only the “motor impulsivity” section of the BIS-11 and selected addictive behaviors based on the most recent Italy Country Drug Report (https://www.emcdda.europa.eu/system/files/publications/11329/italy-cdr-2019_0.pdf) was due to the necessity to limit the length of the questionnaire. In fact, since this was a self-administered online questionnaire, an excessively long and time consuming questionnaire would have reduced the quality of the answers of study participants.

To our knowledge (Odone et al., 2020c), this is the first study on the topic conducted on a large national representative sample. If confirmed by future longitudinal studies, our findings might support the planning, implementation and monitoring of evidence-based preventive interventions, to reduce addictive behaviors during public health emergencies.

Author contributions

All authors conceptualized and designed the study. CS and AL analysed the data under the supervision of SG. AA, AO and SG wrote the first draft of the manuscript. TF, GG, RP, GS provided important contributions for the interpretation of findings. AO, GS and SG provided important intellectual supports in various steps of the study. All authors carefully revised the final version of the manuscript. All authors have read and approved the last version of the manuscript.

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Availability of data and materials

Data that support the findings of this study and materials are available from the corresponding author, AO, upon request.

Ethical standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000.

>Declaration of Competing Interest

Dr. Amerio, Dr. Stival, Dr. Lugo, Dr. Fanucchi, Dr. Gorini, Dr. Pacifici, Prof. Odone, Prof. Serafini and Dr. Gallus, report no conflicts of interest.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jad.2022.01.094.

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