Short communication

Italians do it … less. COVID-19 lockdown impact on sexual activity: Evidence from a large representative sample of Italian adults

Andrea AMERIO 1,2, Alessandra LUGO 3, Cristina BOSETTI 4, Tiziana FANUCCHI 5, Giuseppe GORINI 6, Roberta PACIFICI 7, Anna ODONE 8,9, Silvano GALLUS 3

1) Department of Neuroscience, Rehabilitation, Ophthalmology, Genetics, Maternal and Child Health, Section of Psychiatry, University of Genoa, Genoa, Italy

2) IRCCS Ospedale Policlinico San Martino, Genoa, Italy

3) Department of Environmental Health Sciences, Istituto di Ricerche Farmacologiche Mario Negri, Milan, Italy

4) Department of Oncology, Istituto di Ricerche Farmacologiche Mario Negri, Milan, Italy

5) SOD Alcologia & Centro Alcologico Regionale Toscano, Azienda Ospedaliero-Universitaria Careggi, Florence, Italy

6) Oncologic Network, Prevention and Research Institute (ISPRO), Florence, Italy

7) National Centre on Addiction and Doping, Istituto Superiore di Sanità, Rome, Italy

8) Department of Public Health, Experimental and Forensic Medicine, University of Pavia, Pavia, Italy

9) IRCCS San Raffaele Scientific Institute, Milan, Italy

Andrea AMERIO: andrea.amerio@unige.it

Alessandra LUGO: alessandra.lugo@marionegri.it

Cristina BOSETTI: cristina.bosetti@marionegri.it

Tiziana FANUCCHI: fanucchit@aou-careggi.toscana.it

Giuseppe GORINI: g.gorini@ispro.toscana.it

Roberta PACIFICI: roberta.pacifici@iss.it
Competing interests: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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.

Authors’ contributions: All authors conceptualized and designed the study. AL and CB analysed the data under the supervision of SG. AA, AO and SG wrote the first draft of the manuscript. TF, RP, SG provided important contributions for the interpretation of findings. AO 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.

Funding: The survey was co-funded by the Italian National Institute of Health (ISS).

Running title: COVID-19 lockdown impact on sexual activity
ABSTRACT

Background: To explore how sexual activity was impacted by COVID-19 lockdown measures in the general adult population.

Methods: A cross-sectional survey was conducted on 6,003 Italian adults aged 18-74 years, representative of the Italian general population. Study subjects were recruited at the time of the nation-wide stay-at-home order (from April 27 to May 3, 2020). We identified characteristics associated to decreased frequency of sex during lockdown, differentiating between cohabiting and non-cohabiting subjects.

Results: Over one third (35.3%) of Italians reported to have changed (8.4% increased and 26.9% decreased) their sexual activity during lockdown. When focusing on cohabitants (N=3,949, 65.8%), decreased sexual activity (20.7%) was more frequently reported by men (22.3%; compared to women, multivariable odds ratio=1.23; 95% confidence interval=1.05-1.44), younger (p for trend <0.001), more educated subjects (p for trend=0.004), subjects living in smaller houses (p for trend=0.003), and those reporting longer time spent outdoor before the lockdown (p for trend <0.001).

Conclusions: COVID-19 lockdown drastically altered people's day-to-day life and is likely to have impacted on lifestyle habits and behavioral risk factors, including sexual attitudes and practice. This is the first national population-level study exploring changes in sexual life in this COVID-19 era.

As we report sexual practice to have been affected by lockdown restrictions, we suggest these changes are to be explored beyond imposed social distancing, into mental health, social, and other determinants.
INTRODUCTION

Since the World Health Organization (WHO) declared the coronavirus infectious disease 2019 (COVID-19) outbreak a pandemic on March 11th, 2020, rapid and severe ‘lockdown’ measures have been adopted by the Italian Government with school closures, border restrictions, quarantine of confirmed or suspected patients, and ‘stay-at-home’ or confinement policies for all citizens.

Social distancing, isolation, and infection fear drastically altered people's day-to-day life, with higher risk of mood lability, anxiety symptoms, irritability, insomnia, and potential consequences on sexual activity and couple’s relationship. Being forced to stay together, sharing the same living space for many weeks/months could result in decreased or increased sexual desire and activity depending on the individual response to stress.

To our knowledge, original studies investigating changes in sexual life during COVID-19 lockdown are still scant and all conducted on convenience samples. As part of the project LOckdown and lifeSTyle IN ITALY (‘LOST IN ITALY’), we conducted a large cross-sectional study during the ‘stay-at-home’ weeks to assess the impact of COVID-19 mass quarantine restrictions on lifestyle habits, social dynamics, and mental health. Within this survey, we explored reported changes in sexual activity, as compared to pre-lockdown times.

METHODS

We conducted a cross-sectional study on a representative sample of 6,003 Italian adults aged 18-74 years. Study participants were recruited from April 27 to May 3, 2020 (i.e., within the first phase of the lockdown, between March 9 to May 4, 2020) from the web panel of Doxa, the Italian branch of the Worldwide Independent Network/Gallup International Association, including more than 140,000 Italian adults. Using a quota sampling method by age, sex and region (the first-level
constituent Italian entity), we randomly selected, from all the 140,000 panellists, 6,003 participants (2,962 men and 3,041 women). Response rate was 36%. Other details on the study and on sampling methodology are provided elsewhere. Recruited subjects filled an online self-administered questionnaire, including detailed information on demographic and socio-economic characteristics, e.g., marital status, education, number of rooms and number of people living at home. From number of rooms and people at home, we derived the ratio of household inhabitants per room. We also collected information on selected lifestyle habits, including smoking status and time (in hours per week) spent outdoor for leisure time or work prior to lockdown. A specific question asked if participants’ sexual activity was lower, the same or higher as compared to before the lockdown. The protocol of the study 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 written consent to participate was collected from all study participants.

We present descriptive analyses (prevalence and 95% confidence intervals, CI) of overall changes, decrease, and increase in sexual activity during lockdown by sex, age group and marital status. We derived odds ratios (OR), and corresponding 95% CI, for decreased sexual activity (i.e., the most frequent outcome reported by the respondents) compared to either no change or increased sexual activity, using multivariable logistic regression models after adjustment for sex, age group, level of education, and geographic area. All estimates were provided overall and differentiating between cohabiting subjects (i.e., married/cohabitants) and non-cohabiting subjects (i.e., singles, divorced/separated, or widowed). A statistical weight was applied to all the analyses to further guarantee the representativeness of the national sample in terms of sex, age, socio-economic status (i.e., level of education) and geographic area (i.e., region and municipality size). Sampling weights were computed by Doxa using official national data from the Italian National Institute of Statistics (ISTAT, 2019).

RESULTS
Among 6,003 participants, 35.3% reported to have experienced changes in sexual activity during lockdown: 8.4% reported to increase, while 26.9% reported a decrease (Figure 1). Those reporting a change (either positive or negative) in sexual activity were more frequently men (38.8%), young (i.e., subjects aged 18-35; 50.2%), and singles (46.3%). By multivariable analysis, compared to cohabitants, decreased sexual activity was higher in non-cohabiting (i.e., singles or divorced/separated or widowed) subjects (OR=2.06; 95% CI: 1.82-2.34; data not shown in Tables).

The distribution and characteristics of Italians having decreased their sexual activity is reported in Table 1. When focusing on cohabitants (N=3,949, 65.8% of total study population) decreased sexual activity was more likely reported by men (OR=1.23; 95% CI: 1.05-1.44), younger (p for trend <0.001), more educated subjects (p for trend=0.004), subjects living in smaller houses (increasing n. of inhabitants per room, p for trend=0.003), and those reporting longer time spent outdoor before lockdown (p for trend <0.001). Current smoking was associated with reported decreased sexual activity among non-cohabitants (OR=1.47; 95% CI: 1.18-1.84), but not among cohabitants.

Analyses for cohabitants stratified by sex are shown in Supplementary Table 1. Results for age, smoking status, and time spent outdoor were consistent in both sexes. More educated men (p for trend <0.001) and women living in smaller houses (p for trend=0.001) significantly decreased sexual activity.

Among cohabitants, increased sexual activity was more frequently reported by men (OR=1.43; 95% CI: 1.14-1.79), young (p for trend <0.001), and subjects living in larger houses (p for trend=0.023; data not shown in Tables). No relationship has been observed with level of education, smoking status, and time spent outside.

**DISCUSSION**

We report that more than one third of Italian adults modified their frequency of sex under COVID-19 lockdown, with one in four Italians reporting a decrease. If during nation-wide stay-at-
home order decreased sexual activity was expected in singles or non-cohabitants, one in five
married or cohabiting subjects reporting decreased sexual activity is something worth exploring.
We estimate that, within cohabitants, men, younger generations, more educated subjects, people
living in smaller houses, and those who used to spend more time outdoor prior to lockdown were
more likely to report decreased sexual activity. Men and the young also reported an increase in their
sexual activity. These subgroups of the population were more susceptible to any change (either
increase or decrease) in sexual activity.

Several environmental factors, including behavioural and psychological determinants are
known to be associated with sexual life; however, as most of the available evidence on the topic
derives from cross-sectional studies, their causative effect is far from being established. In the
context of the COVID-19 outbreak, sexual practice and attitudes might have been influenced
through different pathways. These include: i) modified opportunities for sexual intercourses: if -
on one side - imposed social distancing and isolation rules prevented people to meet (mainly singles
and non-cohabitants) - on the other side - they forced cohabiting subjects (mainly
married/cohabitants) to spend long hours together, ii) fear of infection transmission during close
contacts, iii) psychological stress associated with the COVID-19 public health emergency and its
clinical, social and economic consequences, as mediators of sexual desire. These potential
mechanisms might explain the large proportion of Italian adults having modified - mostly,
decreased - their sexual activity.

In fact, if we apply these theoretical pathways to interpret our data we can confirm that
limiting the opportunity for casual sexual encounters as a consequence of imposed social contact
restrictions reduced reported sex frequency in singles and young people. On the other hand, even if
married/cohabitants might consider intimacy as a way to enhance their relationship during long
hours spent at home, feelings of apprehension and anxiety might have prevailed, ultimately making
sex not desirable or enjoyable. Reported sex differences in married/cohabitants might be partly
due to men stopping extramarital sexual relations - including with sex workers - during lockdown.
In addition, information bias cannot be ruled out: as men have shown to overestimate the number of
reported sexual intercourses and partners, compared to women,\textsuperscript{13} such tendency might having
played in the opposite direction when overestimating having to renounce to sex due to COVID-19.
The association between decreased sex frequency in people living in smaller houses can be
interpreted both in light of lack of privacy to have sex, as well as a proxy for lower socio-economic
status with consequent higher risk of anxiety associated to household-level economic impact of
COVID-19 response and decrease willingness to enjoy sex.\textsuperscript{14}

Findings from our survey suggest decreased sexual activity in more educated subjects who
might have adopted a more cautious approach to sex being more aware of the public health
emergency and associated risks.\textsuperscript{15}

Subjects reporting longer time spent outdoor before the lockdown might be more likely to
have more unstable relationships or to have suffered more from staying at home, with ultimate
consequences on sexual desire.\textsuperscript{16}

Smoking is a well known risk factor of sexual dysfunction that could impact the quality of
life by reducing sexual desire and satisfaction, and damaging self-esteem and interpersonal
relationship.\textsuperscript{17} A positive dose-dependent association between smoking and both male erectile
dysfunction and female sexual dysfunction in smokers has been extensively studied.\textsuperscript{18,19} In light of
the increase smoking reported during lockdown,\textsuperscript{7} cigarette smoking might have had a role in the
observed decreased sexual activity among smokers.

Pre-COVID-19 population-level surveys on patterns and characteristic of sexual activity are
available for selected countries, including the UK,\textsuperscript{20} the USA,\textsuperscript{21} Scandinavian countries,\textsuperscript{22}
Australia,\textsuperscript{23} and Japan,\textsuperscript{24} among others, showing that they are setting-specific and reflect cultural
trends. The public health relevance of exploring sexual habits and attitudes has been previously
recognised.\textsuperscript{25} More in details, from a public health perspective, it is important to identify both
determinants of sexual activity, and its effects on mental and physical health. As the COVID-19
public health emergency and response is projected to have deep health, social, and economic
impacts, we believe it is worth exploring how it has impacted on sexual and reproductive health and their associated factors.

Our findings, although preliminary and with limitations linked to the cross-sectional study design, provide timely estimates on lockdown impact on sexual activity and suggest that, not only more than one third of the population reported sexual life to be affected by lockdown, but also, how determinants and mediators of these changes are to be explored beyond imposed social distancing, into mental health, social and other determinants. Almost no evidence exists on the topic; one cross-sectional study conducted in Bangladesh, India and Nepal reported the percentage of married couples having more than five sexual intercourse per week to have increased from 6.7% to 10% before and during COVID-19 lockdown; however, no reliable conclusions can be derived from such data as the survey was conducted on a convenience sample of 120 subjects.

To our knowledge, this is the first study on the topic conducted on a large national representative sample. As it is part of a broader study exploring through both cross-sectional and longitudinal study designs the effects of COVID-19 public health response in Italy on a rich set of behavioural risk factors, physical and mental health outcomes, we are confident the current data will help to better design complementary research questions in the near future so as to provide solid and comprehensive national-level evidence that can inform the planning, implementation and monitoring of mitigation interventions of the adverse health and social consequences of the current pandemic.
FIGURE LEGEND

Figure 1 Distribution of 6003 Italians by change in sexual activity during the Covid-19 lockdown, overall and in strata of marital status. Italy, 2020.

Footnote: “Cohabiting” (N=3949) includes participants reporting they were married or they were living with the partner; “Non-cohabiting” (N=2054) includes participants reporting they were divorced or separated (19.2%), widowed (5.6%), or single (75.2%).
Table 1. Distribution of Italians having decreased their sexual activity during the Covid-19 lockdown, according to selected demographic and socio-economic features, lifestyle habits and other individual-level characteristics, overall and in strata of marital status°. Italy, 2020.

|                          | Total         | Married people/cohabiting subjects | Non-cohabiting subjects (divorced/separated, widowed, single) |
|--------------------------|---------------|-------------------------------------|---------------------------------------------------------------|
|                          | N             | % OR (95% CI)*                       | N                 | % OR (95% CI)*                       | N                 | % OR (95% CI)*                       |
| Total                    | 6003          | 26.9 -                              | 3949              | 20.7 -                              | 2054              | 38.9 -                              |
| Sex                      |               |                                     |                   |                                     |                   |                                     |
| Women                    | 3041          | 23.9 1.00^                          | 2025              | 19.1 1.00^                          | 1015              | 33.6 1.00^                          |
| Men                      | 2962          | 30.0 1.37 (1.22-1.54)               | 1923              | 22.3 1.23 (1.05-1.44)               | 1039              | 44.1 1.43 (1.19-1.72)               |
| Age group                |               |                                     |                   |                                     |                   |                                     |
| 18-34                    | 1557          | 39.8 1.00^                          | 628               | 22.8 1.00^                          | 929               | 51.2 1.00^                          |
| 35-54                    | 2457          | 26.0 0.53 (0.47-0.61)               | 1817              | 22.8 0.99 (0.80-1.23)               | 640               | 35.1 0.53 (0.43-0.66)               |
| 55-74                    | 1989          | 17.9 0.34 (0.29-0.39)               | 1503              | 17.1 0.70 (0.56-0.89)               | 485               | 20.3 0.26 (0.20-0.34)               |
|                          |               |                                     |                   |                                     |                   |                                     |
| p for trend              |               | <0.001                              |                   | <0.001                              |                   | <0.001                              |
| Level of education       |               |                                     |                   |                                     |                   |                                     |
| Low                      | 911           | 22.1 1.00^                          | 612               | 17.4 1.00^                          | 299               | 31.6 1.00^                          |
| Intermediate             | 3032          | 27.9 1.32 (1.10-1.58)               | 1926              | 19.6 1.17 (0.92-1.49)               | 1106              | 42.4 1.43 (1.08-1.90)               |
| High                     | 2060          | 27.5 1.28 (1.06-1.55)               | 1411              | 23.5 1.40 (1.09-1.78)               | 649               | 36.4 1.23 (0.91-1.67)               |
|                          |               |                                     |                   |                                     |                   |                                     |
| p for trend              |               |                                     |                   |                                     |                   |                                     |
| Number of inhabitants per room | |               |                                     |                                     |                   |                                     |
| <1                       | 3429          | 25.0 1.00^                          | 2119              | 18.1 1.00^                          | 1310              | 36.2 1.00^                          |
| 1                        | 1481          | 30.4 1.18 (1.03-1.35)               | 1058              | 24.0 1.40 (1.17-1.68)               | 424               | 46.3 1.08 (0.84-1.37)               |
| >1                       | 1093          | 28.1 1.01 (0.86-1.18)               | 772               | 23.0 1.28 (1.04-1.58)               | 321               | 40.3 0.80 (0.61-1.05)               |
|                          |               |                                     |                   |                                     |                   |                                     |
| p for trend              |               |                                     |                   |                                     |                   |                                     |
| Smoking status           |               |                                     |                   |                                     |                   |                                     |
| Never                    | 4053          | 26.5 1.00^                          | 2626              | 20.6 1.00^                          | 1427              | 37.4 1.00^                          |
| Former                   | 549           | 25.3 1.14 (0.92-1.41)               | 420               | 19.3 1.02 (0.78-1.33)               | 130               | 44.7 1.95 (1.32-2.87)               |
| Current                  | 1400          | 28.5 1.16 (1.01-1.34)               | 903               | 21.3 1.04 (0.86-1.25)               | 498               | 41.7 1.47 (1.18-1.84)               |
| Time spent outdoor prior to lockdown (hours/week) | 0   | 183 | 13.3 | 1.00^  | 108 | 6.8 | 1.00^  | 75    | 22.7 | 1.00^  |
|-------------------------------------------------|-----|-----|-----|--------|-----|-----|--------|-------|------|--------|
| 1-6                                             | 1601| 24.0| 2.04 (1.30-3.19)| 1000| 18.6| 2.97 (1.38-6.38)| 601   | 32.8 | 1.84 (1.02-3.32)
| 7-14                                            | 2139| 24.7| 2.29 (1.47-3.58)| 1444| 20.1| 3.36 (1.57-7.17)| 696   | 34.3 | 2.07 (1.16-3.72)
| ≥15                                             | 2079| 32.6| 3.36 (2.16-5.24)| 1396| 23.7| 4.26 (1.99-9.10)| 683   | 50.8 | 3.89 (2.17-6.97)

CI: confidence interval; OR: odds ratio.

* Participants were classified on the basis of their marital status in married people/cohabiting subjects (i.e., participants answering they were married or they were living with the partner) and in non-cohabiting subjects (i.e., participants answering they were divorced or separated, widowed or single).
* Estimated by multivariable logistic regression models after adjustment for sex, age group (18-34, 35-54, 55-74), level of education (low: up to middle school diploma, intermediate: high school, high: university) and geographic area (Northern Italy, Central Italy, Southern Italy and islands). Statistically significant estimates at 0.05 level are in bold.
^ Reference category.
REFERENCES

1. The World Health Organization. Available: https://http://www.who.int/news-room/detail/27-04-2020-who-timeline---covid-19. [Accessed: 23.07.2020].

2. Odone A, Delmonte D, Scognamiglio T, Signorelli C (2020) COVID-19 deaths in Lombardy, Italy: data in context. Lancet Public Health 5: e310.

3. Serafini G, Parmigiani B, Amerio A, Aguglia A, Sher L, et al. (2020) The psychological impact of COVID-19 on the mental health in the general population. QJM.

4. Arafat SMY, Alradie-Mohamed A, Kar SK, Sharma P, Kabir R (2020) Does COVID-19 pandemic affect sexual behaviour? A cross-sectional, cross-national online survey. Psychiatry Res 289: 113050.

5. Li W, Li G, Xin C, Wang Y, Yang S (2020) Challenges in the Practice of Sexual Medicine in the Time of COVID-19 in China. J Sex Med 17: 1225-1228.

6. Yuksel B, Ozgor F (2020) Effect of the COVID-19 pandemic on female sexual behavior. Int J Gynaecol Obstet 150: 98-102.

7. Odone A, Lugo A, Amerio A, Borroni E, Bosetti C, et al. (2020) COVID-19 lockdown impact on lifestyle habits of Italian adults. Acta Biomed 91: 87-89.

8. Lugo A, Stival C, Paroni L, Amerio A, Carreras G, Gorini G, Mastrobattista L, Minutillo A, Mortali C, Odone A, Pacifici R, Tinghino B, Gallus S. The impact of COVID-19 lockdown on gambling habit: a cross-sectional study from Italy. J Behav Addict 2021 [In press]

9. Dupree J.M., Langille G.M. (2016) The Impact of the Environment on Sexual Health. In: Lipshultz L., Pastuszak A., Goldstein A., Giraldi A., Perelman M. (eds) Management of Sexual Dysfunction in Men and Women. Springer, New York, NY.

10. Tang K, Gaoshan J, Ahonsi B, Ali M, Bonet M, et al. (2020) Sexual and reproductive health (SRH): a key issue in the emergency response to the coronavirus disease (COVID-19) outbreak. Reprod Health 17: 59.

11. The New York Times. The Coronavirus Outbreak. Available: https://http://www.nytimes.com/2020/04/13/well/mind/coronavirus-relationships-love-couples-quarantine-shelter.html [Accessed: 23.07.2020].

12. Platt L, Elmes J, Stevenson L, Holt V, Rolles S, et al. (2020) Sex workers must not be forgotten in the COVID-19 response. Lancet 396: 9-11.

13. Mitchell KR, Mercer CH, Prah P, Clifton S, Tanton C, et al. (2019) Why Do Men Report More Opposite-Sex Sexual Partners Than Women? Analysis of the Gender Discrepancy in a British National Probability Survey. J Sex Res 56: 1-8.
14. Holdsworth E, Trifonova V, Tanton C, Kuper H, Datta J, et al. (2018) Sexual behaviours and sexual health outcomes among young adults with limiting disabilities: findings from third British National Survey of Sexual Attitudes and Lifestyles (Natsal-3). BMJ Open 8: e019219.
15. Alahdal H, Basingab F, Alotaibi R (2020) An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia. J Infect Public Health.
16. Lindberg LD, Bell DL, Kantor LM (2020) The Sexual and Reproductive Health of Adolescents and Young Adults During the COVID-19 Pandemic. Perspect Sex Reprod Health.
17. Moreira ED, Jr., Kim SC, Glasser D, Gingell C (2006) Sexual activity, prevalence of sexual problems, and associated help-seeking patterns in men and women aged 40-80 years in Korea: data from the Global Study of Sexual Attitudes and Behaviors (GSSAB). J Sex Med 3: 201-211.
18. Cao S, Gan Y, Dong X, Liu J, Lu Z (2014) Association of quantity and duration of smoking with erectile dysfunction: a dose-response meta-analysis. J Sex Med 11: 2376-2384.
19. Choi J, Shin DW, Lee S, Jeon MJ, Kim SM, et al. (2015) Dose-response relationship between cigarette smoking and female sexual dysfunction. Obstet Gynecol Sci 58: 302-308.
20. Wellings K, Palmer MJ, Machiyama K, Slaymaker E (2019) Changes in, and factors associated with, frequency of sex in Britain: evidence from three National Surveys of Sexual Attitudes and Lifestyles (Natsal). BMJ 365: l1525.
21. Twenge JM, Sherman RA, Wells BE (2017) Declines in Sexual Frequency among American Adults, 1989-2014. Arch Sex Behav 46: 2389-2401.
22. Kontula O. Sex life challenges: the Finnish case. In: Wright JD, ed. international encyclopedia of the social & behavioral sciences. 2nd ed. Elsevier, 2015: 665-71.
23. de Visser RO, Richters J, Rissel C, Badcock PB, Simpson JM, et al. (2014) Change and stasis in sexual health and relationships: comparisons between the First and Second Australian Studies of Health and Relationships. Sex Health 11: 505-509.
24. Japan Family Planning Association. The 8th danjyo no seikatsu to ishiki ni kansuru chosa (national lifestyle and attitudes towards sexual behavior survey). Japan Family Planning Association, 2017.
25. Jasienska G, Bribiescas RG, Furberg AS, Helle S, Núñez-de la Mora A (2017) Human reproduction and health: an evolutionary perspective. Lancet 390: 510-520.
26. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, et al. (2020) The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet 395: 912-920.
27. McKee M, Stuckler D (2020) If the world fails to protect the economy, COVID-19 will damage health not just now but also in the future. Nat Med 26: 640-642.
Table 1. Distribution of Italians having decreased their sexual activity during the Covid-19 lockdown, according to selected demographic and socio-economic features, lifestyle habits and other individual-level characteristics, overall and in strata of marital status°. Italy, 2020.

| Total | Married people/cohabiting subjects | Non-cohabiting subjects (divorced/separated, widowed, single) |
|-------|------------------------------------|------------------------------------------------------------|
| N     | %       | OR (95% CI)* | N     | %       | OR (95% CI)* | N     | %       | OR (95% CI)* |
|-------|---------|-------------|-------|---------|-------------|-------|---------|-------------|
| Total | 6003 26.9 | - | 3949 20.7 | - | 2054 38.9 | - |
| Sex   |         |             |       |         |             |       |         |             |
| Women | 3041 23.9 | 1.00^ | 2025 19.1 | 1.00^ | 1015 33.6 | 1.00^ |
| Men   | 2962 30.0 | 1.37 (1.22-1.54) | 1923 22.3 | 1.23 (1.05-1.44) | 1039 44.1 | 1.43 (1.19-1.72) |
| Age group |         |       |       |       |             |       |         |             |
| 18-34 | 1557 39.8 | 1.00^ | 628 22.8 | 1.00^ | 929 51.2 | 1.00^ |
| 35-54 | 2457 26.0 | 0.53 (0.47-0.61) | 1817 22.8 | 0.99 (0.80-1.23) | 640 35.1 | 0.53 (0.43-0.66) |
| 55-74 | 1989 17.9 | 0.34 (0.29-0.39) | 1503 17.1 | 0.70 (0.56-0.89) | 485 20.3 | 0.26 (0.20-0.34) |
| p for trend | <0.001 |       |       | <0.001 |             | <0.001 |             |             |
| Level of education |         |       |       |       |             |       |         |             |
| Low   | 911 22.1 | 1.00^ | 612 17.4 | 1.00^ | 299 31.6 | 1.00^ |
| Intermediate | 3032 27.9 | 1.32 (1.10-1.58) | 1926 19.6 | 1.17 (0.92-1.49) | 1106 42.4 | 1.43 (1.08-1.90) |
| High  | 2060 27.5 | 1.28 (1.06-1.55) | 1411 23.5 | 1.40 (1.09-1.78) | 649 36.4 | 1.23 (0.91-1.67) |
| p for trend |       | 0.049 |       | 0.004 |             |       | 0.532 |             |
| Number of inhabitants per room |         |       |       |       |             |       |         |             |
| <1    | 3429 25.0 | 1.00^ | 2119 18.1 | 1.00^ | 1310 36.2 | 1.00^ |
| 1     | 1481 30.4 | 1.18 (1.03-1.35) | 1058 24.0 | 1.40 (1.17-1.68) | 424 46.3 | 1.08 (0.84-1.37) |
| >1    | 1093 28.1 | 1.01 (0.86-1.18) | 772 23.0 | 1.28 (1.04-1.58) | 321 40.3 | 0.80 (0.61-1.05) |
| p for trend |       | 0.488 |       | 0.003 |             |       | 0.218 |             |
| Smoking status |         |       |       |       |             |       |         |             |
| Never | 4053 26.5 | 1.00^ | 2626 20.6 | 1.00^ | 1427 37.4 | 1.00^ |
| Former | 549 25.3 | 1.14 (0.92-1.41) | 420 19.3 | 1.02 (0.78-1.33) | 130 44.7 | 1.95 (1.32-2.87) |
| Current | 1400 28.5 | 1.16 (1.01-1.34) | 903 21.3 | 1.04 (0.86-1.25) | 498 41.7 | 1.47 (1.18-1.84) |
| Time spent outdoor prior to lockdown (hours/week) | Frequency | Percentage | OR (95% CI) |  p for trend |
|---|---|---|---|---|
| 0  | 183 | 13.3 | 1.00<sup>^</sup> | <0.001 |
| 1-6 | 1601 | 24.0 | 2.04 (1.30-3.19) | <0.001 |
| 7-14 | 2139 | 24.7 | 2.29 (1.47-3.58) | <0.001 |
| ≥15 | 2079 | 32.6 | 3.36 (2.16-5.24) | <0.001 |

CI: confidence interval; OR: odds ratio.

* Participants were classified on the basis of their marital status in married people/cohabiting subjects (i.e., participants answering they were married or they were living with the partner) and in non-cohabiting subjects (i.e., participants answering they were divorced or separated, widowed or single).

* Estimated by multivariable logistic regression models after adjustment for sex, age group (18-34, 35-54, 55-74), level of education (low: up to middle school diploma, intermediate: high school, high: university) and geographic area (Northern Italy, Central Italy, Southern Italy and islands). Statistically significant estimates at 0.05 level are in bold.

<sup>^</sup> Reference category.
Figure 1 Distribution of 6003 Italians by change in sexual activity during the Covid-19 lockdown, overall and in strata of marital status. Italy, 2020.

|                | Increased sexual activity | No change | Decreased sexual activity |
|----------------|---------------------------|-----------|---------------------------|
| **Total**      |                           |           |                           |
| **Sex**        |                           |           |                           |
| Men            | 8.8                       |           | 30.0                      |
| Women          | 8.1                       |           | 23.9                      |
| **Age (years)**|                           |           |                           |
| 18-34          | 10.4                      |           | 39.8                      |
| 35-54          | 9.7                       |           | 26.0                      |
| 55-74          | 5.4                       |           | 17.9                      |
| **Marital status** |                       |           |                           |
| Cohabiting     | 9.0                       |           | 20.7                      |
| Non-cohabiting | 7.4                       |           | 38.9                      |

“Cohabiting” (N=3949) includes participants reporting they were married or they were living with the partner; “Non-cohabiting” (N=2054) includes participants reporting they were divorced or separated (19.2%), widowed (5.6%), or single (75.2%).