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Research

Knowledge, Attitude and Practices Regarding COVID-19 among Undergraduate Students of A Medical College in District Anantnag, Kashmir

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ABSTRACT

Background: The control measures implemented against COVID-19 infection are affected largely in turn by the knowledge, attitudes, and practices (KAP) towards COVID-19. The medical undergraduates being most active users of social media could have a huge impact over spread as well as control of this pandemic. So in order to evaluate their understanding of COVID-19. This study was aimed to assess knowledge, attitude and practices associated with COVID-19 among the undergraduate medical students.
Subjects dan Method: A cross sectional study using an online survey was conducted among the medical students of Government Medical College, District Anantnag, J&K. All the medical students enrolled in this medical college were included in the study. Universal sampling was followed and a total of 183 medical students were included in the study. Data was collected by using a pre-tested semi-structured questionnaire through online survey form. The dependent variables were Knowledge, Attitude and Practice regarding COVID-19. The independent variables were demographic characteristics like age, gender, residence etc. Frequencies were obtained using descriptive statistics using appropriate statistical tool for analysis.
Results: A total of 183 medical students participated in this study. All the subjects knew about corona virus and their main source of information was social media (n=131; 71.4%). About 95.6% knew about mode of transmission, and 91.2% knew about all major symptoms of corona virus infection. Most of the participants felt that COIVD-19 is a serious (n=137; 74.9%) disease and that lockdown is helping in reducing the number of cases (n=157; 85.8%). Our study also showed that 86.9% wash their hands regularly, 90.2% wear a face mask to avoid transmission, and 89.1% followed the lockdown guidelines.
Conclusion: The present study showed that these medical students seem to have satisfactory knowledge, positive attitude and good practices regarding COVID-19.

Keywords: COVID-19, knowledge, attitude, practice, medical students, Anantnag

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BACKGROUND

Epidemics and pandemics affect the survival of human beings and hence have been thoroughly and repeatedly explained by scholars time over time. Lack of knowledge among people during an epidemic or

pandemic can cause confusion and havoc. So this gap in the knowledge is bridged by conducting studies regarding knowledge, attitudes, and practices (KAPs) of specific epidemics or pandemic e.g. swine influenza (Shilpa et al., 2014), Middle East Respiratory Syndrome (MERS) (AlJohani and Al-Qahtani, 2016) and Dengue fever (Nalongsack et al., 2009).

The very first few cases of pneumonia of unknown etiology were reported in late December, 2019 in Wuhan province of China (WHO, 2020) and the causative agent was found to be a new Corona virus named SARS-COV-2. This virus rapidly spread to the mainland China and then further across the international borders to most countries of the world. Soon after this, on 11th March, 2020, WHO declared it a global pandemic. Since 2020, most of the countries have implemented various measures to minimize the spread, morbidity and mortality of this disease (Sorci et al. 2020).

India had its first case of COVID-19 infection reported on January 30, 2020 from Kerala (Andrews et al., 2020) and faced a massive rise in the daily number of cases during the first wave. Despite the development and provision of vaccine against COVID-19, India and its healthcare system faced two major challenges. The first one being blocking the community transmission with various measures such as face mask-wearing, social distancing, avoiding large gatherings, lockdowns, tracking and quarantine, along with massive testing (WHO, 2020). The second one being provision of hospital care to those patients who require it, especially oxygen, ventilators, intensive care units (ICU) etc (Bouadma et al., 2020). As of December 24, 2021, the number of confirmed SARS-CoV-2 infections in India were 3.48 crore cases and reported COVID-19 deaths were 4.76 lacs (Status, 2021). Jammu and Kashmir reported its first case of corona virus infection on March 16, 2020 (Lone et al., 2020) and on 14th April 2020, District Anantnag reported its first case of this dreadful infection. Just like the rest of the country, situation in the J&K state looks grim with shortage of oxygen beds and consistent rise of COVID-19 cases during each wave. The control measures implemented against COVID-19 infection are very significant, and are affected largely in turn by the knowledge, attitudes, and practices (KAP) towards COVID-19 (Ajilore and Atakiti, 2017; Tachfouti et al., 2012).

The recently established medical college in District Anantnag, J&K has around 200 enrolled students currently undergoing their training. With the recent upsurge of the COVID-19 cases across the state, the entire educational system including medical studies has been once again put in unprecedented hard situation. The medical undergraduates being the most active users of social media could have a huge impact over the spread as well as control of this pandemic by their perception and behavior (Peng et al., 2020) and they also need to be well versed with the situation and show resilience which can be looked up to by the whole community. Hence in order to evaluate their understanding of the COVID-19 pandemic, a cross sectional study was conducted to assess the knowledge, attitude, and practice associated with COVID-19 among the undergraduate medical students during the second wave of COVID-19 outbreak in India.

SUBJECTS AND METHOD

1. Study Design

A cross sectional study using an online survey was conducted among the medical undergraduate students of Government Medical College, District Anantnag, Jammu

& Kashmir between October 2021 to November 2021.

2. Population and Sample

The Government Medical College, District Anantnag, J&K is the only medical college of the district and has been established in 2018 with its 1st MBBS batch enrolled in 2019. Hence at present (2021), there are only two batches in the college with 100 medical students in each batch. Universal sampling was followed and all the students who were willing to participate were included in the study. A total of 183 medical students participated in this study.

3. Study Variables

The dependent variables for this study were knowledge, attitude and practice regarding COVID-19 among the medical undergraduates. The independent variables were demographic characteristics of the students who participated like age, gender, residence etc.

4. Operational Definition of Variable

Knowledge: Presence of knowledge regarding COVID-19 included awareness about corona virus, source of information, mode of transmission etc. Some questions have a Yes/No type of response and some have multiple response answers.

Attitude: Attitude regarding COVID-19 involves approach or stance of these medical students towards COVID-19 pandemic. It involves whether they consider COVID-19 a fatal disease or not, their opinions regarding government policies, has lockdown helped in controlling it? etc.

Practice: Practice against COVID-19 infection involves various activities done to curb this disease viz hand washing, social distancing, staying home during lockdown etc.

Age: Age of participants has been expressed in years.

Gender: Gender has been divided into Male and Female.

Residence: Residence has been categorized as urban (area under municipality) and rural (area under panchayat).

5. Study Instruments

The data was collected by using a pre-tested semi-structured questionnaire through online survey form (Google Forms). The questionnaire had four parts viz socio-demographic details, knowledge regarding COVID-19, and attitude- and practice-based questions. The questionnaire had a user-friendly design and layout to avoid multiple responses. The questionnaire was pretested among fifteen medical students of the college, and necessary changes in language, style, and responses were made. These forms were circulated among the various Whatsapp groups of the students from both batches.

6. Data Analysis

The collected data was entered in Microsoft Excel spreadsheet. Frequencies were obtained using descriptive statistics using appropriate statistical tool for analysis.

7. Research Ethics

All the necessary information regarding the study participants' rights, and researcher's contact details were provided on the first page of the survey questionnaire. The anonymity and confidentiality of the participants was ensured during the study process. The research ethical clearance approval was obtained from the Institutional Ethics Committee via the protocol ID IEC/GMCA/21/012.

RESULTS

1. Sample Characteristics:

A total of 183 medical students participated in this study, with a response rate of 91.5%. Majority (n=129; 70.6%) of these students belonged to rural areas, more than half of the participants were females (n=99; 54.1%) and median age of the participants was 20 years (Table 1).

Table 1. Baseline characteristics of medical students of Government Medical College, District Anantnag, J&K

Parameter	Frequency	Percentage
Age in years		
19	76	41.50
20	85	46.40
21	22	12.10
Gender		
Male	84	45.90
Female	99	54.10
Residence		
Rural	129	70.50
Urban	54	29.50
MBBS year (currently)		
1st	98	53.50
2nd	85	46.50

Knowledge regarding COVID-19

All the subjects knew about coronavirus and that the first case was reported in China. The main source of information was social media (n=131; 71.4%). About 95.6% knew about the mode of transmission, 75.4% knew that all age groups were susceptible and 91.2% knew about all major symptoms of corona virus infection. All the students knew about the availability of vaccine against corona virus and 61.2% knew that currently there is no definite treatment available against this disease (Table 2).

Table 2. Knowledge regarding COVID-19 among the medical students of Government Medical College, District Anantnag, J&K

Knowledge	Frequency	Percentage
Awareness about corona virus		
Yes	183	100.00
Source of Information		
Social media	131	71.40
TV	26	14.30
Friends	22	12.00
Others	4	2.30
First case of COVID-19 was reported in		
China	183	100.00
Modes of transmission of corona virus *		
Sneezing/coughing	25	13.60
Droplet	3	1.70
Touch	2	1.10
<1 m distance	2	1.10
All	175	95.60
Awareness on prevention of corona virus infection		
Yes	166	90.70
No	0	0.00
Not fully sure	17	9.30
Susceptible age group to COVID-19 infection		

All ages	138	75.40
Elderly	38	20.80
Children	7	3.80
Symptoms of novel COVID-19 *		
All	167	91.20
Fever	89	48.60
Body ache	68	37.10
Shortness of breath	57	31.50
Cough	67	36.60
Cold	51	27.80
Awareness on whom to contact if symptoms occur		
Yes	177	96.70
No	6	3.30
Availability of treatment for COVID-19?		
Yes	71	38.80
No	112	61.20
Vaccine for COVID-19		
Yes	183	100.00
Sources of awareness regarding coronavirus?		
All	155	84.70
Internet	25	13.60
TV	3	1.70

*Multiple responses

Attitude regarding COVID-19

Most of the participants felt that COIVD-19 is a serious (n=137, 74.9%) disease and that lockdown is helping in reducing the number of cases (n=157, 85.8%). Furthermore 78.2% felt that Government's initiatives against this deadly disease are inadequate and 64.5% participants thought that the lockdown should be extended. Most of the students (n=155, 84.7%) thought that their studies were hampered during the lockdown (Table 3).

Table 3. Attitude regarding COVID-19 among the medical students of Government Medical College, District Anantnag, J&K

Attitude	Frequency	Percentage
Are you worried that someone you know may have an infection & you are not aware of it?		
Yes	59	32.30
No	51	27.80
Sometimes	73	39.90
Nature of the disease?*		
Fatal	31	16.90
Mild	58	31.70
Serious	137	74.90
Don't know	17	9.30
Government's initiatives to prevent corona virus are adequate?		
Yes	24	13.10
No	143	78.20
Don't know	16	8.70
Do you think lockdown helped in reducing the number of cases?		

Yes	157	85.80
No	20	10.90
Don't know	6	3.30
Is there a need to extend the lockdown?		
Yes	118	64.50
No	50	27.30
Don't know	15	8.20
Do you feel that the precautions such as hand washing, isolation, quarantine, social distancing, and wearing a mask will reduce the transmission?		
Yes	183	100.00
What to do if coronavirus symptoms develop?		
Go to hospital	29	15.80
Isolation/quarantine	154	84.20
Management of coronavirus infection suspects?		
Home quarantine	89	48.60
Hospital quarantine	13	7.10
Isolation	81	44.30
Wearing a cotton mask/triple layer mask will protect from corona virus?		
Yes	88	48.10
No	15	8.20
Don't know	12	6.50
Maybe	68	37.20
Have you looked for information on how to wear a mask correctly?		
I know how to	72	39.40
Yes I have	93	50.80
Partly looked for	17	9.30
No I have not	1	0.50
Do you think your studies have been hampered during lockdown?		
Yes	155	84.70
No	11	6.10
Don't know	3	1.60
Maybe	14	7.60

Practices regarding COVID-19

Our study showed that 86.9% wash their hands regularly, 90.2% wear a face mask to avoid transmission, 89.1% followed the lockdown guidelines, 73.2% maintain social distancing and 97.3% preferred to stay home during the lockdown (Table 4)

Table 4. Practice regarding COVID-19 among the medical students of Government Medical College, District Anantnag, J&K

Practice	Frequency	Percentage
Do you wash your hands with soap and water regularly?		
Yes	159	86.90
No	9	4.90
Sometimes	15	8.20
Are you wearing mask to avoid transmission?		
Yes	165	90.20
No	3	1.60
Sometimes	15	8.20

Are you following the guidelines given by the authority for lockdown?		
Yes	163	89.10
No	3	1.60
Sometimes	17	9.30
Have you been maintaining social distancing?		
Yes	134	73.20
No	9	5.00
Sometimes	40	21.80
Do you keep a track on the progress of the disease through media?		
Yes	150	82.00
No	7	3.80
Sometimes	26	14.20
What do you prefer to do in lockdown?		
Stay home/hostel	178	97.30
Go out	2	1.10
Visit relatives and Friends	3	1.60
How do you spend time during lockdown?*		
Study	97	53.00
Catch on sleep	47	25.70
Play games online	31	16.90
Play games outdoor	8	4.40

DISCUSSION

To our best knowledge, this is the first study to assess the KAP regarding COVID-19 among medical undergraduate students of District Anantnag, J&K. A total of 183 students participated in this study; out of which females were 54.1% and belonged to age group 19-21 years. Similar baseline characteristics of the participants were reported by other studies (Alrasheedy et al., 2021).

Knowledge

Overall the medical undergraduate students appeared to have a good knowledge regarding COVID-19 as all of them knew about the corona virus and that the first case was reported in China. Similar studies conducted among medical students nationally and internationally also revealed the same level of knowledge (Peng et al., 2020; Alrasheedy et al, 2021; Krishna, 2021). Another important finding was that the social media (75.4%) was the main source of COVID-19 information among these students. These findings are in tune to the results reported by other studies (Singh and Sewda, 2020; Kasemy et al., 2020; Alzoubi et al., 2020; Saqlain et al., 2020; Xue-Lian Wu, 2021; Hamza et al., 2020). This clearly indicates that participants are relying consistently on the internet, social media and online information as the principal ways to obtain information, compared with friends and other resources.

The knowledge about the mode of transmission as well as the symptoms of the corona virus infection were present in the majority of the students which is similar to the findings reported by other online surveys conducted among medical students (Peng et al., 2020; Singh and Sewda, 2020; Xue-Lian Wu, 2021; Khasawneh et al., 2020). The knowledge about the susceptibility of COVID-19 infection across different age groups revealed that most of them knew that all age groups were susceptible to the corona virus infection. Studies conducted in Karanataka (Krishna, 2021) and Maharatsra (Sundarajan et al., 2020) also reported same level of knowledge regarding age group involved. One area of concern with our study was the fact that only 61.2%

of medical students knew that there is no effective treatment available against this virus and this percentage was comparatively low as compared to the findings reported by a study conducted in Dehradun, India (Maheshwari et al., 2020) in which 92.4% of medical students answered correctly.

Attitude

Most of the medical students believed that COVID-19 is a serious disease and that the lockdown during this second wave of the pandemic (85.5%) is essential to reduce the number of the cases. This is consistent to studies conducted across India (Krishna, 2021; Singh and Sewda, 2020; Kasemy et al., 2020; Alzoubi et al., 2020; Maheshwari et al., 2020) where majority of the undergraduate students also felt that lockdown is a good step towards reducing the cases. as well as other studies conducted among general public of J&K (Dkhar et al., 2020) as well as India (Sundarajan et al., 2020). In our study most of the students (78.2%) felt that the measures taken by the Government's to curb this disease are inadequate. This percentage is quiet high as compared to a study conducted in India where only around 29.7% of the students believed that these measures are inadequate (Chandana Krishna, 2021). Also 75.4% of the students felt that their studies have been affected due to this lockdown which is in tune with other studies (Krishna, 2021; Dkhar et al., 2020).

Practice

Encouragingly 89.1% of the students stated that they were following the Government guidelines strictly which is also being reflected by the 97.3% of students responding that they prefer to stay home during the lockdown, and these findings are consistent with the findings of other studies (Alrasheedy et al., 2021;Hamza et tal., 2020). In our study most of the students maintain social distancing while out and almost all of them use a face mask and wash their hands regularly, and these findings are in line with findings of other studies (Kasemy et al., 2020; Xue-Lian Wu, 2021; Khasawneh et al., 2020; Narayana et al., 2020; Nair et al., 2014).

The present study showed that the medical students of Government medical college, District Anantnag, JK seem to have satisfactory knowledge, positive attitude and good practices regarding COVID-19. During this pandemic, conducting periodic health awareness programs and webinars for increasing the overall awareness of medical students can serve as a very useful and safe tool in encouraging positive attitude and to bring about safe practices.

These medical students also displayed their zeal to help in controlling this second wave of pandemic by strictly adhering to all the necessary preventative measures put in place by authorities in order to reduce the spread of COVID-19.

The limitation of the study was that sample size was small and study was limited to only one medical college.

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AUTHOR CONTRIBUTION

Mohsina Mukhtar and Mahbooba Rasool raised the initial research question, managed data collection, ran statistical analysis, and interpreted results; Shahnaz Nabi refined research questions and reviewed the results. Suhail Nazir drew tables and graphs and wrote up manuscript. Muneer Ahmad Masoodi suggested issues in the discussion.

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CONFLICT OF INTEREST

There are no conflicts of interest.

REFERENCE

Ajilore K, Atakiti I, Onyenankeya K. (2017). College students knowledge, attitudes and adherence to public service announcements on Ebola in Nigeria: Suggestions for improving future Ebola prevention education programmes. Health Educ J. 76(6): 648–660. doi: 10.1177/0017896917710969.

Alkot M, Albouq MA, Shakuri MA, Subahi MS (2016). Knowledge, attitude, and practice toward MERS-CoV among primary health-care workers in Makkah Al-Mukarramah: an intervention study. Int J Med Sci Public Health. 5(5): 952-959. doi: 10.5455/ijmsph.-2016.10022016362.

Alrasheedy AA, Abdulsalim S, Farooqui M, Alsahali S, Goodman B (2021). Knowledge, attitude and practice about coronavirus disease (COVID-19) pandemic and its psychological impact on students and their studies: a cross-sectional study among pharmacy students in Saudi Arabia. Risk Manag Healthc Policy. 14: 729–741. doi: 10.-2147/RMHP.S292354.

Alzoubi HM, Alnawaiseh N, Al-Mnayyis AM, Abu-Lubad M, Aqel A, Al-Shagahin HM (2020). Covid-19 – Knowledge, attitude and practice among medical and non-medical university students in Jordan. J Pure Appl Microbiol. 14(1): 17-24. doi: 10.22207-/JPAM.14.1.04.

Andrews MA, Areekal B, Rajesh KR, Krishnan J, Suryakala R, Krishnan B, Muraly CP, et al. (2020). First confirmed case of COVID-19 infection in India: A case report. Indian J Med Res. 151(5): 490-492. doi: 10.4103/ijmr.IJMR_21-31_20.

Bouadma L, Lescure F-X, Lucet J-C, Yazdanpanah Y, Timsit J-F (2020). Severe SARS CoV 2 infections: practical considerations and management strategy for intensivists. Intensive Care Med. 46(4):579-582. doi: 10.1007/s0-0134-020-05967-x.

Dkhar SA, Quansar R, Saleem SM, Khan SMS (2020). Knowledge, attitude, and practices related to COVID-19 pandemic among social media users in J&K, India. Indian J Public Health. 64: 205–210. doi: 10.4103/ijph.IJP-H_469_20.

Hamza M, Badary OA, Elmazar MM (2020). Cross sectional study on awareness and knowledge of COVID - 19 among senior pharmacy students. J. Community Health. 46(13): 1–8. doi: 10.1007/s10900-020-00859-z.

Kasemy ZA, Bahbah WA, Zewain SK, Haggag MG, Alkalash SH, Zahran E, Desouky D (2020). Knowledge, attitude and practice toward COVID-19 among Egyptians. J Epidemiol Glob Health. 10(4): 378–385. doi: 10.2991/jegh.k.-200909.001.

Khasawneh AI, Humeidan AA, Alsulaiman JW, Bloukh S, Ramadan M, Al-Shatanawi TN, Awad HH, et al. (2020). Medical students and COVID-19: knowledge, attitudes, and precautionary measures. a descriptive study from Jordan. Front Public Health. 8(253): 1–9. doi: 10.3389/fpubh.20-20.00253.

Krishna C, Menon SS. (2021). Knowledge, attitude, and practice related to COVID-19 among medical students of a rural medical college in Tumkur, Karnataka. Ann. Fam. Med. 9(1): 63-68. pISSN 2347-5455| eISSN 2347-5714.

Maheshwari S, Gupta PK, Sinha R, Rawat P (2020). Knowledge, attitude, and

practice towards coronavirus disease 2019 (COVID-19) among medical students: A cross-sectional study. J. Acute Dis. 9(3): 100-104. doi: 10.4103/2221-6189.283886.

Nair SS, Hanumantappa R, Hiremath SG, Siraj MA, Raghunath P (2014). Knowledge, Attitude, and Practice of Hand Hygiene among medical and nursing students at a tertiary health care centre in Raichur, India. 1-4. doi: 10.1155/2014/608927.

Nalongsack S, Yoshida Y, Morita S, Sosouphanh K, Sakamoto J (2009). Knowledge, attitude and practice regarding dengue among people in Pakse, Laos. Nagoya J. Med. Sci. 71(1–2): 29–37.

Narayana G, Pradeepkumar B, Ramaiah JD, Jayasree T, Yadav DL, Kumar BK (2020). Knowledge, perception, and practices towards COVID-19 pandemic among general public of India: A cross-sectional online survey. Curr Med Res Pract. 10(4):153-159. doi: 10.1016/j.cmrp.2020.07.013.

Peng Y, Pei C, Zheng Y, Wang J, Zhang K, Zheng Z, Zhu P (2020). A cross-sectional survey of knowledge , attitude and practice associated with COVID-19 among undergraduate students in China. BMC Public Health. 20(1): 1292. doi: 10.1186/s12889-020-09392-z.

Saqlain M, Munir MM, Rehman SU, Gulzar A, Naz A, Ahmed Z, Tahir AH, et al. (2020). Knowledge, attitude, practice and perceived barriers among healthcare workers regarding COVID-19: a cross- sectional survey from Pakistan. J Hosp Infect. 105(3): 419-423. doi: 10.1016/j.jhin.2020.05.007.

Shilpa K, Kumar BAP, Kumar SY, Ugargol AR, Naik VA, Mallapur MD (2014). A study on awareness regarding swine flu (influenza A H1N1) pandemic in an urban community of Karnataka. Med J DY Patil Vidyapeeth. 7(6): 732–737. doi: 10.4103/0975-2870.144862.

Singh JP, Sewda A, Shiv DG (2020). Assessing the knowledge, attitude and practices of students regarding the COVID-19 Pandemic. J. Healthc. Manag. 22(2): 281–290. doi: 10.1177/0972063420935669.

Sorci G, Faivre B, Morand S (2020). Explaining among-country variation in COVID-19 case fatality rate. Scientific Reports. Sci. Rep. 10(1): 1–11. doi: 10.1038/s41598-020-75848-2.

Status (2021). https://mohfw.gov.in. Available at: https://mohfw.gov.in.

Sundarajan DP, Reddy KB, Athul K, Swamy S, Deshmukh A, Sanskruti T, et al. (2020). Knowledge, attitude, awareness and practice towards COVID-19 pandemic in indian citizens during the national lockdown period: a quick online cross-sectional study. Int. J. Physiother. 8(3): 3504–3515. doi: 10.16965/ijpr.2020.139.

Tachfouti N, Slama K, Berraho M, Nejjari C (2012). The impact of knowledge and attitudes on adherence to tuberculosis treatment: a case-control study in a Moroccan region. Pan Afr. Med. J. 12(1): 1–8. doi: 10.11604/pamj.2012.12.52.1374.

WHO (2020). Novel Coronavirus (2019-nCoV). (January). 1–5.

Wu XL, Munthali GNC (2021). Knowledge, attitudes, and preventative practices (KAPs) towards COVID-19 among International students in China. Infect Drug Resist. 14: 507–518. doi: doi: 10.2147/IDR.S291199.

WHO (2020). Coronavirus disease 2019 (COVID-19): situation report, 82. 2020. Retrieved from: 20200311-sitrep-51-COVID-19.pdf (who.int).

Zhao J, Yang Y, Huang H, Li D, Gu D, Lu X,

et al. (2020). Relationship between the ABO blood group and the COVID-19 susceptibility. Infect Dis Soc of Amer. 73 (2): 328-331. doi: 10.1101/-2020.03.11.20031096.

Zietz M, Zucker J, Tatonetti NP (2020). Associations between blood type and COVID-19 infection, intubation, and death. Nat Commun. 11: 5761. doi: 10.1038/s41467-020-19623-x.