

Research paper

The collaborative outcomes study on health and functioning during infection times in adults (COH-FIT-Adults): Design and methods of an international online survey targeting physical and mental health effects of the COVID-19 pandemic

Marco Solmi^{1,2,3,4,5}, Andrés Estradé^{4,6}, Trevor Thompson⁷, Agorastos Agorastos⁸, Joaquim Radua^{4,9,10}, Samuele Cortese¹¹, Elena Dragioti^{12,13}, Friedrich Leisch¹⁴, Davy Vancampfort¹⁵, Lau Caspar Thygesen¹⁶, Harald Aschauer¹⁷, Monika Schloegelhofer¹⁷, Elena Akimova¹⁷, Andres Schneeberger¹⁸, Christian G. Huber¹⁹, Gregor Hasler²⁰, Philippe Conus²¹, Kim Q. Do Cuénod²¹, Roland von Känel²², Gonzalo Arrondo^{11,23}, Paolo Fusar-Poli^{4,24,25}, Philip Gorwood^{26,27}, Pierre-Michel Llorca²⁸, Marie-Odile Krebs^{27,29}, Elisabetta Scanferla²⁶, Taishiro Kishimoto³⁰, Golam Rabbani³¹, Karolina Skonieczna-Żydecka³², Paolo Brambilla^{33,34}, Angela Favaro³⁵, Akihiro Takamiya³⁰, Leonardo Zoccante³⁶, Marco Colizzi³⁷, Julie Bourgin³⁸, Karol Kamiński³⁹, Maryam Moghadasin⁴⁰, Soraya Seedat⁴¹, Evan Matthews⁴², John Wells⁴², Emilia Vassilopoulou⁴³, Ary Gadelha⁴⁴, Kuan-Pin Su^{45,114}, Jun Soo Kwon⁴⁶, Minah Kim⁴⁷,

E-mail addresses: marco.solmi83@gmail.com (M. Solmi), andres.estrade.vaz@kcl.ac.uk (A. Estradé), T.Thompson@greenwich.ac.uk (T. Thompson), aagorast@auth.gr (A. Agorastos), radua@clinic.cat, quimradua@gmail.com (J. Radua), samuele.cortese@soton.ac.uk (S. Cortese), elena.dragioti@liu.se (E. Dragioti), Friedrich.Leisch@boku.ac.at (F. Leisch), davy.vancampfort@kuleuven.be (D. Vancampfort), lct@sdu.dk (L.C. Thygesen), harald.aschauer@biopsyc.at (H. Aschauer), monika.schloegelhofer@biopsyc.at (M. Schloegelhofer), elena.akimova@biopsyc.at (E. Akimova), andres.schneeberger@pdgr.ch (A. Schneeberger), christian.huber@unibas.ch (C.G. Huber), gregor.hasler@unifr.ch (G. Hasler), philippe.conus@chuv.ch (P. Conus), Kim.Do@chuv.ch (K.Q.D. Cuénod), roland.vonkaenel@usz.ch (R. von Känel), garrondo@unav.es (G. Arrondo), paolo.fusar-poli@unipv.it (P. Fusar-Poli), p.gorwood@ghu-paris.fr (P. Gorwood), pmlorca@chu-clermontferrand.fr (P.-M. Llorca), MO.KREBS@ghu-paris.fr (M.-O. Krebs), e.scanferla@ghu-paris.fr (E. Scanferla), tkishimoto@keio.jp (T. Kishimoto), rabbani.golam33@gmail.com (G. Rabbani), karzyd@pum.edu.pl (K. Skonieczna-Żydecka), paolo.brambilla1@unimi.it (P. Brambilla), angela.favaro@unipd.it (A. Favaro), akihiro.takamiya@keio.jp (A. Takamiya), leonardo.zoccante@aovr.veneto.it (L. Zoccante), marco.colizzi@univr.it (M. Colizzi), j.bourgin@gh-nord-essonne.fr (J. Bourgin), fizklin@gmail.com (K. Kamiński), mmoghadasin@yahoo.com (M. Moghadasin), sseedat@sun.ac.za (S. Seedat), ematthews@wit.ie (E. Matthews), jswells@wit.ie (J. Wells), vassilopoulouemilia@gmail.com (E. Vassilopoulou), aryarape@gmail.com (A. Gadelha), cobolsu@gmail.com (K.-P. Su), kwonjs@snu.ac.kr (J.S. Kwon), verte82@snu.ac.kr (M. Kim), leetaey@gmail.com (T.Y. Lee), oleg.papsuev@gmail.com (O. Papsuev), denisa.mankova@nudz.cz (D. Manková), a.boscutti@gmail.com (A. Boscutti), cristiano.gerunda@unipd.it (C. Gerunda), diego.sacson@aulss4.veneto.it (D. Saccon), elena.righi@unimore.it (E. Righi), fmonaco1980@gmail.com (F. Monaco), giovannicroatto8@gmail.com (G. Croatto), guido.cereda@unimi.it (G. Cereda), eritrox7@gmail.com (J. Demurtas), nataschia.brondino@unipv.it (N. Brondino), nicola.veronese@unipa.it (N. Veronese), paolo.enrico@unimi.it (P. Enrico), pierluigi.politi@unipv.it (P. Politi), valentina.ciappolino@policlinico.mi.it (V. Ciappolino), Andrea.Pfennig@uniklinikum-dresden.de (A. Pfennig), andreas.bechdolf@uk-koeln.de (A. Bechdolf), Andreas.Meyer-Lindenberg@zi-mannheim.de (A. Meyer-Lindenberg), kahl.kai@mh-hannover.de (K.G. Kahl), katharina.domschke@uniklinik-freiburg.de (K. Domschke), Michael.Bauer@uniklinikum-dresden.de (M. Bauer), Nikolaos.Koutsouleris@med.uni-muenchen.de (N. Koutsouleris), sibylle.winter@charite.de (S. Winter), s.borgwardt@unibas.ch, stefan.borgwardt@uksh.de (S. Borgwardt), bitter.istvan@med.semmelweis-univ.hu (I. Bitter), balazs.judit@ppk.elte.hu (J. Balazs), czobor.pal@med.semmelweis-univ.hu (P. Czobor), unoka.zsolt@med.semmelweis-univ.hu (Z. Unoka), dmavridi@uoi.gr (D. Mavridis), ksamakis@gmail.com (K. Tsamakis), mpozikas@auth.gr (V.P. Bozikas), chavit.T@chula.ac.th (C. Tunvirachaisakul), dr.michaelmaes@hotmail.com (M. Maes), drteerayuth@gmail.com (T. Rungnirundorn), thitiporn.s@chula.ac.th (T. Supasitthumrong), arifulhaque.ukzn@gmail.com (A. Haque), brunoni@usp.br (A.R. Brunoni), gustavocostardi@hotmail.com (C.G. Costardi), felipe.schuch@ufsm.br (F.B. Schuch), polanczyk.guilherme@gmail.com (G. Polanczyk), jhoanne_luiz@hotmail.com (J.M. Luiz), laisfonseca@gmail.com (L. Fonseca), luanavma@hotmail.com (L.V. Aparicio), samiravassori@unesc.net (S.S. Valvassori), mn@dadlnet.dk (M. Nordentoft), pv@psykiatrifonden.dk (P. Vendsborg), sohh@sdu.dk (S.H. Hoffmann), jihed.sehli@gmail.com (J. Sehli), sartorius@normansartorius.com (N. Sartorius), sabina.heuss@fhnw.ch (S. Heuss), DGuinart@northwell.edu (D. Guinart), Jane.E.Hamilton@uth.tmc.edu (J. Hamilton), JKane2@northwell.edu (J. Kane), JRubio13@northwell.edu (J. Rubio), michael.sand@boehringer-ingenheim.com (M. Sand), a.koyanagi@psjd.org (A. Koyanagi), al.solanes@gmail.com (A. Solanes), a.andreu.bernabeu@gmail.com, alvaro.andreu@salud.madrid.org (A. Andreu-Bernabeu), antonia.sanjose@iisgm.com (A.S.J. Cáceres), carango@hggm.es (C. Arango), covadonga.martinez@iisgm.com (C.M. Díaz-Caneja), dahidalg@clinic.cat (D. Hidalgo-Mazzei),

<https://doi.org/10.1016/j.jad.2021.07.048>

Received 25 February 2021; Accepted 11 July 2021

Available online 19 July 2021

0165-0327/© 2021 Elsevier B.V. All rights reserved.

TaeYoung Lee⁴⁸, Oleg Papsuev⁴⁹, Denisa Manková⁵⁰, Andrea Boscutti³³, Cristiano Gerunda³⁵, Diego Saccon⁵¹, Elena Righi⁵², Francesco Monaco⁵³, Giovanni Croatto⁵⁴, Guido Cereda³³, Jacopo Demurtas⁵⁵, Natascia Brondino²⁵, Nicola Veronese⁵⁶, Paolo Enrico³³, Pierluigi Politi²⁵, Valentina Ciappolino³⁴, Andrea Pfennig⁵⁷, Andreas Bechdolf⁵⁸, Andreas Meyer-Lindenberg⁵⁹, Kai G. Kahl⁶⁰, Katharina Domschke⁶¹, Michael Bauer⁵⁷, Nikolaos Koutsouleris⁶², Sibylle Winter⁶³, Stefan Borgwardt⁶⁴, Istvan Bitter⁶⁵, Judit Balazs^{66,67}, Pal Czobor⁶⁵, Zsolt Unoka⁶⁵, Dimitris Mavridis⁶⁸, Konstantinos Tsamakis⁶⁹, Vasilios P. Bozikas⁸, Chavit Tunvirachaisakul⁷⁰, Michael Maes⁷⁰, Teerayuth Rungrunirundorn⁷⁰, Thitiporn Supasitthumrong⁷⁰, Ariful Haque³¹, Andre R. Brunoni⁷¹, Carlos Gustavo Costardi⁴⁴, Felipe Barreto Schuch⁷², Guilherme Polanczyk⁷¹, Jhoanne Merlyn Luiz⁷³, Lais Fonseca⁴⁴, Luana V. Aparicio⁷¹, Samira S. Valvassori⁷³, Merete Nordentoft⁷⁴, Per Vendsborg⁷⁵, Sofie Have Hoffmann¹⁶, Jihed Sehli²⁰, Norman Sartorius⁷⁶, Sabina Heuss⁷⁷, Daniel Guinart^{78,79,80}, Jane Hamilton⁸¹, John Kane^{78,82}, Jose Rubio^{78,82}, Michael Sand⁸³, Ai Koyanagi⁸⁴, Aleix Solanes⁹, Alvaro Andreu-Bernabeu⁸⁵, Antonia San José Cáceres⁸⁵, Celso Arango⁸⁵, Covadonga M. Díaz-Caneja⁸⁵, Diego Hidalgo-Mazzei⁸⁶, Eduard Vieta⁸⁶, Javier Gonzalez-Peñas⁸⁵, Lydia Fortea⁹, Mara Parellada⁸⁵, Miquel A. Fullana⁹, Norma Verdolini⁸⁷, Eva Fárková⁵⁰, Karolina Janků⁵⁰, Mark Millan⁸⁸, Mihaela Honciuc²⁸, Anna Moniuszko-Malinowska⁸⁹, Igor Łoniewski^{32,90}, Jerzy Samochowiec⁹¹, Łukasz Kiszkiel⁹², Maria Marlicz³², Paweł Sowa³⁹, Wojciech Marlicz^{93,94}, Georgina Spies⁴¹, Brendon Stubbs⁹⁵, Joseph Firth⁹⁶, Sarah Sullivan⁹⁷, Asli Enez Darcin⁹⁸, Hatice Aksu⁹⁹, Nesrin Dilbaz¹⁰⁰, Onur Noyan¹⁰⁰, Momoko Kitazawa³⁰, Shunya Kurokawa³⁰, Yuki Tazawa³⁰, Alejandro Anselmi⁶, Cecilia Cracco⁶, Ana Inés Machado⁶, Natalia Estrade⁶, Diego De Leo¹⁰¹, Jackie Curtis¹⁰², Michael Berk¹⁰³, Philip Ward¹⁰⁴, Scott Teasdale¹⁰³, Simon Rosenbaum¹⁰⁴, Wolfgang Marx¹⁰³, Adrian Vasile Horodnic¹⁰⁵, Liviu Oprea¹⁰⁵, Ovidiu Alexinschi¹⁰⁶, Petru Ifteni¹⁰⁷, Serban Turliuc¹⁰⁵, Tudor Ciuhodaru¹⁰⁸, Alexandra Bolos¹⁰⁵, Valentin Matei¹⁰⁹, Dorien H. Nieman¹¹⁰, Iris Sommer^{111,112}, Jim van Os¹¹³, Therese van Amelsvoort¹¹⁴, Ching-Fang Sun^{115,116}, Ta-wei Guu¹¹⁷, Can Jiao¹¹⁸, Jieting Zhang¹¹⁸, Jialin Fan¹¹⁸, Liye Zou¹¹⁸, Xin Yu¹¹⁹, Xinli Chi¹¹⁸, Philippe de Timary¹²⁰, Ruud van Winke¹²¹, Bernardo Ng¹²², Edilberto Pena¹²², Ramon Arellano¹²², Raquel Roman¹²², Thelma Sanchez¹²², Larisa Movina⁴⁹, Pedro Morgado^{123,124}, Sofia Brissos¹²⁵, Oleg Aizberg¹²⁶, Anna Mosina¹²⁷, Damir Krinitski¹²⁸, James Mugisha¹²⁹, Dena Sadeghi-Bahmani^{130,131}, Masoud Sadeghi¹³²,

javipenhas@gmail.com (J. Gonzalez-Peñas), lydiafor94@gmail.com (L. Fortea), parelladahggm@gmail.com, parelladahggm.es (M. Parellada), mafullana@clinic.cat (M.A. Fullana), norma.verdolini@gmail.com (N. Verdolini), eva.farkova@nudz.cz (E. Fárková), karolina.janku@nudz.cz (K. Janků), mark.millan@servier.com (M. Millan), rmhnciuc@chu-clermontferrand.fr (M. Honciuc), annamoniuszko@op.pl (A. Moniuszko-Malinowska), sanprobi@sanprobi.pl (I. Łoniewski), samoj@pum.edu.pl (J. Samochowiec), lukasz.kiszkiel@gmail.com (L. Kiszkiel), mariamarlicz@gmail.com (M. Marlicz), mailtosowa@gmail.com (P. Sowa), marlicz@hotmail.com (W. Marlicz), ggioscos@sun.ac.za (G. Spies), brendon.stubbs@kcl.ac.uk (B. Stubbs), joseph.firth@manchester.ac.uk (J. Firth), Sarah.Sullivan@bristol.ac.uk (S. Sullivan), aslienez@gmail.com (A.E. Darcin), aksubhatice@yahoo.com (H. Aksu), nesrin.dilbaz@gmail.com (N. Dilbaz), conurnoyan@gmail.com (O. Noyan), m-kitazawa@keio.jp (M. Kitazawa), shunya5@keio.jp, shunyakurokawa@gmail.com (S. Kurokawa), tazawa@a5.keio.jp (Y. Tazawa), alejandro.anselmi@ucu.edu.uy (A. Anselmi), ccracco@ucu.edu.uy (C. Cracco), amachado@ucu.edu.uy (A.I. Machado), natalia.estrade@ucu.edu.uy (N. Estrade), D.DeLeo@griffith.edu.au (D. De Leo), j.curtis@unsw.edu.au (J. Curtis), michael.berk@deakin.edu.au (M. Berk), p.ward@unsw.edu.au (P. Ward), s.teasdale@unsw.edu.au (S. Teasdale), s.rosenbaum@unsw.edu.au (S. Rosenbaum), wolf.marx@deakin.edu.au (W. Marx), adrian-vasile-horodnic@umfiasi.ro (A.V. Horodnic), liviu.oprea@umfiasi.ro, liviu.oprea@gmail.com (L. Oprea), alexinschi@yahoo.com (O. Alexinschi), petru.ifteni@yahoo.com (P. Ifteni), serban.turliuc@yahoo.com (S. Turliuc), tudorciuhodaru@yahoo.co.uk (T. Ciuhodaru), alex_andra_bolos@yahoo.com (A. Bolos), valipmatei@yahoo.com (V. Matei), d.h.nieman@amc.uva.nl (D.H. Nieman), i.e.c.sommer@umcg.nl (I. Sommer), j.j.vanos-2@umcutrecht.nl (J. van Os), t.vanamelsvoort@maastrichtuniversity.nl (T. van Amelsvoort), chingfangsun@gmail.com (C.-F. Sun), da20vid@gmail.com (T.-w. Guu), jiaocan@szu.edu.cn (C. Jiao), jenny121@126.com (J. Zhang), FanJL@szu.edu.cn (J. Fan), liyezou123@gmail.com (L. Zou), yuxin@bjmu.edu.cn (X. Yu), xinlichi@126.com (X. Chi), Philippe.detimary@uclouvain.be (P. de Timary), ruud.vanwinkel@kuleuven.be (R. van Winke), bng@sunvalleyb.com (B. Ng), epena@cisne.mx (E. Pena), jramonarellano@hotmai.com (R. Arellano), raquelrr@hotmail.com (R. Roman), marsan2@prodigy.net.mx (T. Sanchez), movina_larisa@bk.ru (L. Movina), pedromorgado@med.uminho.pt (P. Morgado), brissos.sofia@gmail.com (S. Brissos), oleg.aizberg@gmail.com (O. Aizberg), annamosina.md@gmail.com (A. Mosina), damir.krinitski@gmail.com (D. Krinitski), Jmmugi77@hotmail.com (J. Mugisha), Bahmanid@stanford.edu (D. Sadeghi-Bahmani), sadeghi_mbr@yahoo.com (M. Sadeghi), hadi.samira@yahoo.com (S. Hadi), serge.brand@upk.ch (S. Brand), anerrazuriz@uc.cl (A. Errazuriz), ncrossley@uc.cl (N. Crossley), draganaristic4@gmail.com (D.I. Ristic), carlos.lopez20@udea.edu.co, carloslopezjaramillo@gmail.com (C. López-Jaramillo), dimitriseffy@gmail.com (D. Efthymiou), drpraveenlalkuttichira@gmail.com (P. Kuttichira), roykalli@gmail.com (R.A. Kallivayalil), afzalj@gmail.com (A. Javed), driquebalafridi@yahoo.com (M.I. Afridi), bawojames@yahoo.com (B. James), sebakahomen@gmail.com (O.J. Seb-Akahomen), jfedorowicz@toh.ca (J. Fiedorowicz), Andre.Carvalho@camh.ca (A.F. Carvalho), Jeff.Daskalakis@camh.ca (J. Daskalakis), l.yatham@ubc.ca (L.N. Yatham), lin.yang@ahs.ca (L. Yang), tarek.okasha@gmail.com (T. Okasha), aichadahdoudh@gmail.com (A. Dahdoudh), bjorn.gerdle@liu.se (B. Gerdle), jari.tiihonen@ki.se (J. Tiihonen), SHINJI@yuhs.ac (J.I. Shin), jinh.lee95@yonsei.ac.kr (J. Lee), ahmed.mhalla@yahoo.fr (A. Mhalla), gaha.lotfi@yahoo.fr (L. Gaha), takoua.brahim@yahoo.com (T. Brahim), altyn@mail.ru (K. Altynbekov), nick.negaj@mail.ru (N. Negay), saya_n@yahoo.com (S. Nurmagambetova), yasser@gcmhp.net (Y.A. Jamei), mweiser@netvision.net.il (M. Weiser), CCorrell@northwell.edu (C.U. Correll).

Samira Hadi¹³³, Serge Brand^{131,134,135,136,137}, Antonia Errazuriz¹³⁸, Nicolas Crossley¹³⁸,
 Dragana Ignjatovic Ristic¹³⁹, Carlos López-Jaramillo¹⁴⁰, Dimitris Efthymiou⁴³,
 Praveenlal Kuttichira¹⁴¹, Roy Abraham Kallivayalil¹⁴², Afzal Javed¹⁴³,
 Muhammad Iqbal Afridi^{144,145,146}, Bawo James¹⁴⁷, Omonefe Joy Seb-Akahomen¹⁴⁸,
 Jess Fiedorowicz¹, Andre F. Carvalho¹⁴⁹, Jeff Daskalakis¹⁵⁰, Lakshmi N. Yatham¹⁵¹,
 Lin Yang¹⁵², Tarek Okasha¹⁵³, Aicha Dahdouh¹⁵⁴, Björn Gerdle¹², Jari Tiihonen¹⁰,
 Jae Il Shin¹⁵⁵, Jinhee Lee¹⁵⁶, Ahmed Mhalla¹⁵⁷, Lotfi Gaha¹⁵⁷, Takoua Brahim¹⁵⁸,
 Kuanysh Altynbekov¹⁵⁹, Nikolay Negay¹⁵⁹, Saltanat Nurmagambetova¹⁵⁹,
 Yasser Abu Jamei¹⁶⁰, Mark Weiser¹⁶¹, Christoph U. Correll^{63,78,79}

¹ University of Ottawa, Department of Psychiatry, Ontario, Canada

² The Ottawa Hospital, Department of Mental Health, Ontario, Canada

³ University of Ottawa, Ottawa Hospital Research Institute (OHRI) Clinical Epidemiology Program, Ottawa Ontario

⁴ Early Psychosis: Interventions and Clinical-detection (EPIC) Lab, Department of Psychosis Studies, Institute of Psychiatry, Psychology & Neuroscience, King's College London, London, United Kingdom

⁵ Centre for Innovation in Mental Health-Developmental Lab, School of Psychology, University of Southampton, and NHS Trust, Southampton, United Kingdom

⁶ Universidad Católica, Department of Psychology, Montevideo, Uruguay

⁷ University of Greenwich, School of Human Sciences, London, United Kingdom

⁸ Aristotle University of Thessaloniki, II. Dept. of Psychiatry, Division of Neurosciences, Medical School, Faculty of Health Sciences, Greece

⁹ Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), Imaging of Mood- and Anxiety-Related Disorders (IMARD), CIBERSAM, Barcelona, Spain

¹⁰ Karolinska Institutet, Centre for Psychiatric Research and Education, Department of Clinical Neuroscience, Stockholm, Sweden

¹¹ University of Southampton, Centre for Innovation in Mental Health, Southampton, United Kingdom

¹² Linköping University, Pain and Rehabilitation Centre and Department of Health, Medicine and Caring Sciences, Linköping, Sweden

¹³ University of Ioannina, Research Laboratory Psychology of Patients, Families & Health Professionals, Department of Nursing, School of Health Sciences, Ioannina, Greece

¹⁴ University of Natural Resources and Life Sciences, Wien, Austria

¹⁵ Katholieke Universiteit Leuven (KU Leuven), Department of Rehabilitation Sciences, Leuven, Belgium

¹⁶ National Institute of Public Health, University of Southern Denmark, Denmark

¹⁷ BioPsyC - Biopsychosocial Corporation, Non-profit association for Research Funding Ltd., Vienna, Austria

¹⁸ Psychiatric Services Grisons, Department of Adult Psychiatry, Switzerland

¹⁹ University of Basel, Universitäre Psychiatrische Kliniken Basel (UPK), Basel, Switzerland

²⁰ University of Fribourg, Fribourg Network of Mental Health (RFSM), Fribourg, Switzerland

²¹ University of Lausanne, Department of Psychiatry, Lausanne, Switzerland

²² University Hospital Zurich, Department of Consultation-Liaison Psychiatry and Psychosomatic Medicine, Switzerland

²³ University of Navarra, Mind-Brain Group, Institute for Culture and Society (ICS), Pamplona, Spain

²⁴ OASIS service, South London and Maudsley NHS Foundation Trust, London, United Kingdom

²⁵ University of Pavia, Department of Brain and Behavioral Sciences, Pavia, Italy

²⁶ Université de Paris, CMME, GHU Paris Psychiatrie et Neurosciences, Paris, France

²⁷ Institut de Psychiatrie et Neuroscience de Paris, INSERM U1266, F-75014, Paris, France

²⁸ Université Clermont Auvergne, CHU Clermont-Ferrand, Service de Psychiatrie B, Clermont-Ferrand, France

²⁹ Université de Paris, PEPIT, GHU Paris Psychiatrie et Neurosciences, Paris, France

³⁰ Keio University School of Medicine, Department of Neuropsychiatry, Tokyo, Japan

³¹ The National Foundation of Mental Health of Bangladesh, Bangladesh

³² Pomeranian Medical University in Szczecin, Department of Biochemical Sciences, Szczecin, Poland

³³ University of Milan, Department of Pathophysiology and Transplantation, Milan, Italy

³⁴ Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Department of Neurosciences and Mental Health, Milan, Italy

³⁵ University of Padua, Neurosciences Department, Padua, Italy

³⁶ Integrated University Hospital of Verona, Child and Adolescent Neuropsychiatry Unit, Maternal-Child Integrated Care Department, Verona, Italy

³⁷ University of Verona, Section of Psychiatry, Department of Neurosciences, Biomedicine and Movement Sciences, Verona, Italy

³⁸ Service de Psychiatrie de l'enfant et de l'adolescent, GHNE, 91440 Bures Sur Yvette, France

³⁹ Medical University of Białystok, Department of Population Medicine and Lifestyle Diseases Prevention, Białystok, Poland

⁴⁰ Kharazmi University, Department of Clinical Psychology, Faculty of Psychology and Education, Tehran, Iran

⁴¹ Stellenbosch University, Department of Psychiatry, Faculty of Medicine and Health Sciences, South Africa

⁴² Waterford Institute of Technology, School of Health Sciences, Waterford, Ireland

⁴³ University of Nicosia, Department of Life and Health Sciences, Nicosia, Cyprus

⁴⁴ Universidade Federal de São Paulo, Department of Psychiatry, São Paulo, Brazil

⁴⁵ An-Nan Hospital, China Medical University, Department of Psychiatry, Tainan, Taiwan

⁴⁶ Seoul National University College of Medicine, Department of Psychiatry, Seoul, Republic of Korea

⁴⁷ Seoul National University Hospital, Department of Neuropsychiatry, Seoul, Republic of Korea

⁴⁸ Pusan National University Yangsan Hospital, Department of Psychiatry, Yangsan, Republic of Korea

⁴⁹ Moscow Research Institute of Psychiatry, Moscow, Russia

⁵⁰ National Institute of Mental Health, Klecany, Czech Republic

⁵¹ AULSS4 Veneto Orientale, Addictions Department, Italy

⁵² University of Modena and Reggio Emilia, Department of Biomedical, Metabolic and Neural Sciences, Modena, Italy

⁵³ ASL Salerno, Department of Mental Health, Salerno, Italy

⁵⁴ University of Padova, Padova, Italy

⁵⁵ University of Modena and Reggio Emilia, Clinical and Experimental Medicine PhD Program, Modena, Italy

⁵⁶ University of Palermo, Department of Internal Medicine, Geriatrics Section, Palermo, Italy

⁵⁷ Technische Universität Dresden, University Hospital Carl Gustav Carus, Department of Psychiatry and Psychotherapy, Dresden, Germany

⁵⁸ University of Cologne, Cologne, Germany

⁵⁹ Heidelberg University, Central Institute of Mental Health, Medical Faculty Mannheim, Germany

⁶⁰ Hannover Medical School, Department of Psychiatry, Social Psychiatry and Psychotherapy, Germany

⁶¹ University of Freiburg, Department of Psychiatry and Psychotherapy, Medical Center – University of Freiburg, Faculty of Medicine, Freiburg, Germany

⁶² Ludwig-Maximilians-University of Munich, Munich, Germany

⁶³ Charité Universitätsmedizin Berlin, Department of Child and Adolescent Psychiatry, Berlin, Germany

⁶⁴ University of Lübeck, Lübeck, Germany

- ⁶⁵ Semmelweis University, Department of Psychiatry and Psychotherapy, Budapest, Hungary
- ⁶⁶ Eotvos Lorand University, Institute of Psychology, Budapest, Hungary
- ⁶⁷ Bjørknes University College, Oslo, Norway
- ⁶⁸ University of Ioannina, Department of Primary Education, Ioannina, Greece
- ⁶⁹ King's College London, Institute of Psychiatry, Psychology and Neuroscience, London, United Kingdom
- ⁷⁰ Chulalongkorn University, Department of Psychiatry, Thailand
- ⁷¹ Faculdade de Medicina da Universidade de São Paulo, Departments of Internal Medicine and Psychiatry, São Paulo, Brazil
- ⁷² Universidade Federal de Santa Maria, Department of Sports Methods and Techniques, Santa Maria, RS, Brazil
- ⁷³ Universidade do Extremo Sul Catarinense, Translational Psychiatry Laboratory, Graduate Program in Health Sciences, Criciúma, SC, Brazil
- ⁷⁴ University of Copenhagen, Copenhagen, Denmark
- ⁷⁵ Psykiatrifonden, Copenhagen, Denmark
- ⁷⁶ Association for the Improvement of Mental Health Programmes (AMH), Switzerland
- ⁷⁷ FHNW University of Applied Sciences and Arts Northwestern Switzerland, Switzerland
- ⁷⁸ The Zucker Hillside Hospital, Northwell Health, New York, USA
- ⁷⁹ Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, New York, USA
- ⁸⁰ Universitat Autònoma de Barcelona, Centro de Investigació Biomèdica en Red de Salud Mental (CIBERSAM), Institut de Neuropsiquiatria i Addiccions (INAD), Hospital del Mar, Institut Hospital del Mar d'Investigacions Mèdiques (IMIM), Departament de Psiquiatria, Barcelona, Spain
- ⁸¹ University of Texas Health Science Center Houston, McGovern Medical School, Louis A. Faillace, MD, Department of Psychiatry and Behavioral Sciences, USA
- ⁸² Feinstein Institutes for Medical Research, New York, USA
- ⁸³ Boehringer-Ingelheim, USA
- ⁸⁴ Parc Sanitari Sant Joan de Deu, Research and Development Unit, CIBERSAM, ICREA, Barcelona, Spain
- ⁸⁵ Hospital General Universitario Gregorio Marañón, Department of Child and Adolescent Psychiatry, Institute of Psychiatry and Mental Health (IPS MARAÑÓN), IISGM, CIBERSAM, Madrid, Spain
- ⁸⁶ University of Barcelona, Hospital Clínic, IDIBAPS, CIBERSAM, Barcelona, Spain
- ⁸⁷ University of Barcelona, Hospital Clínic, Bipolar and Depressive Disorders Unit, Institute of Neuroscience, IDIBAPS, CIBERSAM, Barcelona, Spain
- ⁸⁸ Institut de Recherché de Servier (IDRS), France
- ⁸⁹ Medical University of Białystok, Department of Infectious Diseases and Neuroinfections, Poland
- ⁹⁰ Sanprobi Sp. z o.o. Sp. k, Poland
- ⁹¹ Pomeranian Medical University in Szczecin, Department of Psychiatry, Szczecin, Poland
- ⁹² University of Białystok, Institute of Sociology, Society and Cognition Unit, Białystok, Poland
- ⁹³ Pomeranian Medical University in Szczecin, Department of Gastroenterology, Szczecin, Poland
- ⁹⁴ The Centre for Digestive Diseases Endoklinika, Szczecin, Poland
- ⁹⁵ King's College London, London, United Kingdom
- ⁹⁶ University of Manchester, Division of Psychology and Mental Health, Manchester, United Kingdom
- ⁹⁷ University of Bristol, Bristol, United Kingdom
- ⁹⁸ Istanbul Basaksehir Cam ve Sakura City Hospital, Department of Psychiatry, Istanbul, Turkey
- ⁹⁹ Adnan Menderes University Department of Child and Adolescent Psychiatry, Aydın, Turkey
- ¹⁰⁰ Uskudar University, Department of Psychiatry and Psychology, Istanbul, Turkey
- ¹⁰¹ Griffith University, South East Queensland, Australia
- ¹⁰² Mindgardens Neuroscience Network, Sydney, Australia
- ¹⁰³ Deakin University School of Medicine, Victoria, Australia
- ¹⁰⁴ UNSW Sydney, School of Psychiatry, Sydney, Australia
- ¹⁰⁵ University of Medicine and Pharmacy Grigore T. Popa, Faculty of Medicine, Iasi, Romania
- ¹⁰⁶ Institute of Psychiatry "Socola", Iasi, Romania
- ¹⁰⁷ Transilvania University of Brasov, Faculty of Medicine, Brasov, Romania
- ¹⁰⁸ Emergency Hospital "Nicolae Oblu", Iasi, Romania
- ¹⁰⁹ Psychiatry Department, University of Medicine and Pharmacy "Carol Davila" Bucharest, "Prof. Dr. Alexandru Obregia" Psychiatric Hospital, Bucharest, Romania
- ¹¹⁰ Academisch Medisch Centrum Universiteit van Amsterdam, Amsterdam, The Netherlands
- ¹¹¹ University Medical Center Groningen, University of Groningen, Cognitive Neurosciences, Department of Biomedical Sciences of Cells & Systems, Groningen, The Netherlands
- ¹¹² University Medical Center Groningen, University of Groningen, Department of Psychiatry, Groningen, The Netherlands
- ¹¹³ Utrecht University Medical Centre, Department of Psychiatry, Utrecht, The Netherlands
- ¹¹⁴ Maastricht University, Department of Psychiatry and Neuropsychology, Maastricht, The Netherlands
- ¹¹⁵ China Medical University Hospital, Mind-Body Interface Research Center, Taichung, Taiwan
- ¹¹⁶ Department of Psychiatry and Behavioral Medicine, Carilion Clinic Virginia Tech Carilion School of Medicine, Roanoke, VA, USA
- ¹¹⁷ China Medical University Beigang Hospital, Division of Psychiatry, Department of Internal Medicine, Taiwan
- ¹¹⁸ Shenzhen University, School of Psychology, Shenzhen, China
- ¹¹⁹ Peking University Institute of Mental Health, Department of Public Mental Health, Pekin, China
- ¹²⁰ UCLouvain, Institute of Neuroscience and Cliniques Universitaires Saint-Luc, Department of Adult Psychiatry, Brussels, Belgium
- ¹²¹ Katholieke Universiteit Leuven (KU Leuven), Department of Neurosciences, Leuven, Belgium
- ¹²² Asociación Psiquiátrica Mexicana, Mexico
- ¹²³ University of Minho, Life and Health Sciences Research Institute (ICVS), School of Medicine, Braga, Portugal
- ¹²⁴ ICVS/3B's - PT Government Associate Laboratory, Braga Guimarães, Portugal
- ¹²⁵ Lisbon's Psychiatric Hospital Centre, Department of Psychiatry, Portugal
- ¹²⁶ Belarusian Medical Academy of Postgraduate Education, Belarus
- ¹²⁷ Clénia AG, Wetzikon Psychiatric Centre, Switzerland
- ¹²⁸ Integrated Psychiatry Winterthur (IPW), Switzerland
- ¹²⁹ Kyambogo University, Department of Sociology and Social Administration, Kampala, Uganda
- ¹³⁰ Stanford University, Department of Psychology, California, USA
- ¹³¹ Universitäre Psychiatrische Kliniken Basel (UPK), Center of Affective, Stress and Sleep Disorders (ZASS), Basel, Switzerland
- ¹³² Kermanshah University of Medical Sciences, Medical Biology Research Center, Kermanshah, Iran
- ¹³³ Kharazmi University, Tehran, Iran
- ¹³⁴ University of Basel, Department of Sport, Exercise, and Health, Division of Sport Science and Psychosocial Health, Basel, Switzerland
- ¹³⁵ Kermanshah University of Medical Sciences, Substance Abuse Prevention Research Center, Kermanshah, Iran
- ¹³⁶ Kermanshah University of Medical Sciences, Sleep Disorders Research Center, Kermanshah, Iran
- ¹³⁷ Tehran University of Medical Sciences, School of Medicine, Tehran, Iran
- ¹³⁸ Pontificia Universidad Católica de Chile, Department of Psychiatry, School of Medicine, Santiago, Chile
- ¹³⁹ University of Kragujevac, Department of Psychiatry, Faculty of Medical Sciences, Kragujevac, Serbia
- ¹⁴⁰ University of Antioquia, Department of Psychiatry, Medellín, Colombia
- ¹⁴¹ Jubilee Mission Medical College & Research Institute, Thrissur, India

¹⁴² Pushpagiri Institute of Medical Sciences, Department of Psychiatry, Thiruvalla, Kerala, India¹⁴³ Chairman, Pakistan Psychiatric Research Centre-Fountain House, Lahore, Pakistan¹⁴⁴ Dean, Faculty of Psychiatry, College of Physicians and Surgeons, Pakistan¹⁴⁵ Dean, Jinnah Postgraduate Medical Centre, Karachi, Pakistan¹⁴⁶ Dean, Faculty of Medicine, Jinnah Sindh Medical University, Karachi, Pakistan¹⁴⁷ Federal Neuropsychiatric Hospital, Department of Clinical Services, Benin-City, Nigeria¹⁴⁸ Irrua Specialist Teaching Hospital, Department of Psychiatry, Edo State, Nigeria¹⁴⁹ Centre for Addiction and Mental Health (CAMH), Canada¹⁵⁰ University of Toronto, Toronto, Canada¹⁵¹ University of British Columbia, Vancouver, Canada¹⁵² University of Calgary, Alberta Health Services, Calgary, Canada¹⁵³ Okasha Institute of Psychiatry, Faculty of Medicine, Ain Shams University, Cairo, Egypt¹⁵⁴ Oran 1 University, Department of Psychiatry-Addictology, Oran, Algeria¹⁵⁵ Yonsei University College of Medicine, Department of Pediatrics, Seoul, South Korea¹⁵⁶ Yonsei University Wonju College of Medicine, Department of Psychiatry, Wonju, South Korea¹⁵⁷ University of Monastir, Research Unit "Vulnerability to Mental Disorders" LR05ES10, Monastir, Tunisia¹⁵⁸ University of Monastir, University Hospital of Monastir, Department of Psychiatry, Monastir, Tunisia¹⁵⁹ Republican Scientific and Practical Center of Mental Health, Kazakhstan¹⁶⁰ Gaza Community Mental Health Programme, Palestine¹⁶¹ Sheba Medical Center, Israel

ARTICLE INFO

Keywords:

COVID-19
 mental health
 functioning
 physical health
 representative
 well-being
 resilience
 survey
 international
 psychiatry
 depression
 anxiety
 post-traumatic
 COH-FIT
 children
 adolescents
 adults

ABSTRACT

Background: . High-quality comprehensive data on short-/long-term physical/mental health effects of the COVID-19 pandemic are needed.

Methods: . The Collaborative Outcomes study on Health and Functioning during Infection Times (COH-FIT) is an international, multi-language (n=30) project involving >230 investigators from 49 countries/territories/regions, endorsed by national/international professional associations. COH-FIT is a multi-wave, on-line anonymous, cross-sectional survey [wave 1: 04/2020 until the end of the pandemic, 12 months waves 2/3 starting 6/24 months thereafter] for adults, adolescents (14-17), and children (6-13), utilizing non-probability/snowball and representative sampling. COH-FIT aims to identify non-modifiable/modifiable risk factors/treatment targets to inform prevention/intervention programs to improve social/health outcomes in the general population/vulnerable subgroups during/after COVID-19. In adults, co-primary outcomes are change from pre-COVID-19 to intra-COVID-19 in well-being (WHO-5) and a composite psychopathology P-Score. Key secondary outcomes are a P-extended score, global mental and physical health. Secondary outcomes include health-service utilization/functioning, treatment adherence, functioning, symptoms/behaviors/emotions, substance use, violence, among others.

Results: . Starting 04/26/2020, up to 14/07/2021 >151,000 people from 155 countries/territories/regions and six continents have participated. Representative samples of ≥1,000 adults have been collected in 15 countries. Overall, 43.0% had prior physical disorders, 16.3% had prior mental disorders, 26.5% were health care workers, 8.2% were aged ≥65 years, 19.3% were exposed to someone infected with COVID-19, 76.1% had been in quarantine, and 2.1% had been COVID 19-positive.

Limitations: . Cross-sectional survey, preponderance of non-representative participants.

Conclusions: . Results from COH-FIT will comprehensively quantify the impact of COVID-19, seeking to identify high-risk groups in need for acute and long-term intervention, and inform evidence-based health policies/strategies during this/future pandemics.

1. Introduction

In March 2020, the World Health Organization (WHO) declared the COVID-19 virus (known as Coronavirus) a global pandemic. Up until July 23rd, 2021, 192,694,293 individuals had confirmed COVID-19 infection, and 4,138,605 died.([Dong et al., 2020](#); [Johns Hopkins University, 2020](#); [World Health Organization, 2020](#)) The infection was first detected in China and subsequently in all six inhabited continents, leading to almost ubiquitous public health restrictive measures (e. g., personal/public space hygiene measures, social/physical distancing, travel restrictions, personal protective equipment, quarantine). Both the COVID-19 pandemic and applied restrictive measures can have marked detrimental effects on physical and mental health-related quality of life and functioning of the general population([Kazan Kizilkurt et al., 2020](#)) and in specific population groups, which could be at increased risk of poor health and well-being during infection times (i.e., health workers,

children, elderly, individuals with physical or mental conditions, ([Alonso et al., 2021](#); [Anmella et al., 2020](#); [Lima et al., 2020](#); [Qiu et al., 2020](#); [Salazar de Pablo et al., 2020](#); [Wang et al., 2020](#)) refugees/social/ethnic/linguistic minority groups, people experiencing relevant financial loss/losing their job).

A pandemic is a very stressful event *per se*, considering exposure to deaths, multi-level restrictions, emotions of fear and an uncertain future. In the U.S. only, it is estimated that up to 40 million people will lose their job due to the COVID-19 pandemic, with the lower socio-economic strata of the population bearing the hardest consequences.([Poor Americans Hit Hardest by Job Losses Amid Covid-19 Lockdowns, Fed Says - The New York Times, 2021](#)) Moreover, behavioural restriction and social isolation measures have forced drastic life-style changes in every-day (co-)living conditions, which can (independently from the infection's spreading) introduce additional stress with concurrently minimized stress management resources access/availability, and potentially trigger unhealthy

life-style, coping strategies, and verbal and physical aggressive behaviours within households.(Fullana et al., 2020) Extended exposure to overall stress may contribute to alterations in biological stress-responsive systems (i.e., hypothalamic-pituitary-adrenal axis, autonomic nervous system, sympatho-adreno-medullary system, immune system) and precipitate physical and mental disorders (e.g., depression and anxiety disorders)(Chrousos, 2009) or negatively affect ongoing conditions in people already affected by mental or physical conditions. Beyond an immediate impact on health, the pandemic might also have delayed onset or long-term consequences in people not returning to their baseline after the removal of the stressful pandemic.

Taken together, apart from the direct COVID-19-infection-related health complications, secondary/indirect physical/mental health complications might represent the much larger, crucial and still unpredictable public-health-related burden of the pandemic.(Clark et al., 2020) However, only few studies have currently reported original, nationally/geographically comparable, inclusive and multi-language, representative data on health and well-being during the COVID-19 pandemic, and even less have included person-level assessments from the pre-COVID-19 period. In contrast, most studies have reported on data only from individual countries, with small and non-representative sample sizes, a focus on subgroups and/or very restricted sets of outcomes.(Thomas et al., 2020) Most published/registered/ongoing studies on the mental health impact of the COVID-19 pandemic have used an either single-wave cross-sectional or longitudinal design assessing the general population or, even more so, specific groups in a single country (or restricted set of). The largest cross-sectional planned study to the best of our knowledge targeted sample size of 65,000 subjects (NCT04378452), while most studies had <10,000 participants. Few longitudinal studies are targeting large national samples, such as one UK study planning to recruit >1,000,000 people (ISRCTN97041334), or have a multi-national approach, such as one study planning to recruit in 14 countries (NCT04367337). However, even such large studies did not consider linguistic/ethnic minorities, most studies use <5 mental-health-related assessment instruments, and few studies include non-psychological parameters, behavioural coping, or detailed demographic data.(Thomas et al., 2020) Acknowledging these gaps in the existing and evolving literature, and considering the unclear mechanisms underlying associations between the COVID-19 pandemic and health outcomes, unclear epidemiologic estimates, possible persistence of adverse outcomes after the pandemic in subgroups, unclear risk and protective factors, and differences across countries, large multi-language studies collecting multi-dimensional data throughout the pandemic from all the six continents are urgently needed.

This article presents the hypotheses, methodology and current dissemination status (July 23rd, 2021) of the Collaborative Outcomes study on Health and Functioning during Infection Times (COH-FIT), a large-scale, inclusive and multi-language global study and unique collaboration between over >230 researchers from 49 countries/territories/regions and six continents, focusing on the adult participant part of the survey study. Concurrently, we put the COH-FIT project in the context of previous or ongoing research on mental health outcomes during the COVID-19 pandemic. The design of the COH-FIT study may allow the better identification of non-modifiable/modifiable multi-system risk/resilience factors, and inform and facilitate both acute/long-term preventive responses and better adaptation capacity to the COVID-19 pandemic, without leaving linguistic minorities behind, potentially informing also evidence-based strategies for future pandemics/global crises.

2. Study design and methodology

In this section, the COH-FIT project is outlined regarding design, registration, objectives, hypotheses, development, researchers and institutions, countries/territories/regions involved, timeline, primary/key secondary/secondary outcomes, target populations, questionnaire development, variable selection, survey structure, survey platform, recruitment strategies, data storage and management, envisioned statistical analyses, funding, focusing on the COH-FIT-Adult (COH-FIT-A) part of the survey study. A description of the design of COH-FIT-Adolescent (COH-FIT-AD) and COH-FIT-Child (COH-FIT-C) is available elsewhere.(Solmi et al., 2021)

2.1. Clinical trial registration statement

The protocol of the COH-FIT study was finalized before first data collection, submitted on April 27th to ClinicalTrials.gov and officially registered there on May 12th, 2020 (Identifier: NCT04383470).

2.2. Objectives and hypotheses

The primary objective of COH-FIT is to assess, quantify and understand the impact of the COVID-19 pandemic and related protective measures on the health and well-being, as well as on social, behavioural outcomes and coping strategies, and health-service functioning in the general population, and across specific population risk groups. Our hypotheses are that both physical and mental health and well-being of the general population is heterogeneously affected by the pandemic. Some groups that are characterized by non-modifiable risk factors are at increased risk of poor outcome, but also certain individual/environmental/institutional modifiable risk factors are identifiable, informing resource allocation for interventions/preventive strategies during present/future infection times.

2.3. Collaborator network

The COH-FIT project, with >230 clinicians/researchers/academicians, across 49 countries/territories/regions and six continents, embraces to the authors' knowledge currently the largest global network (full list available at: www.coh-fit.com/collaborators/) among COVID-19 related health projects. Principal investigators of the COH-FIT project (Fig. 1) are Christoph U. Correll, MD, and Dr. Marco Solmi, MD, PhD (details available at: <https://www.coh-fit.com/project-leads/>). Coordinating co-investigators are Agorastos Agorastos, MD, Aristotle University of Thessaloniki, Greece, and Andrés Estradé, MSc, Universidad Católica, Uruguay. Individual researchers from the professional network of PIs were invited to the project, with subsequent spontaneous team compositions at country level. Clear criteria for participating to global and local papers were set and agreed upon. No formal agreement was signed by any member, and the project has been developed based on mutual trust and consideration, globally coordinated by the coPIs and study coordinators, and locally at country level.

2.4. Supporting and endorsing organizations

COH-FIT is supported by many organizations/institutions, and national scientific associations including European College of Neuropsychopharmacology Network on the Prevention of Mental Disorders and Mental Health Promotion (ECNP PMD-MHP), European Psychiatric

Association (EPA), World Association of Social Psychiatry (WASP), European Lifestyle Medicine Organization (ELMO), The Association for Child and Adolescent Mental Health (ACAMH), World Alliance for Crisis Helplines, among many more (full list of supporting partners available at <https://www.coh-fit.com/partners/>).

Partners that funded COH-FIT are listed in details in supplementary Table 5.

2.5. Study design and timeline

The COH-FIT study is a cross-sectional survey, structured in three consecutive waves (wave 1, during the COVID-19 pandemic until the World Health organization (WHO) has declared the pandemic over; wave 2, starting six months later, lasting 12 months; wave 3, 24 months later, lasting 12 months). Although cross-sectional at an individual level, COH-FIT continuously collects information during and after the pandemic, ultimately collecting longitudinal data at a population level, since individuals of the population are being sampled and assessed at different times and regional severities of the pandemic and related restrictions and effects. Study participation is anonymous. No country is excluded.

2.6. Ethics committee approval

The online survey launch on the COH-FIT website (www.coh-fit.com) occurred immediately after the first ethics committee/Institutional Review Board (IRB) approval (Aristotle University of Thessaloniki, Greece, 04/27/2020). Afterwards, prior to active local/national investigator outreach and advertisement activities regarding COH-FIT dissemination, approval or waiver (due to the anonymous, observational nature of the study) was sought from at least one national IRB.

2.7. Target population and targeted minimum sample size

The COH-FIT study targets adults (≥ 18 years old) in all countries/territories/regions, plus adolescents (14–17) and children (6–13) in most countries. Demographic, socio-economic, occupational, and clinical variables will identify specific population subgroups (i.e., age groups, genders, mental or physical conditions, pregnant women, health workers, immigrants, etc.). The minimum targeted sample size upon study design was 50,000 participants in wave 1, and 30,000 each in wave 2 and 3. Since the survey participation is anonymous, individuals can't be matched across consecutive waves, but in waves 2 and 3, participants will be asked if they participated in a prior COH-FIT wave.

2.8. Continent and country participation

The COH-FIT survey is freely accessible online. COH-FIT collaborators from 49 countries/territories/regions are actively promoting/disseminating/advertising the COH-FIT study via multi-channel approaches after IRB approval or waiver (see above). The following 49/territories/regions countries are part of the COH-FIT via >230 local COH-FIT collaborators from over 120 institutions: i) Africa: Algeria, Egypt, Nigeria, South Africa, Tunisia, Uganda; ii) Asia: Bangladesh, China, India, Iran, Israel, Japan, Kazakhstan, Pakistan, Palestine, South Korea, Taiwan, Thailand; iii) Europe: Austria, Belarus, Belgium, Cyprus, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Romania, Russia, Serbia, Spain, Sweden, Switzerland, Turkey, United Kingdom; iv) North America:

Canada, Mexico, United States of America; v) Oceania: Australia; vi) South America: Brazil, Chile, Colombia, Uruguay.

2.9. Language availability and survey translations

The survey is currently available in the following 30 languages: Arabic, Bengalese, Chinese (traditional), Chinese (simplified), Czech, Danish, Dutch (Belgium), Dutch (Netherlands), English, French, German, Greek, Hungarian, Italian, Japanese, Korean, Polish, Persian (Farsi), Portuguese (Brazil), Portuguese (Portugal), Romanian, Romansch, Russian, Serbian, Spanish, Swedish, Thai, Turkish, Urdu, Xhosa.

For each language, the original English version underwent two independent forward translations, followed by a harmonization of the two versions to create a target-language version, and one independent back-to-English translation by a third translator blinded to the original English version. The final version required the consensus of the three translators. Translators were healthcare professionals with specific competence in both the source and target language and questionnaire validation.

2.10. Survey platform, data management and protection

COH-FIT survey data are collected, stored and managed using the Research Electronic Data Capture (REDCap) software tool hosted at the Department of Neurosciences of the University of Padua, Italy, and at Department of Child and Adolescent Psychiatry, Charité Universitätsmedizin, Berlin, Germany. (Harris et al., 2009) REDCap is a secure, web-based application designed to support data capture for research studies and used in >3,700 institutions worldwide and provides: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources. The application and data part reside on two separate virtual machines. The information is stored in two different datastore nodes to ensure resilience, disaster recovery and business continuity. Backup of all information is ensured daily. The entire system is protected by two perimetral defense levels. All operations are logged as required by GDPR law. The participation to the study is 100% anonymous and voluntary. No individually identifying information or data regarding individuals' online activity will be collected and retained. Participating countries' national data will be made promptly available upon request to the members of each country's national COH-FIT coordinating team, prioritizing the global results dissemination before dissemination of local results. The international PIs and statistical analysis core team (see below) will have unlimited access to all global data for 15 years.

2.11. Informed consent

All adult participants must provide informed consent electronically on the survey's platform prior to initiating the survey.

2.12. Survey structure and format

2.12.1. Survey structure

The survey is divided into three arms, namely COH-FIT-A (adults), COH-FIT-AD (adolescents), COH-FIT-C (children) (Fig. 2). We here focus on COH-FIT-A.



Fig. 1. Collaborative Outcomes study on Health and Functioning during Infection Times (COH-FIT) logo.

In the COH-FIT-A, adults first fill out the self-rated COH-FIT-A questionnaire. Additionally, participants reporting being legal guardians of minors have the option to list their children's or adolescents' age, and physical and mental health diagnoses and rate them with the Children's Global Assessment Scale (CGAS), (Shaffer et al., 1983) and Pediatric Quality of Life Enjoyment and Satisfaction Questionnaire (PQ-LES-Q). (Endicott et al., 2006) Finally, before study completion, participants have the option to answer validated questionnaires, namely Altman Self-Rating Mania Scale (ASRM), (Altman et al., 1997) Brief Obsessive Compulsive Scale (BOCS), (Bejerot et al., 2014) Brief Resilience Scale (BRS), (Smith et al., 2008) CGAS, (Shaffer et al., 1983) Generalized Anxiety Disorder 7-item scale (GAD-7), (Spitzer et al., 2006) Patient Health Questionnaire 9-item scale (PHQ-9), (Kroenke et al., 2001) PTSD Checklist for DSM-5 (PCL-5), (Blevins et al., 2015) Prodromal Questionnaire-16, (Ising et al., 2012) Suicidal Behaviors Questionnaire-Revised (SBQ-R). (Osman et al., 2001)

2.12.2. Survey format

The survey has an adaptive format. Depending on the selected age of the participant, COH-FIT-A, COH-FIT-AD, or COH-FIT-C are individually activated. In addition, particular questions are displayed based on specific answers to preceding questions, following a predefined branching logic. Participants have the option of saving their answers and returning later to the survey for questionnaire completion through a generated Return Code. This code is sent automatically to an individually inputted e-mail address of preference (neither the code nor email address are stored in the database) and is requested to rejoin and complete the saved questionnaire.

2.13. COH-FIT questionnaire, variables and rating

2.13.1. Targeted areas of interest

The COH-FIT questionnaire targets information on demographic and socioeconomic status including migrant status, physical and mental health, pregnancy status, well-being, functioning, emotional/psychological, behavioural and environmental factors, including restrictions and COVID-19 exposure-related information, health care access/utilization, vaccine-related beliefs/behavior, treatment adherence, telehealth, personal opinions about pandemic response measures and individual coping strategies, among others. A list of modifiable/non-modifiable factors and outcomes is available in Table 1, and Fig. 3.

"Modifiable" and "non-modifiable" labels have been assigned from a stakeholder perspective, with those labeled "modifiable" that represent promptly actionable factors.

2.13.2. Questionnaire development

Survey questions were chosen according to published literature on the effects of pandemics and social isolation, and ongoing survey and cohort studies assessing the health impact of COVID-19 (see Supplementary Material for the considered body of evidence). The goal was to develop a questionnaire that was easy to score through simple rating and scoring instructions, comprehensively covering the areas of evaluation specified in Table 1 and Fig. 3. The first-draft questionnaire was developed by the two PIs, which then underwent extensive testing, revision and improvement by the whole COH-FIT Consortium who ultimately approved the final version. Specifically, after reaching consensus on the areas to be assessed by the COH-FIT survey, the item pool was screened to determine the questions' applicability and relevance to the pandemic phases across cultures. Special attention was given to including items rating the level of COVID-19-related information in the population, access to/utilization of healthcare, current restrictive measures, specific emotional or behavioral changes. The language of the collected questions was adapted to qualify for use in the general population. Group consensus on both content and form was finally reached. The items were selected, so that the COH-FIT-A can be completed within 30-35 minutes.

To utilize a consistent and intuitive rating/scoring system that also will allow pooling across different times/dimensions, the final continuous, quantitative outcome items were as much as possible rescaled into a homogenous 0-100 visual analogue scale (VAS). These outcome questions are asked for the time period of "2 weeks of normal life prior to the outbreak of the COVID-19 pandemic" and for the "last two weeks prior to taking the survey". We chose the period of two weeks to allow for a reasonable time frame that would assure stability and validity of the response and also to be consistent with the The CoRonavIruS Health Impact Survey (CRISIS), conducted by investigators of the National Institute of Mental Health. (CRISIS, 2021) (<https://github.com/nimh-comppsych/CRISIS>) Exceptions to this 2-week time frame are questions about suicide attempts (lifetime before the pandemic and since the pandemic). Items for each psychopathologic/behavioral domain of interest were selected by the two PIs aiming to as much as possible capture the assessed dimension (e.g., asking about sadness and lack of interest to capture depression, about being nervous/anxious/on the edge and unable to stop worrying for anxiety, about recurrent trauma-related experiences, acting/feeling like if trauma occurring again, avoidant behavior and alert status for post-traumatic symptoms) and endorsed/approved after beta-testing by the extended COH-FIT investigator team. For some outcomes, key items were extracted from the following validated questionnaires (which were optional additional questionnaires that a subset of adults can complete after completion of COH-FIT-A to test the validity of the selected COH-FIT-A items): Altman Self-Rating Mania Scale (ASRM), (Altman et al., 1997) Brief Obsessive Compulsive Scale (BOCS), (Bejerot et al., 2014) Brief Resilience Scale (BRS), (Smith et al., 2008) CGAS, Generalized Anxiety Disorder 7-item scale (GAD-7), (Spitzer et al., 2006) Patient Health Questionnaire 9-item scale (PHQ-9), (Kroenke et al., 2001) PTSD Checklist for DSM-5 (PCL-5), (Blevins et al., 2015) Prodromal Questionnaire-16, (Ising et al., 2012) Suicidal Behaviors Questionnaire-Revised (SBQ-R). (Osman et al., 2001) Answers to all questions, except for consent, the date of survey response, and age are optional.

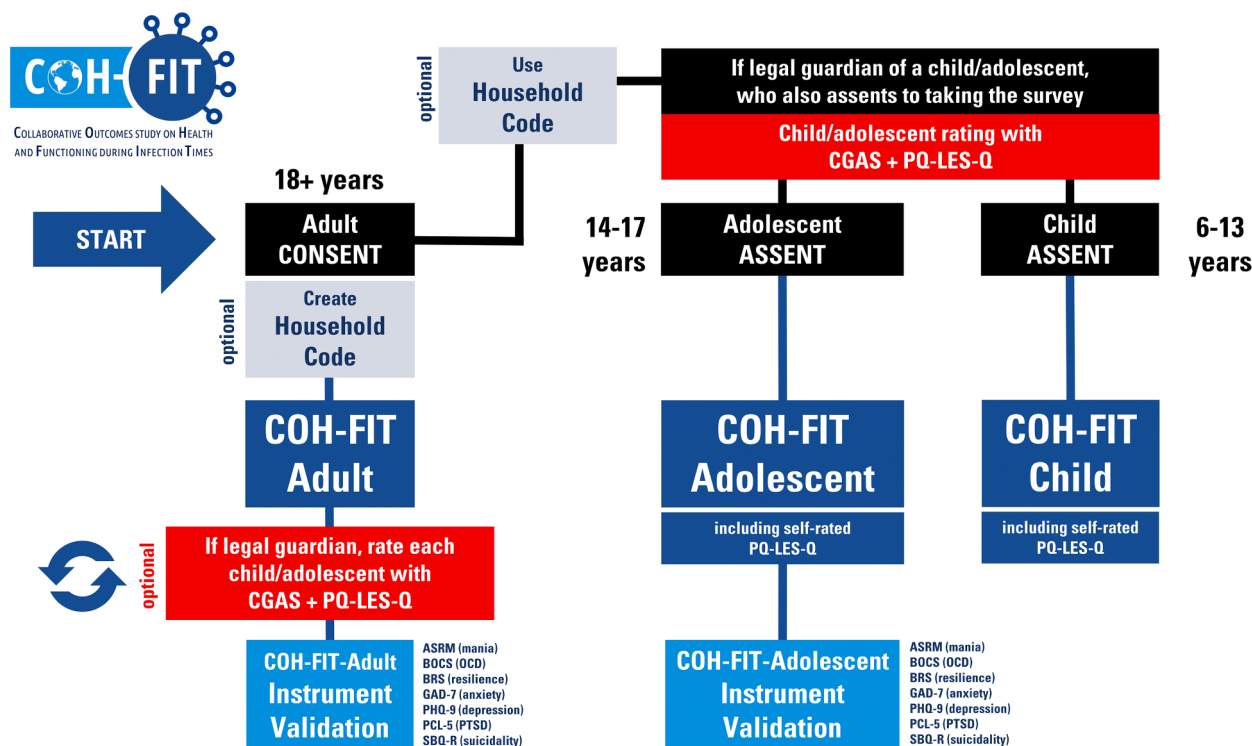


Fig. 2. COH-FIT survey participation flow chart

Legend. ASRM, Altman Self-Rating Mania Scale (Altman et al., 1997); BOCs, Brief Obsessive Compulsive Scale (Bejerot et al., 2014); BRS, Brief Resilience Scale (Smith et al., 2008); CGAS, Children's Global Assessment Scale (Shaffer et al., 1983); GAD-7, Generalized Anxiety Disorder 7-item scale (Spitzer et al., 2006); OCD, Obsessive Compulsive Disorder; PCL-5, PTSD Checklist for DSM-5 (Blevins et al., 2015); PHQ-9, Patient Health Questionnaire 9-item scale (Kroenke et al., 2001); PQ-LES-Q, Pediatric Quality of Life Enjoyment and Satisfaction Questionnaire (Endicott et al., 2006); PQ-16, Prodromal Questionnaire-16 (Ising et al., 2012); PTSD, Post-Traumatic Stress Disorder; SBQ-R, Suicidal Behaviors Questionnaire-Revised (Osman et al., 2001).

2.14. The COH-FIT project international website

The website (www.coh-fit.com) is the project hub, providing information on the project (study design, project leads, collaborators, supporting and/or endorsing organizations, funding, relevant publications) and link to the survey in all available languages. A prominent, central link directs visitors to the survey platform, where visitors can re-select the survey language. Hourly updated study participation statistics per country are provided on an interactive world map (<https://www.coh-fit.com/project-statistics/>).

2.15. Participant recruitment

Two main recruitment strategies are applied. The first snowball approach generates a non-probability, convenience sample aiming to maximize the overall number of collected responses through several channels of targeted/untargeted, personal/institutional advertisement (e.g., social media, mass media, personal network, press releases, institutional newsletters) in all countries/territories/regions with IRB approval/waiver. The second approach targets nationally representative samples (with respect to sex, age, country/region, education (university: yes/no), and employment (yes/no), by paid professional polling companies collecting COH-FIT survey responses on behalf of the project

members.

2.16. Primary and secondary outcomes

Co-primary outcomes are well-being, and a composite psychopathology measure (P-score). Well-being is measured with the full WHO-5 questionnaire (Topp et al., 2015) yet answer options were converted from the six-points Likert items to a VAS 0-100 scale.

The P-score is measured as the sum of unit-weighted domains measuring symptoms in the psychopathologic spectra, including only a priori extracted items proving to be valid after external validation with full questionnaires (correlation threshold $r \geq 0.5$). A-priori domains envisioned to compose P-Score are: anxiety, depression, sleep, concentration, post-traumatic stress, obsessive-compulsive symptoms, bipolar mania, stress, and psychosis (for domains with multiple items, we will only retain the items correlating at least $r \geq 0.2$ provided the combined $r \geq 0.5$).

Singe/dual items used in the COH-FIT survey were extracted from the following validated self-report instruments: Generalized Anxiety Disorder 7-item scale (Spitzer et al., 2006) for anxiety, Patient Health Questionnaire 9-item scale (Kroenke et al., 2001) for depression, sleep and concentration, PTSD Checklist for DSM-5 (Blevins et al., 2015) for post-traumatic stress, Brief Obsessive Compulsive Scale (Bejerot et al.,

2014) for obsessive-compulsive symptoms, Altman Self-Rating Mania Scale (Altman et al., 1997) for bipolar mania, WHO-5 (Topp et al., 2015) for stress, and the Prodromal Questionnaire-16 (Ising et al., 2012) for psychosis.

Key secondary outcomes are a P-Extended score (see below), global physical health, global mental health, global health (average of physical and mental health). The P-Extended score is the sum of unit weighted domains also including those domains not correlating well enough to make it to the P-Score, plus loneliness, helplessness, and anger, for which no validated scales were utilized. For further information about the data analytic approach, see below.

Secondary outcomes include individual psychopathology domains (anxiety, depression, post-traumatic stress, obsessive-compulsive symptoms, bipolar mania symptoms, mood swings, delusions, hallucinations). In addition, episodes of self-injurious behavior, panic, sleep problems are assessed. We also consider suicidality (suicidal thoughts during the pandemic only, number of suicide attempts and proportion of people attempting suicide/ number of suicide attempts during pandemic), number of episodes witnessing, experiencing or perpetrating, aggressive behavior, other psychological experiences (anger, loneliness, helplessness, fear of infection, boredom, frustration, stress, cognition, sleep, anger, helplessness), substance and behavioral addictive behaviors (cigarettes, alcohol, cannabinoids, other substances, as well as gambling). Family/social/interpersonal/work/school functioning, self-care, social interactions, hobbies/free-time are inquired about. Resilience is also considered as a potential outcome influenced by the pandemic or as an outcome moderator. Regarding physical health, general physical health, body mass index (kg/m²), and pain are measured. Social altruism is captured with experienced social support and episodes of prosocial activities. Other daily behaviors include time

spent on social media, internet, gaming, watching TV, reading, listening to music, and physical activity/exercising, among others. Finally, data on the impact of COVID-19 on educational activities of medical doctors, and the impact of telemedicine on their clinical experience are collected.

Co-primary, key secondary, and secondary outcomes are measured as change between the last two weeks of regular life before COVID-19 outbreak and the immediate last two weeks before taking the COH-FIT survey.

To view the whole set of questions, readers are invited to take the survey at www.coh-fit.com.

2.17. Statistical analyses

All analyses will be conducted with either R (<https://www.R-project.org/>) (<https://www.R-project.org/>, R Foundation for Statistical Computing, Vienna, n.d.) or Stata (Stata Statistical Software: Release 15, 2017) upon consensus on scripts between two analysts to ensure consistent results across analysts, softwares, and packages.

Descriptive statistics will be used for demographic, socio-economic, environmental, clinical, behavioral and psychological variables and emotions, across modifiable and non-modifiable factors. Change of co-primary, key secondary and secondary outcomes during the COVID-19 pandemic compared with before the pandemic will be reported, as well as proportion of people with worst and best outcome during the pandemic. Additionally, worst or best percentile, proportions of subjects above a threshold validated against full questionnaires, or mean value during the pandemic will be used as outcomes to answer different research questions.

Table 1

A list of main variables and a-priori definition (exposure, outcome) of variables collected in the COH-FIT study.

Non modifiable exposure		Modifiable exposure			Outcomes [baseline values acting also as moderators, and change values as mediators]			
Demographic and socio-economic	Environmental and clinical	Behavioral/ Psychological	Emotions / subjective status	Environmental and clinical	Primary outcomes	Secondary outcomes		
Age	COVID-19 infection / symptoms	Adherence to pandemic-related social restrictions	Anger	Access to medications	Well-being	Anxiety symptoms / Panic episodes	Aggressive behavior perpetration	Appetite and food intake
Education	COVID-19 related social restriction severity and duration	Vaccine-related beliefs and behavior	Boredom	Mental health care access/ utilization	Composite mental health P-Score	Depressive symptoms	Aggressive behavior victim	BMI
Employment status	Family history of mental illness	Coping strategies	Fear of getting infected	Physical healthcare access/ utilization		Euphoric mood/ Mood swings	Aggressive behavior witnessing	Pain
Ethnicity/ migration	Household (rooms, outside space, co-living people, social support)	Exercise	Frustration	Access to protective devices	Key secondary outcomes	Obsessive-compulsive symptoms	Concentration	Telemedicine experience
Gender	Mental condition	Prosocial behavior	Helplessness	COVID-19 information	P-Extended score	Post-traumatic symptoms	Self-injurious behavior	Impact on education
Job type	Medical condition	Screen time (social media, TV, gaming, reading, listening to music)	Loneliness	Economic loss	General mental health	Psychotic symptoms (Hallucinatory experiences/ delusional experiences)	Sleep problems	
Marital status	Past traumatic events	Sexual activity	Resilience	Healthcare system (by country)	General physical health	Suicidal ideation / attempt	Addictive behaviors/ substances	
Socioeconomic status	Urbanicity		Stress	Number of medications	Functioning / Quality of life			

Legend. Modifiable exposure will also be considered as outcomes, depending on hypotheses to be tested.

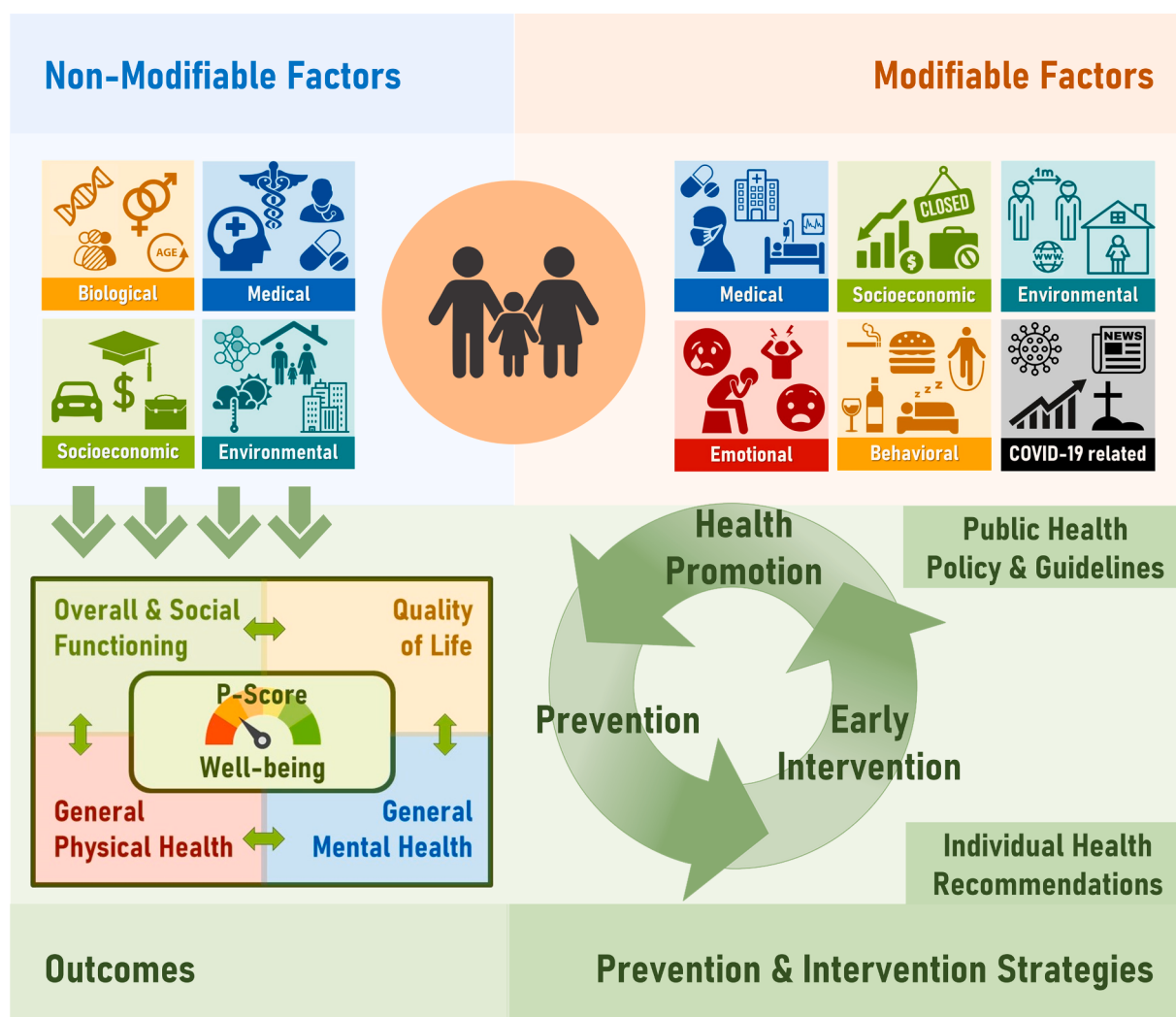


Fig. 3. COH-FIT variables universe

Legend. P-score is a psychopathology composite score indicating an “overall” symptom measure. It includes anxiety, depressive, obsessive-compulsive, post-traumatic, delusional and hallucinatory experiences, as well stress, sleep, concentration.

2.17.1. Data cleaning and quality check

Any responses provided on the website before April 26th, 2020 (first COH-FIT approval by Ethical Committee and Institutional Review Board of Aristotle University of Thessaloniki, Greece, on April 15th, 2020) will be removed. Only respondents providing responses to all items of two-item outcomes, or to all items but one of three or more-item outcomes, will be included in the main analyses. The allowed missing items will be imputed via multiple imputation by chained equations (using MICE algorithm with *mice* (van Buuren and Groothuis-Oudshoorn, 2011) package in R).

2.17.2. Weighting and adjusting for confounding factors

In order to provide nationally representative estimates, the following weighting procedures will be applied within countries/territories/regions. Within each country, the non-representative sample will be weighted by quota of key variables e.g. age, gender, job status, education, according to official representative quota (<https://population.un.org/wpp/Download/Standard/Population/>) to maximize consistency.

Weighting will be applied to countries with ≥ 100 participants who completed the surveys, with countries with < 100 left unweighted. Weighting will be performed with the “survey” package in R using the following procedures, with the primary objective of correcting survey coverage error. First, as some population reference statistics are available as joint probabilities (age X gender) but others only as marginal probabilities (education, employment), we will use iterative proportional fitting (raking) to compute sample weights that approximate the overall population distributions, but with the constraint that weights cannot exceed sample unit weights by a factor of more than 1.2. Second, if the fitting algorithm fails to converge for any country (e.g. due to very low sample cell sizes), we would then attempt to compute weights for that country through post-stratification, first on age X gender, and then education (second) or employment (third) in the event of non-convergence resulting from the constraints previously referred to. <https://population.un.org/wpp/Download/Standard/Population/>

We will also run our key secondary analysis separately in by-continent analyses including an additional adjustment factor derived

from direct comparison of representative vs non-representative samples on a by-continent basis.

To adjust for representativeness of each country's samples, each country will be assigned an adjustment factor accounting for the responses/country population ratio.

2.17.3. Association between factors and outcomes

The association between non-modifiable and modifiable risk factors and co-primary outcomes will be measured as follows. The association between explanatory factors and co-primary, key secondary, and secondary outcomes will be tested with multivariable linear or logistic regression analysis (depending on outcome of interest). Multivariable models will include date/country-matched COVID-19 cumulative incidence and deaths in the past 7 or 14 days (freely available repository by the Johns Hopkins University: <https://github.com/CSSEGISandData/COVID-19>), as well as country-specific and/or region-specific restriction measures drawn from the survey responses and/or national databases. Backward model selection and/or LASSO will be used to select the best multivariable model, together with literature-based relevant factors. Factors will be presented in descending order based on <https://github.com/CSSEGISandData/COVID-19> large, medium, and small effect size associations, following Cohen's original definition (small=0.2-0.49, medium=0.5-0.79, large $\geq$ 0.8). (Sullivan and Feinn, 2012) For backward model selection, in case the variables are collinear, the most statistically or clinically significant variable will be selected.

For additional publications the same analyses will be conducted on additional outcomes, with added approaches as appropriate.

2.17.4. Additional analytic approaches

Additional analytic approaches will be used. First, we will run a network analysis with a set of "nodes" selected based both on results of the primary analyses (exposure variables consistently associated with primary and secondary outcomes) and on clinical judgement. Second, we will test several path analyses, driven and suggested by the network structure and its nodes' centrality, in order to understand the mediation and moderation role of exposure variables, to develop a mechanistic insight into what leads to poor or resilient health outcomes. Third, we will also test internal psychometric properties of questionnaires used as validation parameters (several of them are being translated for the first time in new languages). Fourth, by means of a ROC analysis, using diagnostic thresholds of validated questionnaires as valid external reference, we will identify the score of primary and secondary outcomes items with the best specificity/sensitivity trade-off. Such threshold will be used to estimate the prevalence, as well as the incidence, persistence and remission rates of likely syndromal anxiety, depressive, manic, obsessive-compulsive, post-traumatic stress disorder, at-risk for psychosis as well as of suicidal ideation symptoms during the pandemic. Fifth, machine learning techniques (e.g., LASSO or random forest) will be used to identify predictors of primary or secondary outcomes. Sixth, time-series analyses will be conducted to describe the trend of primary and secondary outcomes in relationship with the pandemic course and restrictions. Additional secondary analysis strategies will be discussed among members of COH-FIT as relevant/appropriate for the addressed research questions.

2.17.5. Validation analyses

To test the validity of items used in the composite P-score, a Pearson correlation analysis will be conducted with the total score of validated questionnaires provided in the validation section of the COH-FIT-A survey (see above). The Pearson correlation analysis will be performed

on the whole sample and by individual languages. Additionally, in an exploratory sensitivity analysis, we will repeat the Pearson correlation analyses between the one, two, or four COH-FIT items drawn from the full questionnaires with the full respective questionnaires between two participants' subgroups, one subgroup matched to the COH-FIT sample in the same countries/territories/regions that took part in the survey and not answering the validation questionnaires, and a second subgroup consisting of the remainder of the unmatched participants answering the validation questionnaires. We will only perform weighting procedures in case that the samples completing and not completing the validated scales are materially different on key demographic variables on a by-country level. Finally, internal validity of the P-Score will be measured with standard psychometric procedures.

2.18. Dissemination of results

Results from the COH-FIT project will be disseminated via presentations at scientific meetings, press releases and interviews as well as scientific publications. This strategy includes at least two main papers per wave involving all collaborators merging data from all the included countries/territories/regions, one in adult participants, one in children/adolescents, which will target major medical journals. Additional manuscripts on subgroups of participants, professions, participating countries/territories/regions, and specific outcomes, etc, will be published by subgroups of authors working specifically on these topics.

3. COH-FIT preliminary dissemination results

By 23/07/2021, >150,000 subjects (adults, adolescents, children) have given consent to participate and started to answer the survey at least answering to the first question. Responses came from 155 countries/territories (49 with $\geq$ 50 complete adult survey): 24 in Europe, eight in Asia, five in Africa, two in North and Central America, five in South America, three in Oceania. Representative adult (aged 18+) samples have been/are being collected in 15 countries: Australia, Austria, Brazil, Denmark France, Germany, Greece, Hungary, Italy, Poland, Russia, Spain, Switzerland, United Kingdom, USA.

4. Discussion

New information, learnings and adaptation are needed rapidly in order to minimize the likely relevant and potentially lasting negative impact of COVID-19 pandemic, including a worsening of already existing health problems and inequalities, and impact on fragile groups. (Adhikari et al., 2020; Banerjee et al., 2020; Brooks et al., 2020; Clark et al., 2020; Colao et al., 2020; Cowling et al., 2020; D'Agostino et al., 2020; Esposito et al., 2021; Holmes et al., 2020; Kamrath et al., 2020; Liu et al., 2020; Moreno et al., 2020; Nguyen et al., 2020; Panovska-Griffiths et al., 2020; Pereira-Sanchez et al., 2020; Pierce et al., 2020a; Ravi, 2020; Shi et al., 2020; Thomas et al., 2020; Viner et al., 2020; Webb Hooper et al., 2020). Acknowledging the current state of published or ongoing research on the impact of the COVID-19 pandemic and related restrictions (cf. Suppl. Material), to the best of our knowledge, so far there does not exist a study with a large-scale, multi-national, multi-language, and transdiagnostic approach that targets the complexity of a comprehensive, literature-informed list of modifiable and non-modifiable risk and protective factors influencing health, well-being, functioning, behavioral coping and social interactions as well as health-service access and functioning across the six continents, including representative samples. Investigating a small subset of the

general population without at least weighting for representative quota of demographic and regional variables, likely limits a fuller understanding of the multifaceted factors and impacts that the pandemic exerts on the general population and relevant subgroups. (Holmes et al., 2020) Indeed, not every individual has been experiencing or will experience a deterioration in health during the pandemic, as several individual, demographic, socioeconomic, clinical and behavioral factors have repeatedly been shown to be closely associated with mental and physical health-related outcomes in a complex multidimensional network that can be modifiable or non-modifiable according to the management of the pandemic (Table S4). (Kamrath et al., 2020; Moreno et al., 2020; Ravi, 2020; Solmi et al., 2019; Thomas et al., 2020) In fact, subgroups might even have improved health due to reduced stress, for example, by not having to attend school or work in person, having increased family interactions and time, or by utilizing specific sets of coping strategies that other subgroups could also benefit from. (Luo et al., 2020) For instance, a large cohort study also showed that despite at the beginning of lockdown in United Kingdom anxiety and depression symptoms were high, they decreased across weeks following lockdown. (Fancourt et al., 2020)

In general, non-modifiable factors identify individuals at increased risk during the pandemic, who might be in need of specific interventions, while modifiable factors identify potential targets for prevention/intervention strategies. These actionable results from a large population speaking different languages across/within countries/territories/regions affected by COVID-19 across six continents are insufficiently available, limiting a desirable evidence-based and precision political and health care governance, without neglecting evidence from other-than-official language speaking minorities in each country. (Gao et al., 2020; Hanney et al., 2020; Maulik et al., 2020; Nussbaumer-Streit et al., 2020; Raboisson and Lhermie, 2020; Rhodes et al., 2020) So far, most recommendations are based on expert consensus. (Cortese et al., 2020; Moreno et al., 2020)

COH-FIT envisions to fill the current gap largely excluding linguistic/ethnic minorities across the globe, as the largest international collaborative study translated in 30 languages, collecting to our knowledge the biggest set of transdiagnostic, multi-dimensional and multi-disciplinary data from currently 152 high-, middle-, and low-income countries/territories/regions across the globe from the general population starting from age 6. Respondents are allowed to choose their own preferred language, regardless of the country where they are answering from. Beyond that, COH-FIT particularly assesses specific populations at risk, such as minors and elderly, individuals with preexisting physical and mental disorders, lower-socioeconomic status or/and unemployed population, urban/rural area inhabitants, populations with limited access to health care and/or availability of protective devices, migrants and refugees, healthcare workers, working parents of home-school attending minors, gender minorities, pregnant women, those with economic threats, etc. In addition, COH-FIT targets pandemic effects on whole families and the relationship between of adults' and minors' health and functioning status, through the combined direct (COH-FIT-AD/C) and indirect (COH-FIT-A parental rating) assessment of same household family members, and specifically investigates the moderating effect of adaptive and maladaptive coping factors, including total screen time, substance use, social media usage, physical activity, social interaction, sexual activity, hobbies, etc.

The COH-FIT study is an investigator-driven project, without industry funding, which secures independent results usable by decision makers (national/international public health authorities, professional health associations, and other stakeholders), who can benefit from

learnings that can be used within and across high-, middle-, and low-income countries/territories/regions in order to implement evidence-based, timely and multi-level (systemic, societal, individual) strategies for the current and, possibly, future pandemic outbreaks. The participant recruitment of the COH-FIT survey has been already proven effective with over 150,000 participants from 155 countries/territories/regions on July 23rd, 2021 since its launch in April 2020.

COH-FIT has limitations that need to be acknowledged. First, the study has a three-wave, cross-sectional design, allowing data collection in each wave over an extended period of time (duration of the pandemic, and up to 36 (waves 2 plus 3) post-end of the COVID-19 pandemic) during heterogeneous scenarios regarding both the pandemic and the applied protective measures. Furthermore, depending on IRB approval, the beginning of the proactive dissemination/advertising of the COH-FIT questionnaire varies across countries/territories/regions within the COH-FIT network. We plan to account for such heterogeneity by collecting information on restrictions in the COH-FIT questionnaire, and supplementing multivariate models with the temporally and locally fine-grained data from the Johns Hopkins website. (Dong et al., 2020) On the other hand, the variation in environmental “viral load” and related restrictions over time and regions will also allow for time-series analyses plotting primary, secondary outcomes, but also environmental “exposure” following the pandemic breakout throughout time. Second, retrospective items referring to the 2-week time period before the pandemic outbreak are vulnerable to recall bias. Third, the COH-FIT questionnaire includes several non-validated items for primary and secondary outcomes. However, most of these items have been extracted from already validated tools, and will undergo external/internal validation assessment. Fourth, the majority of respondents are recruited via a snow-ball/ yielding non-representative/biased sample. However, we designed the study to also include representative samples to assess differences in the results between representative and non-representative samples and to weight non-representative responses according to representative quota (age, gender, region, job status, education). Yet, residual bias is always present in representative samples. (Pierce et al., 2020b) Fifth, the survey is long, which may lead to incomplete assessments in certain subgroups. However, we placed the co-primary outcome questions early within the questionnaire, right after key demographic and COVID-19 related questions. Moreover, we will assess if certain demographic variables are associated with non-completion of the survey, and will weight results based on representative quota.

Taken together, COH-FIT is a unique, inclusive multi-language study collecting large-scale, multi-dimensional data on individual, society, and services outcomes of the COVID-19 pandemic across the globe. COH-FIT measures health, behavior, well-being, quality of life, health-service and society functioning as outcomes (among others), and accounts for the likely largest set of modifiable and non-modifiable risk factors to date, including ethnicity, ongoing conditions, job, psychological factors (resilience), financial loss, pandemic burden and course, restrictions, among many others. The multi-wave, detailed, multi-level insight generated by the COH-FIT project is expected to be instrumental for multi-level guideline development and implementation of targeted interventions on key parameters identified by the COH-FIT results. It is hoped that the resulting data will be informative on an individual and global level, contributing to the much-needed development and refinement of evidence-based and precision resource allocation and governance during this and future infection times in order to improve overall outcomes.

Funding statement

All the institutions and funding agencies are listed in supplementary Table 5. COH-FIT PIs and collaborators have applied/are actively applying for several national and international grants to cover expenses related to the coordination of the study, website, nationally representative samples, advertisement of the study, and future dissemination of study findings.

Authors' contribution

Christoph U. Correll (CUC), Marco Solmi (MS), designed the study. Agorastos Agorastos (AA), Andres Estradé (AE), CUC, MS wrote the study protocol. Ai Koyanagi (AK), CUC, Dimitris Mavridis (DM), Elena Dragioti (ED), Friedrich Leisch (FL), MS, Joaquim Radua (JR), Trevor Thompson (TT) designed the statistical analysis plan. AA, AE, CUC, Davy Vancampfort (DV), MS conducted a preliminary review of the available publications and ongoing registered studies. All authors contributed to the final version of the COH-FIT survey and are involved in disseminating the COH-FIT survey link and collecting the data and designing and preparing research reports on national data. All local researchers contributed to and approved translations of the COH-FIT survey in their respective language. AK, CUC, DM, ED, FL, MS, JR, TT, had access to the global raw data on participation results. AA, AE, CUC, MS, wrote the first draft of the paper. All authors read, contributed to and approved the final version of the manuscript.

Declaration of Competing Interest

All conflict of interest statements of all authors are detailed in Supplementary Table 6.

Acknowledgement

All authors thank all respondents who took the survey so far, funding agencies and all professional and scientific national and international associations supporting or endorsing the COH-FIT.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.jad.2021.08.116](https://doi.org/10.1016/j.jad.2021.08.116).

References

- Adhikari, S., Pantaleo, N.P., Feldman, J.M., Ogedegbe, O., Thorpe, L., Troxel, A.B., 2020. Assessment of community-level disparities in coronavirus disease 2019 (COVID-19) infections and deaths in large US metropolitan areas. *JAMA Netw. Open* 3, e2016938. <https://doi.org/10.1001/jamanetworkopen.2020.16938>.
- Alonso, J., Vilagut, G., Mortier, P., Ferrer, M., Alayo, I., Aragón-Peña, A., Aragonès, E., Campos, M., Cura-González, I.D., Emparanza, J.I., Espuga, M., Forjaz, M.J., González-Pinto, A., Haro, J.M., López-Fresneña, N., Salazar, A.D.M.de, Molina, J.D., Ortí-Lucas, R.M., Parellada, M., Pelayo-Terán, J.M., Pérez-Zapata, A., Pijoan, J.I., Plana, N., Puig, M.T., Rius, C., Rodríguez-Blázquez, C., Sanz, F., Serra, C., Kessler, R. C., Bruffaerts, R., Vieta, E., Pérez-Solà, V., 2021. Mental health impact of the first wave of COVID-19 pandemic on Spanish healthcare workers: a large cross-sectional survey. *Rev. Psiquiatr. Salud Ment.* <https://doi.org/10.1016/j.rpsm.2020.12.001>.
- Altman, E.G., Hedeker, D., Peterson, J.L., Davis, J.M., 1997. The Altman Self-Rating Mania Scale.
- Anmella, G., Fico, G., Roca, A., Gómez-Ramiro, M., Vázquez, M., Murru, A., Pacchiarotti, I., Verdolini, N., Vieta, E., 2020. Unravelling potential severe psychiatric repercussions on healthcare professionals during the COVID-19 crisis. *J. Affect. Disord.* <https://doi.org/10.1016/j.jad.2020.05.061>.
- Banerjee, A., Pasea, L., Harris, S., Gonzalez-Izquierdo, A., Torralbo, A., Shallcross, L., Noursadeghi, M., Pillay, D., Sebire, N., Holmes, C., Pagel, C., Wong, W.K., Langenberg, C., Williams, B., Denaxas, S., Hemingway, H., 2020. Estimating excess 1-year mortality associated with the COVID-19 pandemic according to underlying conditions and age: a population-based cohort study. *Lancet* 395, 1715–1725. [https://doi.org/10.1016/S0140-6736\(20\)30854-0](https://doi.org/10.1016/S0140-6736(20)30854-0).
- Bejerot, S., Edman, G., Anckarsäter, H., Berglund, G., Gillberg, C., Hofvander, B., Humble, M.B., Mörtberg, E., Rastam, M., Stahlberg, O., Frisén, L., 2014. The Brief Obsessive-Compulsive Scale (BOCS): a self-report scale for OCD and obsessive-compulsive related disorders. *Nord. J. Psychiatry* 68, 549–559. <https://doi.org/10.3109/08039488.2014.884631>.
- Blevins, C.A., Weathers, F.W., Davis, M.T., Witte, T.K., Domino, J.L., 2015. The posttraumatic stress disorder checklist for DSM-5 (PCL-5): development and initial psychometric evaluation. *J. Trauma. Stress* 28, 489–498. <https://doi.org/10.1002/jts.22059>.
- Brooks, S.K., Webster, R.K., Smith, L.E., Woodland, L., Wessely, S., Greenberg, N., Rubin, G.J., 2020. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 395, 912–920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8).
- Chrousos, G.P., 2009. Stress and disorders of the stress system. *Nat. Rev. Endocrinol.* 5, 374–381. <https://doi.org/10.1038/nrendo.2009.106>.
- Clark, H., Coll-Seck, A.M., Banerjee, A., Peterson, S., Dalglish, S.L., Ameratunga, S., Balabanova, D., Bhutta, Z.A., Borrazzo, J., Claeson, M., Doherty, T., El-Jardali, F., George, A.S., Gichaga, A., Gram, L., Hipgrave, D.B., Kwamie, A., Meng, Q., Mercer, R., Narain, S., Nsungwa-Sabiiti, J., Olumide, A.O., Osrin, D., Powell-Jackson, T., Rasanathan, K., Rasul, I., Reid, P., Requejo, J., Rohde, S.S., Rollins, N., Romedenne, M., Singh Sachdev, H., Saleh, R., Shawar, Y.R., Shiffman, J., Simon, J., Sly, P.D., Stenberg, K., Tomlinson, M., Ved, R.R., Costello, A., 2020. After COVID-19, a future for the world's children? *Lancet.* [https://doi.org/10.1016/S0140-6736\(20\)31481-1](https://doi.org/10.1016/S0140-6736(20)31481-1).
- Colao, A., Piscitelli, P., Pulimeno, M., Colazzo, S., Miani, A., Giannini, S., 2020. Rethinking the role of the school after COVID-19. *Lancet Public Health* 5, e370. [https://doi.org/10.1016/S2468-2667\(20\)30124-9](https://doi.org/10.1016/S2468-2667(20)30124-9).
- Cortese, S., Asherson, P., Sonuga-Barke, E., Banaschewski, T., Brandeis, D., Buitelaar, J., Coghill, D., Daley, D., Danckaerts, M., Dittmann, R.W., Doepfner, M., Ferrin, M., Hollis, C., Holtmann, M., Konofal, E., Lecendreux, M., Santosh, P., Rothenberger, A., Soutullo, C., Steinhausen, H.C., Taylor, E., Van der Oord, S., Wong, I., Zuddas, A., Simonoff, E., 2020. ADHD management during the COVID-19 pandemic: guidance from the European ADHD Guidelines Group. *Lancet Child Adolesc. Health.* [https://doi.org/10.1016/S2352-4642\(20\)30110-3](https://doi.org/10.1016/S2352-4642(20)30110-3).
- Cowling, B.J., Ali, S.T., Ng, T.W.Y., Tsang, T.K., Li, J.C.M., Fong, M.W., Liao, Q., Kwan, M.Y., Lee, S.L., Chiu, S.S., Wu, J.T., Wu, P., Leung, G.M., 2020. Impact assessment of non-pharmaceutical interventions against coronavirus disease 2019 and influenza in Hong Kong: an observational study. *Lancet Public Health* 5, e279–e288. [https://doi.org/10.1016/S2468-2667\(20\)30090-6](https://doi.org/10.1016/S2468-2667(20)30090-6).
- CRISIS [WWW Document], 2021. URL <https://github.com/nimh-compmpsyh/CRISIS>.
- D'Agostino, A., Demartini, B., Cavallotti, S., Gambini, O., 2020. Mental health services in Italy during the COVID-19 outbreak. *Lancet Psychiatry.* [https://doi.org/10.1016/S2215-0366\(20\)30133-4](https://doi.org/10.1016/S2215-0366(20)30133-4).
- Dong, E., Du, H., Gardner, L., 2020. An interactive web-based dashboard to track COVID-19 in real time. *Lancet Infect. Dis.* [https://doi.org/10.1016/S1473-3099\(20\)30120-1](https://doi.org/10.1016/S1473-3099(20)30120-1).
- Endicott, J., Nee, J., Yang, R., Wohlberg, C., 2006. Pediatric quality of life enjoyment and satisfaction questionnaire (PQ-LES-Q): reliability and validity. *J. Am. Acad. Child Adolesc. Psychiatry* 45, 401–407. <https://doi.org/10.1097/01.chi.0000198590.38325.81>.
- Esposito, C., D'Agostino, A., Dell'Osso, B., Fiorentini, A., Prunas, C., Fontana, E., Gargano, G., Viscardi, B., Giordano, B., D'Angelo, S., Wiedenmann, F., Macellaro, M., Giorgetti, F., Turtulici, N., Gambini, O., Brambilla, P., 2021. Impact of the first COVID-19 pandemic wave on first episode psychosis in Milan, Italy. *Psychiatry Res.* 298 (113802). In press.
- Fancourt, D., Steptoe, A., Bu, F., 2020. Trajectories of anxiety and depressive symptoms during enforced isolation due to COVID-19 in England: a longitudinal observational study. *Lancet Psychiatry* 8, 141–149. [https://doi.org/10.1016/S2215-0366\(20\)30482-X](https://doi.org/10.1016/S2215-0366(20)30482-X).
- Fullana, M.A., Hidalgo-Mazzei, D., Vieta, E., Radua, J., 2020. Coping behaviors associated with decreased anxiety and depressive symptoms during the COVID-19 pandemic and lockdown. *J. Affect. Disord.* <https://doi.org/10.1016/j.jad.2020.06.027>.
- Gao, Y., Liu, R., Zhou, Q., Wang, X., Huang, L., Shi, Q., Wang, Z., Lu, S., Li, W., Ma, Y., Luo, X., Fukuoka, T., Ahn, H.S., Lee, M.S., Luo, Z., Liu, E., Chen, Y., Shu, C., Tian, D., 2020. Application of telemedicine during the coronavirus disease epidemics: a rapid review and meta-analysis. *Ann. Transl. Med.* 8, 626. <https://doi.org/10.21037/atm-20-3315>.
- Hanney, S.R., Kanya, L., Pokhrel, S., Jones, T.H., Boaz, A., 2020. How to strengthen a health research system: WHO's review, whose literature and who is providing leadership? *Heal. Res. policy Syst.* 18, 72. <https://doi.org/10.1186/s12961-020-00581-1>.

- Harris, P.A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., Conde, J.G., 2009. Research electronic data capture (REDCap)-A metadata-driven methodology and workflow process for providing translational research informatics support. *J. Biomed. Inform.* 42, 377–381. <https://doi.org/10.1016/j.jbi.2008.08.010>.
- Holmes, E.A., O'Connor, R.C., Perry, V.H., Tracey, I., Wessely, S., Arseneault, L., Ballard, C., Christensen, H., Cohen Silver, R., Everall, I., Ford, T., John, A., Kabir, T., King, K., Madan, I., Michie, S., Przybylski, A.K., Shafran, R., Sweeney, A., Worthman, C.M., Yardley, L., Cowan, K., Cope, C., Hotopf, M., Bullmore, E., 2020. Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. *Lancet Psychiatry* 0. [https://doi.org/10.1016/S2215-0366\(20\)30168-1](https://doi.org/10.1016/S2215-0366(20)30168-1). <https://www.R-project.org/>.
- R Foundation for Statistical Computing, 2019. *R: a Language and Environment for Statistical Computing*. A.U.R.L., n.d. R Core Team, Vienna.
- Ising, H.K., Veling, W., Loewy, R.L., Rietveld, M.W., Rietdijk, J., Dragt, S., Klaassen, R.M. C., Nieman, D.H., Wunderink, L., Linszen, D.H., van der Gaag, M., 2012. The validity of the 16-item version of the Prodromal Questionnaire (PQ-16) to screen for ultra high risk of developing psychosis in the general help-seeking population. *Schizophr. Bull.* 38, 1288–1296. <https://doi.org/10.1093/schbul/sbs068>.
- Johns Hopkins University, 2020. Coronavirus COVID-19 (2019-nCoV) [WWW Document]. URL <https://www.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6> (accessed 4.22.20).
- Kamrath, C., Mönkemöller, K., Biester, T., Rohrer, T.R., Warncke, K., Hammersen, J., Holl, R.W., 2020. Ketoacidosis in children and adolescents with newly diagnosed type 1 diabetes during the COVID-19 pandemic in Germany. *JAMA*. <https://doi.org/10.1001/jama.2020.13445>.
- Kazan Kizilkurt MD, Ozlem, Dilbaz MD, Nezir, Noyan MD, Cemal Onur, 2020. Psychological Impact of COVID-19 Pandemic on General Population in Turkey: Risk Factors. *Asia Pacific Journal of Public Health* 32 (8), 1. <https://doi.org/10.1177/1010539520964276>. In this issue.
- Kroenke, K., Spitzer, R.L., Williams, J.B.W., 2001. The PHQ-9: validity of a brief depression severity measure. *J. Gen. Intern. Med.* 16, 606–613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>.
- Lima, C.K.T., Carvalho, P.M., de, M., Lima, I., de, A.A.S., Nunes, J.V.A., de, O., Saraiva, J. S., de Souza, R.I., da Silva, C.G.L., Neto, M.L.R., 2020. The emotional impact of coronavirus 2019-nCoV (new Coronavirus disease). *Psychiatry Res.* <https://doi.org/10.1016/j.psychres.2020.112915>.
- Liu, J., Bao, Y., Huang, X., Shi, J., Lu, L., 2020. Mental health considerations for children quarantined because of COVID-19. *Lancet Child Adolesc. Health* 4. [https://doi.org/10.1016/S2352-4642\(20\)30096-1](https://doi.org/10.1016/S2352-4642(20)30096-1).
- Luo, M., Guo, L., Yu, M., Wang, H., 2020. The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public – a systematic review and meta-analysis. *Psychiatry Res.* <https://doi.org/10.1016/j.psychres.2020.113190>.
- Maulik, P.K., Thornicroft, G., Saxena, S., 2020. Roadmap to strengthen global mental health systems to tackle the impact of the COVID-19 pandemic. *Int. J. Ment. Health Syst.* 14, 57. <https://doi.org/10.1186/s13033-020-00393-4>.
- Moreno, C., Wykes, T., Galderisi, S., Nordentoft, M., Crossley, N., Jones, N., Cannon, M., Correll, C.U., Byrne, L., Carr, S., Chen, E.Y.H., Gorwood, P., Johnson, S., Kärkkäinen, H., Krystal, J.H., Lee, J., Lieberman, J., López-Jaramillo, C., Männikkö, M., Phillips, M.R., Uchida, H., Vieta, E., Vita, A., Arango, C., 2020. How mental health care should change as a consequence of the COVID-19 pandemic. *Lancet Psychiatry*. [https://doi.org/10.1016/S2215-0366\(20\)30307-2](https://doi.org/10.1016/S2215-0366(20)30307-2).
- Nguyen, L.H., Drew, D.A., Graham, M.S., Joshi, A.D., Guo, C.-G., Ma, W., Mehta, R.S., Warner, E.T., Sikavi, D.R., Lo, C.H., Kwon, S., Song, M., Mucci, L.A., Stampfer, M.J., Willett, W.C., Eliassen, A.H., Hart, J.E., Chavarro, J.E., Rich-Edwards, J.W., Davies, R., Capdevila, J., Lee, K.A., Lochlainn, M.N., Varsavsky, T., Sudre, C.H., Cardoso, M.J., Wolf, J., Spector, T.D., Ursellin, S., Steves, C.J., Chan, A.T., Consortium, =Coronavirus Pandemic Epidemiology, 2020. Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort study. *Lancet. Public Health*. [https://doi.org/10.1016/S2468-2667\(20\)30164-x](https://doi.org/10.1016/S2468-2667(20)30164-x).
- Nussbaumer-Streit, B., Mayr, V., Dobrescu, A.I., Chapman, A., Persad, E., Klerings, I., Wagner, G., Siebert, U., Christof, C., Zachariah, C., Gartlehner, G., 2020. Quarantine alone or in combination with other public health measures to control COVID-19: a rapid review. *Cochrane Database Syst. Rev.* <https://doi.org/10.1002/14651858.CD013574>.
- Osman, A., Bagge, C.L., Gutierrez, P.M., Konick, L.C., Kopper, B.A., Barrios, F.X., 2001. The suicidal behaviors questionnaire-revised (SBQ-R): validation with clinical and nonclinical samples. *Assessment* 8, 443–454. <https://doi.org/10.1177/107319110100800409>.
- Panovska-Griffiths, J., Kerr, C.C., Stuart, R.M., Mistry, D., Klein, D.J., Viner, R.M., Bonell, C., 2020. Determining the optimal strategy for reopening schools, the impact of test and trace interventions, and the risk of occurrence of a second COVID-19 epidemic wave in the UK: a modelling study. *The Lancet Child And Adolescent Health* 4 (11), 817–827. [https://doi.org/10.1016/S2352-4642\(20\)30250-9](https://doi.org/10.1016/S2352-4642(20)30250-9).
- Pereira-Sanchez, V., Adiuoku, F., El Hayek, S., Bytyci, D.G., Gonzalez-Diaz, J.M., Kundadak, G.K., Larnaout, A., Nofal, M., Orsolin, L., Ramalho, R., Ransing, R., Shalbafan, M., Soler-Vidal, J., Syarif, Z., Teixeira, A.L.S., da Costa, M.P., 2020. COVID-19 effect on mental health: patients and workforce. *Lancet Psychiatry* 7, e29–e30. [https://doi.org/10.1016/S2215-0366\(20\)30153-X](https://doi.org/10.1016/S2215-0366(20)30153-X).
- Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., Kontopantelis, E., Webb, R., Wessely, S., McManus, S., Abel, K.M., 2020a. Mental health before and during the COVID-19 pandemic: a longitudinal probability sample survey of the UK population. *Lancet Psychiatry*. [https://doi.org/10.1016/S2215-0366\(20\)30308-4](https://doi.org/10.1016/S2215-0366(20)30308-4).
- Pierce, M., McManus, S., Jessop, C., John, A., Hotopf, M., Ford, T., Hatch, S., Wessely, S., Abel, K.M., 2020b. Says who? The significance of sampling in mental health surveys during COVID-19. *Lancet Psychiatry* 7, 567–568. [https://doi.org/10.1016/S2215-0366\(20\)30237-6](https://doi.org/10.1016/S2215-0366(20)30237-6).
- Thomas J, Graziosi S, Brunton J, Ghouze Z, O'Driscoll P, Bond M (2020). EPPI-Reviewer: advanced software for systematic reviews, maps and other evidence synthesis [Software]. <https://eppi.ioe.ac.uk/CMS/Default.aspx?alias=eppi.ioe.ac.uk/cms/er4> [last access July 23rd, 2021].
- Poor Americans Hit Hardest by Job Losses Amid Covid-19 Lockdowns, Fed Says - The New York Times [WWW Document], 2021. URL <https://www.nytimes.com/2020/05/14/business/economy/coronavirus-jobless-unemployment.html> (accessed 5.29.20).
- Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., Xu, Y., 2020. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *Gen. Psychiatry*. <https://doi.org/10.1136/gpsych-2020-100213>.
- Raboisson, D., Lhermie, G., 2020. Living with COVID-19: a systemic and multi-criteria approach to enact evidence-based health policy. *Front. Public Health* 8, 294. <https://doi.org/10.3389/fpubh.2020.00294>.
- Ravi, K., 2020. Ethnic disparities in COVID-19 mortality: are comorbidities to blame? *Lancet* 396, 22. [https://doi.org/10.1016/S0140-6736\(20\)31423-9](https://doi.org/10.1016/S0140-6736(20)31423-9).
- Rhodes, T., Rhodes, T., Lancaster, K., Lees, S., Parker, M., 2020. Modelling the pandemic: attuning models to their contexts. *BMJ Glob. Heal.* 5, 2914. <https://doi.org/10.1136/bmjgh-2020-002914>.
- Salazar de Pablo, G., Vaquerizo-Serrano, J., Catalan, A., Arango, C., Moreno, C., Ferre, F., Shin, J.I., Sullivan, S., Brondino, N., Solmi, M., Fusar-Poli, P., 2020. Impact of coronavirus syndromes on physical and mental health of health care workers: systematic review and meta-analysis. *J. Affect. Disord.* 275, 48–57. <https://doi.org/10.1016/j.jad.2020.06.022>.
- Shaffer, D., Gould, M.S., Brasic, J., Fisher, P., Aluwahlia, S., Bird, H., 1983. A Children's Global Assessment Scale (CGAS). *Arch. Gen. Psychiatry* 40, 1228–1231. <https://doi.org/10.1001/archpsyc.1983.01790100074010>.
- Shi, L., Lu, Z.A., Que, J.Y., Huang, X.L., Liu, L., Ran, M.S., Gong, Y.M., Yuan, K., Yan, W., Sun, Y.K., Shi, J., Bao, Y.P., Lu, L., 2020. Prevalence of and risk factors associated with mental health symptoms among the general population in China during the coronavirus disease 2019 pandemic. *JAMA Netw. Open* 3, e2014053. <https://doi.org/10.1001/jamanetworkopen.2020.14053>.
- Smith, B.W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., Bernard, J., 2008. The brief resilience scale: assessing the ability to bounce back. *Int. J. Behav. Med.* 15, 194–200. <https://doi.org/10.1080/10705500802222972>.
- Solmi, M., Estrade, A., Agorastos, A., Radua, J., Cortese, S., Dragioti, E., Leisch, F., Vancampfort, D., Thompson, T., Correll, C., et al., 2021. Physical and mental health impact of COVID-19 on children, adolescents, and their families: the Collaborative Outcome Study on Health and Functioning during Infection Times - Children and Adolescents (COH-FIT-C&A). *Journal of Affective Disorders*. Submitted for publication.
- Solmi, M., Koyanagi, A., Thompson, T., Fornaro, M., Correll, C.U., Veronese, N., 2019. Network analysis of the relationship between depressive symptoms, demographics, nutrition, quality of life and medical condition factors in the Osteoarthritis Initiative database cohort of elderly North-American adults with or at risk for osteoarthritis - CORRIGENDUM. *Epidemiol. Psychiatr. Sci.* 1. <https://doi.org/10.1017/S2045796019000064>.
- Spitzer, R.L., Kroenke, K., Williams, J.B.W., Löwe, B., 2006. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch. Intern. Med.* 166, 1092–1097. <https://doi.org/10.1001/archinte.166.10.1092>.
- Stata Statistical Software: Release 15., 2017.
- Sullivan, G.M., Feinn, R., 2012. Using effect size-or why the P value is not enough. *J. Grad. Med. Educ.* 4, 279–282. <https://doi.org/10.4300/JGME-D-12-00156.1>.
- Thomas, R.K., Suleman, R., Mackay, M., Hayer, L., Singh, M., Correll, C.U., Dursun, S., 2020. Adapting to the impact of COVID-19 on mental health: an international perspective. *J. Psychiatry Neurosci.* <https://doi.org/10.1503/jpn.200076>.
- Topp, C.W., Østergaard, S.D., Søndergaard, S., Bech, P., 2015. The WHO-5 well-being index: a systematic review of the literature. *Psychother. Psychosom.* 84, 167–176. <https://doi.org/10.1159/000376585>.
- van Buuren, S., Groothuis-Oudshoorn, K., 2011. Mice: multivariate imputation by chained equations in R. *J. Stat. Software* 45 (Issue 3). <https://doi.org/10.18637/jss.v045.i03>.
- Viner, R.M., Russell, S.J., Croker, H., Packer, J., Ward, J., Stansfield, C., Mytton, O., Bonell, C., Booy, R., 2020. School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review. *Lancet Child Adolesc. Health*. [https://doi.org/10.1016/S2352-4642\(20\)30095-X](https://doi.org/10.1016/S2352-4642(20)30095-X).
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C.S., Ho, R.C., 2020. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int. J. Environ. Res. Public Health* 17. <https://doi.org/10.3390/ijerph17051729>.
- Webb Hooper, M., Nápoles, A.M., Pérez-Stable, E.J., 2020. COVID-19 and racial/ethnic disparities. *JAMA*. <https://doi.org/10.1001/jama.2020.8598>.
- World Health Organization, 2020. COVID-19 situation reports [WWW Document]. URL <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports> (accessed 4.22.20).