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Table 1 Supplementary material
Mixed Methods Assessment Tool (MMAT) risk of bias
Magson NR, et al. [1]

Quantitative non-randomized		Yes	No	Can't tell	Comments
	3.1. Are the participants representative of the target population?		X		81.8% Caucasian, and middle-high socioeconomic status 79.2%.
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?			X	
	3.3. Are there complete outcome data?			X	Response rate 53% (248 out of 467)
	3.4. Are the confounders accounted for in the design and analysis?			X	
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	X			
Risk of bias	**Moderate risk**				

Ezpeleta L, et al. [2]

Quantitative non-randomized		Yes	No	Can't tell	Comments
	3.1. Are the participants representative of the target population?		X		Attrition was higher among those in lower SES
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?			X	
	3.3. Are there complete outcome data?			X	55% answered the questionnaires
	3.4. Are the confounders accounted for in the design and analysis?	X			
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	X			
Risk of bias	**Moderate risk**				

Zhang L, et al. [3]

Quantitative non-randomized		Yes	No	Can't tell	Comments
	3.1. Are the participants representative of the target population?		X		59.3% male
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	X			
	3.3. Are there complete outcome data?	X			
	3.4. Are the confounders accounted for in the design and analysis?	X			
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	X			
Risk of bias	**Low risk**				

Chahal R, et al. [4]

		Yes	No	Can't tell	Comments

Quantitative non-randomized	3.1. Are the participants representative of the target population?		X		190 out of 214 recruited, 17 excluded due to motion and image quality 102 provided complete survey data, 86 had usable resting state data, did not answer 85 adolescents (49 female) mean 11.3 yrs
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?		X		Participants retrospectively rated their levels of emotions and worries in the 3 months before COVID and 2 most recent weeks during the pandemic. Pubertal staging was administered at baseline, not at COVID assessment since the sample had a mean age of 16.5 years during the COVID-19 ECN coherence measure was obtained only at baseline
	3.3. Are there complete outcome data?		X		
	3.4. Are the confounders accounted for in the design and analysis?		X		
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?		X		T1 baseline fMRI, completed a survey in April 3-April 20, 2020 (2.5-4.5 weeks after the pandemic) The interval ranged from 3.7 to 6.5 years (mean 5.2 years)
Risk of bias	**High risk. Excluded from the final synthesis**				

Isumi A, et al. [5]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			**Register study**
	4.2. Is the sample representative of the target population?			X	No stratification for <10 yrs, 10-14 yrs, and 15-19 yrs
	4.3. Are the measurements appropriate?	X			
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Moderate**				

Tromans S, et al. [6]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			**Data based on administrative data.**
	4.2. Is the sample representative of the target population?			X	Mental health service utilization in UK, Leicester city Child and adolescent mental health services n=14

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					The data reported is from a single healthcare trust in England, and thus may not be generalizable to all regions. It was not possible to examine the sociodemographic or clinical factors of patients referred or admitted. It might be considered that patients being admitted to mental health services are those with higher or immediate needs. These are all written in limitations
	4.3. Are the measurements appropriate?	X			
	4.4. Is the risk of nonresponse bias low?			X	N= 14 (small sample size)
	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Moderate**				

Physical activity, Obesity

Zenic N, et al. [7]

Quantitative non-randomized		Yes	No	Can't tell	Comments
	3.1. Are the participants representative of the target population?			X	There are no dropouts reported? This is not discussed
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?		X		Self-reported physical activity
	3.3. Are there complete outcome data?	X			
	3.4. Are the confounders accounted for in the design and analysis?	X			
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	X			
Risk of bias	**Moderate. It does not seem altogether unlikely that self-reported measures are affected by the special COVID-19 situation and that those lost to follow-up had different trajectories than those that participated.**				

Gilic B, et al. [8]

Quantitative non-randomized		Yes	No	Can't tell	Comments
	3.1. Are the participants representative of the target population?		X		65% residing in urban centers and follow up testing included adolescents who can use their own technological resources (those who have smart phones, and computers). Regarding socioeconomic status (urban centers, use of technology are a risk to be not representative
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	X			

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	3.3. Are there complete outcome data?	X			
	3.4. Are the confounders accounted for in the design and analysis?	X			
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	X			
Risk of bias	**Moderate**				

Pietrobelli A, et al. [9]

		Yes	No	Can't tell	Comments
Quantitative non-randomized	3.1. Are the participants representative of the target population?		X		Verona, Italy, longitudinal observational study (OBELIX). Non-adult participants with obesity (BMI>25 kg/m2) N=41 children, 35 Italy, 4 North Africa, 2 Albania It is a very small sample.
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?		X		Anthropometric measurements at baseline only. No structured questionnaire. Only a survey on eating and sedentary behaviors while the rest of variable collected at baseline
	3.3. Are there complete outcome data?	X			
	3.4. Are the confounders accounted for in the design and analysis?		X		
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	X			
Risk of bias	**Moderate -High**				

Li M, et al. [10]

		Yes	No	Can't tell	Comments
Descriptive study	4.1. Is the sampling strategy relevant to address the research question?	X			**Register study**
	4.2. Is the sample representative of the target population?			X	Hospital based study (only one hospital) in Hubei Province China (age 18-50 yrs pregnant women)
	4.3. Are the measurements appropriate?	X			
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Moderate**				

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Brenner A, et al. [11]

Quantitative non-randomized		Yes	No	Can't tell	Comments
	3.1. Are the participants representative of the target population?			X	Patient cohort where only one out of six participated. No attrition analysis.
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	X			
	3.3. Are there complete outcome data?	X			
	3.4. Are the confounders accounted for in the design and analysis?	X			
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	X			
Risk of bias	**Moderate. Main outcome measures are calculated within the same individuals. Should not be very sensitive to non-representativity of study population.**				

Christoforidis A, et al. [12]

Quantitative non-randomized		Yes	No	Can't tell	Comments
	3.1. Are the participants representative of the target population?			X	Patient cohort of 34 children. A number of exclusion criteria are reported, including "unwillingness" but the number excluded is not reported
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	X			
	3.3. Are there complete outcome data?	X			
	3.4. Are the confounders accounted for in the design and analysis?	X			
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	X			
Risk of bias	**Moderate. Main outcome measures are calculated within the same individuals. Should not be very sensitive to non-representativity of study population.**				

Di Dalmazzi G, et al. [13]

Quantitative non-randomized		Yes	No	Can't tell	Comments
	3.1. Are the participants representative of the target population?		X		Italy, S.Orsola Policlinic. 130 consecutive patients with T1D wearing CGM system (30 children <12 yrs), 24 teenagers (13-17 yrs), glucose data The sample size is small and a very selected group (those under CGM monitoring and with sensor use of >70%). So, results cannot be extended to all patients with T1DM
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?			X	
	3.3. Are there complete outcome data?	X			
	3.4. Are the confounders accounted for in the design and analysis?		X		Clustering only in adult patients
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	X			
Risk of bias	**Moderate**				

Keays G, et al. [14]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			**Register study**
	4.2. Is the sample representative of the target population?			X	28 yrs injury related ED visits Montreal Children's Hospital (one hospital), provincially designated pediatric trauma center. The study relied on data from one hospital
	4.3. Are the measurements appropriate?	X			
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Moderate**				

Cheek JA, et al. [15]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			**Register study.**
	4.2. Is the sample representative of the target population?			X	Australia, pediatric ED visits. Two tertiary and 2 urban district hospitals in Victoria. The data reported from 4 centers, and the numbers of mental health and neonatal presentations are small, not sure to be generalizable
	4.3. Are the measurements appropriate?	X			Pediatric ED presentations. Mental health patients. Neonatal presentations
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Moderate**				

Palladino F, et al. [16]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			**Register study**
	4.2. Is the sample representative of the target population?			X	South Italy, ED of a single center 4-14 years, seizures, n=57, median age 8 yrs

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					The data is from a single center and small sample size, probably not generalizable
	4.3. Are the measurements appropriate?			X	Demographic, seizures semiology, treatment ED data base and medical records MMD (media use) elaborated by adapting others validated questionnaires?
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Moderate**				

Dopfer C, et al. [17]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			**Ecological register study of total population in catchment area**
	4.2. Is the sample representative of the target population?			X	
	4.3. Are the measurements appropriate?	X			
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Low**				

Valitutti F, et al. [18]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			Ecological register study of total population in catchment area
	4.2. Is the sample representative of the target population?			X	
	4.3. Are the measurements appropriate?		X		Appropriate, but poorly defined. Dependent on nurses judgement, could easily change over time with decreased load of patients. Decrease in percentage of total number of patients is used as outcome, is not OK. Should be population bases
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?	X			

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Risk of bias	**Moderate**

Chandir S, et al. [19]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			
	4.2. Is the sample representative of the target population?			X	
	4.3. Are the measurements appropriate?	X			
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?		X		**The study contains data on two levels, region and individual but is analyzed as one level.**
Risk of bias	**Low for crude analyses of change, Moderate for multivariate analysis.**				

Chelo D, et al. [20]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			**Ecological register study of total population in catchment area**
	4.2. Is the sample representative of the target population?			X	
	4.3. Are the measurements appropriate?	X			**Cause of deaths were not registered for those who arrived dead at hospital. This is appropriately discussed**
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Low**				

Violence, abuse against children
Garstang J, et al. [21]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			**Register study**
	4.2. Is the sample representative of the target population?			X	Most severe (hospital cases) injuries were not included

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		Yes	No	Can't tell	Comments
	4.3. Are the measurements appropriate?	X			
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Low**				

Kovler ML, et al. [22]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			**Register study**
	4.2. Is the sample representative of the target population?			X	Maryland, Physical child abuse related injuries (n=8) 75% black, median age 11.5 months. This study is limited by the short period of retrospective review, and thus by the small number of patients included. Both regional and nationwide data would be needed to be compiled, and to determine if the measure taken to fight the Covid-19 pandemic is broadly associated with increased physical child abuse with more certainty.
	4.3. Are the measurements appropriate?	X			
	4.4. Is the risk of nonresponse bias low?	X			
	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Moderate**				

Baron EJ, et al. [23]

Descriptive study		Yes	No	Can't tell	Comments
	4.1. Is the sampling strategy relevant to address the research question?	X			**Study based on administrative data**
	4.2. Is the sample representative of the target population?			X	The data come from one State. Difficulties to know whether the results are externally valid and comparable to other counties and the US.
	4.3. Are the measurements appropriate?	X			
	4.4. Is the risk of nonresponse bias low?	X			

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	4.5. Is the statistical analysis appropriate to answer the research question?	X			
Risk of bias	**Low- moderate**				

References

1. Magson NR, Freeman JYA, Rapee RM, Richardson CE, Oar EL, Fardouly J. Risk and Protective Factors for Prospective Changes in Adolescent Mental Health during the COVID-19 Pandemic. *J Youth Adolesc*. 2020. doi:10.1007/s10964-020-01332-9

2. Ezpeleta L, Navarro JB, de la Osa N, Trepat E, Penelo E. Life conditions during COVID-19 lockdown and mental health in Spanish adolescents. *Int J Environ Res Public Health*. 2020;17(19):1-13. doi:10.3390/ijerph17197327

3. Zhang L, Zhang D, Fang J, Wan Y, Tao F, Sun Y. Assessment of Mental Health of Chinese Primary School Students Before and After School Closing and Opening During the COVID-19 Pandemic. *JAMA Netw open*. 2020;3(9):e2021482. doi:10.1001/jamanetworkopen.2020.21482

4. Chahal R, Kirshenbaum JS, Miller JG, Ho TC, Gotlib IH. Higher Executive Control Network Coherence Buffers Against Puberty-Related Increases in Internalizing Symptoms During the COVID-19 Pandemic. *Biol Psychiatry Cogn Neurosci Neuroimaging*. 2020; doi:10.1016/j.bpsc.2020.08.010

5. Isumi A, Doi S, Yamaoka Y, Takahashi K, Fujiwara T. Do suicide rates in children and adolescents change during school closure in Japan? The acute effect of the first wave of COVID-19 pandemic on child and adolescent mental health. *Child Abuse Negl*. 2020:104680. doi:10.1016/j.chiabu.2020.104680

6. Tromans S, Chester V, Harrison H, Pankhania P, Booth H, Chakraborty N. Patterns of use of secondary mental health services before and during COVID-19 lockdown: observational study. *BJPsych Open*. 2020;6(6):1-6. doi:10.1192/bjo.2020.104

7. Zenic N, Taiar R, Gilic B, et al. Levels and Changes of Physical Activity in Adolescents during the COVID-19 Pandemic: Contextualizing Urban vs. Rural Living Environment. *Appl Sci*. 2020;10(11). doi:10.3390/app10113997

8. Gilic B, Ostojic L, Corluka M, Volaric T, Sekulic D. Contextualizing Parental/Familial Influence on Physical Activity in Adolescents before and during COVID-19 Pandemic: A Prospective Analysis. *Children*. 2020;7(9):125. doi:10.3390/children7090125

9. Pietrobelli A, Pecoraro L, Ferruzzi A, et al. Effects of COVID-19 Lockdown on Lifestyle Behaviors in Children with Obesity Living in Verona, Italy: A Longitudinal Study. *Obesity*. 2020;28(8):1382-1385. doi:10.1002/oby.22861

10. Li M, Yin H, Jin Z, et al. Impact of Wuhan lockdown on the indications of cesarean delivery and newborn weights during the epidemic period of COVID-19. *PLoS One*. 2020;15:1-9. doi:10.1371/journal.pone.0237420

11. Brener A, Mazor-Aronovitch K, Rachmiel M, et al. Lessons learned from the continuous glucose monitoring metrics in pediatric patients with type 1 diabetes under COVID-19 lockdown. *Acta Diabetol*. 2020;57(12):1511-1517. doi:10.1007/s00592-020-01596-4

12. Christoforidis A, Kavoura E, Nemtsa A, Pappa K, Dimitriadou M. Coronavirus lockdown effect on type 1 diabetes management on children wearing insulin pump equipped with continuous glucose monitoring system. *Diabetes Res Clin Pract*. 2020;166. doi:10.1016/j.diabres.2020.108307

13. DI Dalmazi G, Maltoni G, Bongiorno C, et al. Comparison of the effects of lockdown due

to COVID-19 on glucose patterns among children, adolescents, and adults with type 1 diabetes: CGM study. *BMJ Open Diabetes Res Care*. 2020;8(2):1-9. doi:10.1136/bmjdrc-2020-001664

14. Keays G, Freeman D, Gagnon I. Injuries in the time of COVID-19. *Health Promot Chronic Dis Prev Canada*. 2020;40(11/12):336-341. doi:10.24095/hpcdp.40.11/12.02

15. Cheek JA, Craig SS, West A, Lewena S, Hiscock H. Emergency department utilisation by vulnerable paediatric populations during the COVID-19 pandemic. *EMA - Emerg Med Australas*. 2020;32(5):870-871. doi:10.1111/1742-6723.13598

16. Palladino F, Merolla E, Solimeno M, et al. Is Covid-19 lockdown related to an increase of accesses for seizures in the emergency department? An observational analysis of a paediatric cohort in the Southern Italy. *Neurol Sci*. 2020;41(12):3475-3483. doi:10.1007/s10072-020-04824-5

17. Dopfer C, Wetzke M, Scharff AZ, et al. COVID-19 related reduction in pediatric emergency healthcare utilization - a concerning trend. *Bmc Pediatr*. 2020;20(1). doi:10.1186/s12887-020-02303-6

18. Valitutti F, Zenzeri L, Mauro A, et al. Effect of Population Lockdown on Pediatric Emergency Room Demands in the Era of COVID-19. *Front Pediatr*. 2020;8. doi:10.3389/fped.2020.00521

19. Chandir S, Siddiqi DA, Mehmood M, et al. Impact of COVID-19 pandemic response on uptake of routine immunizations in Sindh, Pakistan: An analysis of provincial electronic immunization registry data. *Vaccine*. 2020;38(45):7146-7155. doi:10.1016/j.vaccine.2020.08.019

20. Chelo D, Nkwelle IM, Nguefack F, et al. Decrease in Hospitalizations and Increase in Deaths during the Covid-19 Epidemic in a Pediatric Hospital, Yaounde-Cameroon and Prediction for the Coming Months. *Fetal Pediatr Pathol*. 2020 doi:10.1080/15513815.2020.1831664

21. Garstang J, Debelle G, Anand I, et al. Effect of COVID-19 lockdown on child protection medical assessments: a retrospective observational study in Birmingham, UK. *BMJ Open*. 2020;10(9). doi:10.1136/bmjopen-2020-042867

22. Kovler ML, Ziegfeld S, Ryan LM, et al. Increased proportion of physical child abuse injuries at a level I pediatric trauma center during the Covid-19 pandemic. *Child Abuse Negl*. 2020:104756. doi:10.1016/j.chiabu.2020.104756

23. Baron EJ, Goldstein EG, Wallace CT. Suffering in silence: How COVID-19 school closures inhibit the reporting of child maltreatment. *J Public Econ*. 2020;190:104258. doi:10.1016/j.jpubeco.2020.104258