

The Impact of the COVID-19 Pandemic on Healthy Lifestyles in Rural Families

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Abstract

The purpose of the current study is to understand how the early portion of COVID-19 pandemic impacted the health behaviors of rural families participating in a healthy lifestyles intervention. Caregivers of rural children participating in a healthy lifestyles intervention were invited to participate in a structured interview regarding how the COVID-19 pandemic affected their family and family health behaviors. Interviews were transcribed and the research team conducted a rigorous inductive thematic analysis. Structured qualitative interviews with caregivers (n=30) resulted in 5 saturated themes: (a) caregivers reported new or exacerbated mental health concerns and stress among family members, largely due to social isolation and external stressors, (b) caregivers reported feeling out of control of positive health behaviors for themselves and their children, (c) families reported variability in how they handled reductions in schedule demands, ranging from filling time with positive activities to negative behaviors such as snacking, (d) families continuously re-adjusted their approach to parenting, routines, and health behaviors due to internal and external factors, (e) families ate foods that were accessible and convenient, which impacted the health of the family diet. Despite being asked primarily about lifestyle behavior changes, families reported concerns around mental health. Implications are that professionals working with rural children and families, even those without mental health training, may be called upon to help address these concerns especially in these underserved, rural families.

Keywords: *SARS-CoV2, health behaviors, physical activity, mental health, qualitative*

The outbreak of the novel coronavirus (COVID-19) in the spring of 2020 led to many government entities implementing stay at home orders (World Health Organization [WHO], 2020). These orders encouraged individuals to stay home and discontinue in-person gatherings with people outside of their households; these orders impacted over 91% of US children (over 57 million) and adults (Donohue & Miller, 2020; Education Week, 2020; Kazak et al., 2021). In addition, virtually all youth sports were cancelled or suspended, impacting 45 million youth athletes in the U.S. (Sanderson & Brown, 2020). There were numerous other cancellations and disruptions, such as childcare, athletic activities, clubs, and religious gatherings (Lee et al., 2021). For adults, by April 2020, the unemployment rate increased by a record-breaking 10.3% to reach 14.7%, the highest rate and largest over-the-month increase in the time since the U.S. Bureau of Labor Statistics began collecting these data (U.S. Bureau of Labor Statistics, 2020). Further, as of September 2020, it is estimated that ~40% of adults in the U.S. lost their jobs or had reduced wages as a result of the COVID-19 pandemic (Parker et al., 2020). For adults who were able to keep their jobs, many non-essentials jobs were modified to remote-work or schedules were modified to reduce risk of exposure.

Initial research has been done on the early impact of the outbreak of COVID-19 on children and families. For example, Eyler, Schmidt, Gilbert, et al. (2021) published an analysis of structured interviews with 16 urban parents who reported that the transition to virtual school transformed daily activities and created many challenges for families, especially around screen time. This same group published a quantitative survey which indicated 63% of parents reported a decrease in physical activity, which was exacerbated by a lack of playmates and if there was a lack of availability of adult supervision (Eyler, Schmidt, Keeper, et al., 2021). Other early studies suggest an increased hospitalization rate for children with Type 2 diabetes during the early pandemic, and an increase in mental health problems among children, as well as the important associations between mental health and health behaviors and overweight/obesity status in children (Hsia et al., 2021; Leff et al., 2021; Alves et al., 2021).

The impact of the COVID-19 pandemic and early stay at home orders on families living in rural areas is not well understood. The Food and Agriculture Organization of the United Nations reported that rural communities may be more vulnerable to and impacted by the COVID-19 pandemic due to poor access to technology, lack of local public transportation, and limited food outlets in the area (e.g., food) (Food and Agriculture Organization of the United Nations [FAO], 2020). Individuals from rural areas

also routinely face health disparities, such as higher rates of chronic disease (e.g., cardiovascular disease, Type 2 diabetes and obesity) (Eberhardt et al., 2001; Clark et al., 2007; Befort et al., 2012). Currently there is a need to expand on our understanding of the impact of stay at home orders and other changes due to the COVID-19 pandemic on rural children and families. Therefore, the current qualitative study sought to examine the impact of the COVID-19 pandemic on underserved rural children and their families who were participating in a health promotion program (NCT03304249), with a focus of the impact on family health behaviors such as physical activity, screen time, and diet.

Methods

Participants in this study include caregivers from a healthy lifestyles promotion intervention for rural families of children with overweight/obesity (Davis, Beaver, et al., 2019). This healthy lifestyle promotion program was delivered in partnership with rural elementary schools and focused on promoting healthy dietary behaviors, improved screen time and physical activity habits, and the effective use of goal setting and other behavior change techniques. Families were randomly assigned (at the school level) to either a newsletter version of the intervention or a virtual group-based version of the intervention. Families from both conditions were invited to participate in the current project; more details about the methods of the larger project are published elsewhere (Davis, Beaver, et al., 2019).

All caregivers in the larger intervention (n=141) were invited via email to respond to a COVID-19-specific-survey, and subsequently via text message followed by phone call, to complete an in-depth structured interview. Structured interviews with caregivers followed a semi-structured format; questions were designed to focus on the impact of the COVID-19 pandemic and subsequent shutdowns on child and family physical activity and dietary behaviors (see Table 1). A research team member contacted participants (i.e., caregivers) via text message to their preferred phone to confirm their interest in completing the interview and to schedule a 30-minute appointment time for the call. At the beginning of each interview, participants were informed of their right to stop the interview at any time, given an initial briefing, and provided verbal consent for study procedures per IRB approved protocol. The interviews were conducted via an interactive video platform (Zoom) and transcribed verbatim by a professional service. Caregivers received payment for participating in the interview (\$30 payment). Interviews were conducted June 2020 through September 2020 and the interviews lasted on average 17 minutes (SD = 5 minutes).

Table 1. Interview questions.

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1. How do you think COVID-19, and the stay-at-home orders and other changes, affected your child participating in iAmHealthy?
 2. Regarding this same child: How do you think COVID-19, and the stay-at-home orders and other changes, affected your child's ability to lead a healthy lifestyle?
 3. What were the biggest challenges to your child leading a healthy lifestyle during this time?
 4. Were there any health habits that improved for your child during this time?

5. How do you think COVID-19, and the stay-at-home orders and other changes, affected you?
 6. How do you think COVID-19, and the stay-at-home orders and other changes, affected your ability to lead a healthy lifestyle?
 7. What were the biggest challenges to you leading a healthy lifestyle during this time?
 8. Were there any of your health habits that improved during this time?
 9. Thinking specifically about food for members of your household, how did your eating habits change as a household?
 - a. Were some food items less available? Or, did you get food from a food pantry or other resource?
 - b. Did anyone's snacking habits change?
 - c. Did you have enough food for your family?
 - d. What about changes in cooking and family meals?
 - e. Did you experience any changes in your amount of cooking?
 - f. What about frequency of family meals?
 - g. What effects did you experience from these changes in cooking and/or family meals?
 10. Thinking specifically about physical activity for members of your household, how did your physical activity habits change as a household?
 - a. Were some activities less available, or discontinued all together?
 - b. Did you start/stop doing activities as a family?
 11. Thinking specifically about screen time for members of your household, how did your screen time habits change as a household? Was this due to work? To school? Due to leisure time screen time? Something else?
 12. What else would you like to tell us about how COVID-19 affected your family?
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Trained research staff (n=5) independently reviewed participant responses via typed transcripts and conducted an inductive thematic analysis, guided by Morgan and Krueger methodology, to identify themes within the responses (Morgan et al., 1998). The coders each developed preliminary themes independently and determined whether the themes reached saturation. The coders then met as a group to reach consensus on theme content areas and to develop final wording of themes; all coders agreed that saturation was reached. Transcripts were then reviewed again to identify specific quotes that best represented each theme. Participant demographic data were analyzed through frequencies, means and standard deviations.

Results

Thirty (n=30) adult caregivers who participated in the larger trial also chose to participate in the current study. Participants (caregivers) were on average 38.8 years old (range = 30 to 57 years) and the majority (96%) were female; 28 participants described their relationship to the child as mother, one as father, and one as grandmother. The identified child who was the primary participant in the larger intervention study ranged in age from 9 to 14 years, 53.3% were female and most families were not eligible for free lunch at the time of the survey (26.7% eligible for free or reduced lunch). Five major themes were identified and reached saturation, and specific quotes can be seen in Table 2.

Theme #1

Caregivers reported new or exacerbated mental health concerns and stress among family members, largely due to social isolation and external stressors.

Despite questions focusing on family health behavior issues, caregivers described new or exacerbated cases of mental health concerns regarding themselves and their children. Some caregivers contributed their worsening mental health to financial instability, the added stress of

taking care of children at home, fear of illness, and inability to be social. These factors, for several families, were described to have caused marital stress and increased tension within the household. For example, one caregiver described her partner as a "germaphobe," with obsessive compulsive disorder tendencies and extremely high stress levels with regards to contracting the SARS-CoV-2 virus; this drastically increased tension within this household. For children with preexisting mental health concerns, it was reported by some caregivers that these conditions were exacerbated by the lack of social interaction and stability normally provided by the school setting and after-school activities. Families expressed concern about mood shifts in their children, which contributed to tension between siblings and further weighed on the family dynamic as a whole.

Theme #2

Caregivers reported feeling out of control of positive health behaviors for themselves and their children.

Caregivers described their children being home from school being similar to a summer break for the families. This meant there was increased leisure time for the children and less regulation of health behaviors. Some families attempted to make schedules for meals, while others described not regulating eating behaviors at all for their families. Lacking the structure and social stimulation provided by school days, children consumed more snacks out of boredom and as a source of comfort. One mother described herself as a "self-soother" with food, where she became less restrictive when it came to purchasing unhealthy treats for her family. Another factor beyond the caregiver's control was closure of gyms and sporting activities. While some families maintained a normal level of physical activity through family bike rides and walks, many caregivers reported their children had a decrease in physical activity. This was especially the case for families with members that had physical health conditions, such as

asthma, or mental health conditions, such as anxiety and depression.

Theme #3

Families reported a great deal of variability in how they handled reductions in schedule demands and increases in boredom, ranging from filling time with positive activities such as cooking at home to negative behaviors such as snacking.

Caregivers reported an increase in free time compared to their normal routine prior to the COVID-19 pandemic. Some caregivers reported using this free time for collective family activities such as family bike rides or cooking. Other families found it difficult to fill all of the new free time with activities. Caregivers described children regularly expressing boredom, leading to increased screen time or mindless snacking. Because many caregivers were working from home, it became easier to keep children distracted during the day with screen time compared to outdoor activities that required caregiver supervision and where children would quickly lose interest. This led to increased sedentary behavior in not only the children, but their caregivers as well. In contrast, some caregivers reported having more time for daily walks and new exercise routines, when work schedules would normally impede them from engaging in these activities.

Theme #4

Families continuously re-adjusted their approach to parenting, routines, and health behaviors due to internal and external factors.

During this time, caregivers described continuous readjustments within the family routine. Adjustments were made based upon internal factors for families; for example,

a family member contracting the SARS-CoV-2 virus, or a loss of income. External factors for families included the length of the quarantine or cancellation of social and sporting activities. The lack of structure led some caregivers to develop new routines for their children. A caregiver mentioned creating a meal and playtime schedule after noticing her child was overeating due to boredom. However, this approach was more feasible for caregivers who stayed home. Upon returning to work, increased screen time kept children from roaming outdoors unsupervised, as expressed by some families. One caregiver noticed an uptick in snacking and adjusted by creating a “snack basket.” Other caregivers noted depressive symptoms in their extroverted children, and responded by allowing them to download social media/messenger apps and safely play with friends outdoors when this was previously not allowed

Theme #5

Families ate foods that were accessible and convenient, which impacted the health of the family diet.

Although some families reported that the increased time at home allowed them to teach their children how to cook, eat more fruits and vegetables, and avoid “on-the-go” foods such as fast-food outlets, many families noted that their diets had worsened. This was more prevalent when caregivers reported higher levels of stress contributing to a “lack of motivation.” Additionally, some families lived far away from a grocery store and were attempting to limit visits to public places. Therefore, caregivers would stockpile groceries every 2-3 weeks, limiting the amount of perishable food items purchased. Other families revolved their meals around access to free resources. For example, some local schools and farms offered free lunches or boxes full of produce to the community. For some, these free resources were their only access to fresh food.

Table 2. Saturated Themes of Caregiver Interviews with Supporting Quotes.

1. Parents reported new or exacerbated mental health concerns and stress among family members, largely due to social isolation and external stressors.
“Actually, I think probably mental health was probably the biggest thing for him. ...But just not being able to see his friends, it’s kind of taking its toll. He actually just started football conditioning last week and his mood completely changed. You can tell having that social interaction with friends and his teachers, coaches has been a huge help for his – maybe it’s just pre-teenage mood swings. I don’t know.”
“I had a full on breakdown so much so that I have resulted in going back to the doctor and getting put on more meds...It had me so stressed out...once I realized, okay, this isn’t a joke, I mean, I really lost it. Because I was so worried for my three kids, it took a toll obviously on our eating habits and stuff and my cooking...But there is definitely marital stress, the stress from the sickness and the constant cleaning, trying to make sure my house was perfectly clean so it lowered the chances here of anybody getting sick.”
2. Parents reported feeling out of control of positive health habits for themselves and their children.
“We’ve all gained weight... We were kind of staying on track when it all first began. But I mean as the COVID numbers increased, and of course, I got more stressed, I started relying more on takeout and stuff like that. So that had a pretty big impact on our life.”
“I think that I’m kind of a soother with food, and this was a really anxiety-producing time for me, so I think that I was more open to buying a pack of Oreos at the grocery store than I was. And there were days that I did not have it in me to police her food, and I didn’t want to do that. That’s been the fine line for me this whole time, is I don’t want to create food to being a bigger deal than it is, and having that parlay into some body image stuff. So I think that it’s been a fine line for me.”
3. Families reported a great deal of variability in how they handled reductions in schedule demands and increases in boredom, ranging from filling time with positive activities such as cooking at home to negative behaviors such as snacking.

“I actually think that it’s kind of been good and bad. It’s good because due to the COVID-19, we’re cooking at home now and less take out, less fast food. So the nutritional quality of the food that he was receiving was a lot higher. ...but at the other end, it was and is a lot more likely to eat out of boredom because it’s there.”

“I did a lot of projects in my house and then I kind of slept a lot... I probably could have walked or ran or done something of that nature, but my outlet was also normally going to the gym and that got shut down. Yeah, so I basically would lay in bed and watch Netflix and fall asleep and wake back up and watch more Netflix. I had a lot of anxiety in the beginning of even going anywhere, so I wouldn’t even go to, like, the grocery store...”

4. Families continuously re-adjusted their approach to parenting, routines and health behaviors due to internal and external factors.

“You know, that first two months when I was home it was a lot easier because we had our school time that they had to get done... Now that I’m back at work, screen time is a big problem and like I said, I won’t let them go outside if there’s not a parent around or an adult around, so then that leaves them at home on the screen, whether it’s videogames or tablets, watching YouTube.”

“One thing I worked on with [child] was, we’re going to have breakfast when we wake up, we’re going to have a snack at 10:30, we’re going to have lunch at noon, we’re going to have a snack at 2:30, and then we’re going to have supper at 5. Here is the schedule is food, and it’s not just any time I pass by the kitchen... That schedule worked out pretty well for us. Because I noticed that as she would be in between activities, or she would be bored, she would be like, I’m hungry. And I’d say, tell me where you feel you’re hungry in your body. How hungry? So that’s the conversation through the pandemic that I’ve tried to connect for her...”

5. Families ate foods that were accessible and convenient, which impacted the health of the family diet.

“In our town, we don’t have a grocery store at all. The only thing we have is a Dollar General, and then one of our gas stations does get produce in, but it’s hit and miss. So our food pantry gets produce delivered anywhere from one to three times a week from a charity about 30 minutes away from us... You just have to live within our school district to be able to get it. And so we would get it every single time it would come because then I would just basically plan our meals around whatever produce we got.”

“Us being off of work. So us being able to buy the healthy foods that we were getting was a challenge, because it’s more expensive for the healthier foods than it is for the junk food. That was where we faced a problem.”

Discussion

This project explored rural families’ experiences during the COVID-19 pandemic, specifically the pandemic’s impact on families participating in a healthy lifestyle promotion intervention. This study used an inductive qualitative research design to document changes in family perceptions and behaviors. Overall, five saturated themes emerged from the data. All of the themes surrounded a central concept of the COVID-19 pandemic negatively impacting families’ physical, emotional, and mental wellbeing. The data support that the pandemic had primarily negatively impacted positive health behaviors for families, including less physical activity, more snacking, and less healthy foods in the diet. It is also important to note that although the questions were structured to ask about health behaviors, families expressed greater concerns about stress and mental health, both for caregivers and for children.

Regarding mental health, data from pre-pandemic times indicate that rural children and families face greater mental health challenges than their urban and suburban counterparts (Kozhimannil et al., 2019). Given these higher underlying rates, perhaps it is not surprising that families in the current study (as in other studies) expressed a great deal of concern about stress and mental health issues for all family members in this study about health behaviors (Guessoum et al., 2020; WHO, 2020; Campion et al., 2020). Social isolation presented in the current study as a major negative factor for rural families and their mental wellbeing. Caregivers commonly expressed concern for their children not having access to friends from school and

reported increased symptoms of depression and anxiety in their children. Nationwide data indicate that there was a shortage of trained mental healthcare providers in rural areas to meet this need even prior to the pandemic, which may have been exacerbated as health professionals left the workforce during the pandemic (Thomas et al., 2009; Abelson, 2020). Novel programs delivering services via mHealth or using a virtual mentorship model are reported in the literature and could be used to meet this need, and data indicate telemental health delivery and reimbursement has improved during the pandemic (Zulman et al., 2019; Tarlow et al., 2020; Keeler et al., 2018; Siegel et al., 2021).

In addition to concerns about stress and mental health, families also reported declines in health behaviors. These findings are especially concerning as the participants were already vulnerable as they are at higher risk of many chronic health conditions and would benefit from engagement in health behaviors (Eberhardt et al., 2001; Clark et al., 2007). Previous research indicates an important link between physical activity behaviors and physical and mental health; this may be especially important for these rural families with physical and mental health concerns (Balanzá-Martínez et al., 2021). During the time of the pandemic, research indicates these families may also be at higher risk of severe illness from COVID-19 due to increased age, higher rates of underlying chronic disease, and increased likelihood of having a disability (Centers for Disease Control and Prevention [CDC], 2019).

Strengths and Limitations

The strengths of this study are an appropriate sample size for a qualitative approach and the methods used were rigorous, as well as our focus on rural children and families who are underrepresented in pediatric health research. However, because the population studied was rural families, it is possible that these results may not generalize to non-rural families. A potential limitation is that the subsample of participants who self-selected to be interviewed is not representative of the participants in the larger study or in our state. For example, 26.7% of families who chose to participate in this survey study were eligible for free and reduced lunch, but 37% of children in the state are eligible for free and reduced lunch (Kansas Health Matters, 2021). This suggests that participants in the survey tended to have higher income than the state average. Finally, as is typical in pediatric health research, very few fathers participated (Davidson et al., 2017). There has been published research regarding the importance of fathers to child health, so future efforts should attempt more specific techniques to include them and their perspectives (Davis, Canter, et al., 2019).

Implications

Although the current project planned to focus on changes in health behaviors during the early COVID-19 pandemic (such as diet and physical activity), parents and caregivers wanted to talk about increased mental health and stress concerns, both among caregivers and among children. This implies that professionals working with rural families, even those without mental health training, may be called upon to address mental health and stress concerns among children and families from rural areas.

Conclusion





Rural families reported facing challenges with maintaining healthy lifestyle behaviors in the COVID-19 pandemic setting. However, they reported more significant concerns about caregiver and child mental health and stress. Future pediatric health promotion programs targeting caregivers and children in rural areas should include tools to help caregivers and children address the stress and mental health concerns subsequent to the pandemic, as these concerns are likely to be maintained (at least in part) over time.

References

- Abelson, R. (2020). Doctors Are Calling It Quits Under Stress of the Pandemic. Accessed May 3, 2021, <https://www.nytimes.com/2020/11/15/health/Covid-doctors-nurses-quitting.html>
- Alves, J. M., Yunker, A. G., DeFendis, A., Xiang, A. H., & Page, K. A. (2021). BMI status and associations between affect, physical activity and anxiety among U.S. children during COVID-19. *Pediatric Obesity*. 2021 Sep;16(9):e12786. doi: 10.1111/ijpo.12786.

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Author Contributions

Conceptualization, K.M.E., A.M.D., and M.M.; Methodology, A.M.D. and K.M.E.; Investigation, K.M.E.; Formal Analysis, K.M.E., B.F., M.B., R.B., D.M.B., and A.M.D.; Writing – original draft, K.M.E. and A.M.D.; Writing – review & editing K.M.E., B.F., M.B., R.B., D.M.B., M.M., and A.M.D.; Funding Acquisition, A.M.D.; Resources, A.M.D.; Supervision, A.M.D

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- Balanzá-Martínez, V., Kapczinski, F., de Azevedo Cardoso, T., Atienza-Carbonell, B., Rosa, A. R., Mota, J. C., & De Boni, R. B. (2021). The assessment of lifestyle changes during the COVID-19 pandemic using a multidimensional scale. *Revista de Psiquiatria y Salud Mental*. 2021 January-March;14(1):16-26.
- Befort, C. A., Nazir, N., & Perri, M.G. (2012). Prevalence of obesity among adults from rural and urban areas of the United States: findings from NHANES (2005-2008). *The Journal of Rural Health*. Fall 2012;28(4):392-397. doi: 10.1111/j.1748-0361.2012.00411.x.
- Campion, J., Javed, A., Sartorius, N., & Marmot, M. (2020). Addressing the public mental health challenge of COVID-19. *The Lancet Psychiatry*. 2020;7(8):657-659.
- Centers for Disease Control and Prevention. (2019). Rural Communities. <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/other-at-risk-populations/rural-communities.html>.
- Clark, R. A., Eckert, K. A., Stewart, S., Phillips, S. M., Yallop, J. J., Tonkin, A. M., & Krum, H. (2007). Rural and urban differentials in primary care management of chronic heart failure: new data from the CASE study. *Medical Journal of Australia*. 2007;186(9):441-445.
- Davis, A. M., Beaver, G., Gillette, M. D., Nelson, E. L., Fleming, K., Romine, R. S., Sullivan, D. K., Lee, R., Gabriel, K. P., Dean, K., Murray, M., & Faith, M. (2019). iAmHealthy: Rationale, design and application of a family-based mHealth pediatric obesity intervention for rural children. *Contemporary clinical trials*. 2019;78:20-26.
- Davis, A. M., Canter, K. S., & Pina, K. (2019). The importance of fathers in pediatric research: These authors are on to something important. *Translational behavioral medicine*. 2019;9(3):570-572.
- Davison, K. K., Charles, J. N., Khandpur, N., Nelson, T. J. (2017). Fathers' perceived reasons for their underrepresentation in child health research and strategies to increase their involvement. *Maternal and Child Health Journal*. 2017;21(2):267-274.
- Donohue, J. M. & Miller, E. (2020). COVID-19 and school closures. *Journal of the American Medical Association*. 2020;324(9):845-847.
- Eberhardt, M. S., Ingram, D. D., & Makuc, D. M. (2001). Urban and Rural Health Chartbook: Health, United States, 2001. Education Week. (2020). Map: Coronavirus and School Closures in 2019-2020. Accessed May 3, 2021, <https://www.edweek.org/leadership/map-coronavirus-and-school-closures-in-2019-2020/2020/03>.
- Eyler, A. A., Schmidt, L., Gilbert, A., Beck, A., Keeper, M., & Mazzucca, S. (2021). Children's Physical Activity and Screen Time during COVID-19 Pandemic: a Qualitative Exploration of Parental Perceptions. *Health Behavior and Policy Review*. 8(3): 236-246.

- Eyler, A. A., Schmidt, L., Keeper, M., Mazzucca, S., Gilbert, A., & Beck, A. (2021). Parent Perceptions of Changes in Child Physical Activity during COVID-19 Stay-At-Home Orders. *Front Public Health*. 2021 Jun 7;9:637151. doi: 10.3389/fpubh.2021.637151.
- Food and Agriculture Organization of the United Nations. (2020). Rural youth and the COVID-19 pandemic. <https://www.fao.org/documents/card/en/c/ca9531en/>
- Guessoum, S. B., Lachal, J., Radjack, R., Carretier, E., Minassian, S., Benoit, L., & Moro, M. R. (2020). Adolescent psychiatric disorders during the COVID-19 pandemic and lockdown. *Psychiatry Research*. 2020:113264.
- Hsia, D. S., Lim, M., Beyl, R. A., Hasan, H. A., & Gardner, J. (2021). 153-LB: Initial Presentation of Children with Type 3 Diabetes during the COVID-19 Pandemic. *Diabetes*, Jun; 70 (Supplement 1).
- Kansas Health Matters. (2021). Students Eligible for the Free Lunch Program. Accessed May 3, 2021, <https://www.kansashealthmatters.org/indicators/index/view?indicatorId=416&periodId=1523&localeId=19>
- Kazak, A. E., Alderfer, M., Enlow, P. T., Lewis, A. M., Vega, G., Barakat, L., Kassam-Adams, N., Pai, A., Canter, K. S., Hildenbrand, A. K., McDonnell, G. A., Price, J., Schultz, C., Sood, E., & Phan, T. L. (2021). COVID-19 Exposure and Family Impact Scales: Factor Structure and Initial Psychometrics. *Journal of Pediatric Psychology*. 2021 Jun 3;46(5):504-513. doi: 10.1093/jpepsy/jsab026.
- Keeler, H., Sjuts, T., Niitsu, K., Watanabe-Galloway, S., Mackie, P. F. E., & Liu, H. (2018). Virtual mentorship network to address the rural shortage of mental health providers. *American Journal of Preventive Medicine*. 2018;54(6):S290-S295.
- Kozhimannil, K. B., Interrante, J. D., Henning-Smith, C., & Admon, L. K. (2019). Rural-urban differences in severe maternal morbidity and mortality in the US, 2007–15. *Health Affairs*. 2019;38(12):2077-2085.
- Lee, S. J., Ward, K. P., Chang, O. D., & Downing, K. M. (2021). Parenting activities and the transition to home-based education during the COVID-19 pandemic. *Children and Youth Services Review*. 2021;122:105585.
- Leff, R. A., Setzer, E., Cicero, M. X., & Auerbach, M. (2021). Changes in pediatric emergency department visits for mental health during the COVID-19 pandemic: A cross-sectional study. *Clinical Child Psychology and Psychiatry*. 2021 Jan;26(1):33-38. doi: 10.1177/1359104520972453.
- Morgan, D. L., Krueger, R. A., & Scannell, A. U. (1998). Planning focus groups. *Sage*; 1998.
- Parker, K., Minkin, R., & Bennett, J. (2020). Economic fallout from COVID-19 continues to hit lower-income Americans the hardest. *Pew Research Center*. 2020:21. <https://www.pewresearch.org/social-trends/2020/09/24/economic-fallout-from-covid-19-continues-to-hit-lower-income-americans-the-hardest/>
- Sanderson, J. & Brown, K. (2020). COVID-19 and Youth Sports: Psychological, Developmental, and Economic Impacts. *International Journal of Sport Communication*. 2020;1(aop):1-11.

- Siegel, A., Zuo, Y., Moghaddamcharkari, N., McIntyre, R. S., & Rosenblat, J. D. (2021). Barriers, benefits and interventions for improving the delivery of telemental health services during the coronavirus disease 2019 pandemic: a systematic review. *Current Opinion in Psychiatry*. 2021 Jul 1;34(4):434-443. doi: 10.1097/YCO.0000000000000714.
- Tarlow, K. R., McCord, C. E., Du, Y., Hammett, J., & Wills, T. (2020). Rural mental health service utilization in a Texas telepsychology clinic. *Journal of Clinical Psychology*. 2020;76(6):1004-1014.
- Thomas, K. C., Ellis, A. R., Konrad, T. R., Holzer, C. E., & Morrissey, J. P. (2009). County-level estimates of mental health professional shortage in the United States. *Psychiatric Services*. 2009;60(10):1323-1328.
- U.S. Bureau of Labor Statistics. (2020). TED: The Economics Daily image. Accessed April 22, 2021, <https://www.bls.gov/opub/ted/2020/unemployment-rate-rises-to-record-high-14-point-7-percent-in-april-2020.htm>
- World Health Organization. (2020). Mental health and psychosocial considerations during the COVID-19 outbreak, 18 March 2020. <https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf>
- World Health Organization. (2020). WHO announces COVID-19 outbreak a pandemic. <http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/whoannounces-covid-19-outbreak-a-pandemic>.
- Zulman, D. M., Wong, E. P., Slightam, C., Gregory, A., Jacobs, J. C., Kimerling, R., Blonigen, D. M., Peters, J., & Heyworth, L. Making connections: nationwide implementation of video telehealth tablets to address access barriers in veterans. *Journal of the American Medical Informatics Association*. 2019 Oct 1; 2(3):323-329.