Cultivating Community-Based Participatory Research (CBPR) to Respond to the COVID-19 Pandemic: An Illustrative Example of Partnership and Topic Prioritization in the Food Services Industry

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Abstract

Background

As an illustrative example of COVID-19 pandemic community-based participatory research (CBPR), we describe a community-academic partnership to prioritize future research most important to people experiencing high occupational exposure to COVID-19 – food service workers. Food service workers face key challenges surrounding 1) health and safety precautions, 2) stress and mental health, and 3) the long-term pandemic impact.

Method

Using CBPR methodologies, academic scientists and community stakeholders conducted a survey, three focus groups, and a rapid qualitative assessment to understand the three areas of concern and prioritize future research.

Results

The survey showed that employers mainly supported basic droplet protections (soap, hand sanitizer, gloves), rather than comprehensive airborne protections (high-quality masks, air quality monitoring, air cleaning). Workers faced challenging decisions surrounding isolation, quarantine, testing, masking, vaccines, and in-home transmission, described anxiety as a top mental health concern, and described long-term physical and financial concerns. Focus groups provided qualitative examples of concerns and narrowed topic prioritization. The rapid qualitative assessment identified key needs and opportunities for helping with a top priority, reducing in-home COVID-19 transmission.

Conclusions

The COVID-19 pandemic has forced food service workers to experience complex decisions about health and safety, stress and mental health concerns, and long-term health and financial difficulties. Stakeholders suggest the need for more research aimed at reducing in-home COVID-19 transmission as well as supporting long-term mental health, physical health, and financial concerns. This research provides an illustrative example of how to cultivate community-based partnerships to respond to immediate and critical issues affecting populations most burdened by public health crises.

Introduction

Food service workers fulfill the essential societal function of ensuring access to food. The work spans multiple settings and occupations, including grocery store workers, restaurant workers, food deliverers, and more (1). On the frontlines of the pandemic, they have frequent interactions in close proximity to

densely packed groups of people, and often without rigorous health and safety protocols. Consequently, food service workers have experienced greater viral exposure, been more likely to get COVID-19 infections and reinfections, been more likely to have adverse COVID-19 outcomes, and have had the highest COVID-19 death rates of any occupational group (1-11). Food service workers were among those at greatest risk at the pandemic onset, often lost jobs and health insurance during closures and reduced hours, were among the last eligible for vaccines, and were among the first at risk of infection and reinfection when precautions were discontinued (1, 11-18). The stress of the pandemic has been hard for many (19, 20), especially food service workers (11, 12, 21-26). Overall, food service workers and their families have faced considerable challenges related to 1) COVID-19 health and safety, 2) stress and mental health, and 3) the long-term effects of the COVID-19 pandemic. These three challenges have been particularly difficult in the culinary city of New Orleans. Specifically, New Orleans is a socioeconomically-diverse majority-minority city that relies on tourism and dining as major sectors of the economy and had the highest mortality rate per capita of any major U.S. city at the pandemic onset, slightly higher than New York City (27). As an illustrative example of COVID-19 pandemic community-based participatory research (CBPR), the current investigation was designed to better understand these three domains of pandemic concerns among food service workers in New Orleans.

The current research involved developing a community-academic partnership with local food service workers or the "stakeholder" community from August 2021 through February 2023. We used a combination of surveys, focus groups, and qualitative methods to identify the key pandemic concerns faced by food service workers. The research was designed to document concerns during the course of the pandemic, prioritize future research topics, and suggest a path forward for a sustainable research partnership.

Method

Overview

This research involved a collaborative partnership among academic scientists and stakeholders in the New Orleans food service community and was designed to reveal the key pandemic concerns faced by food service workers. The academic team directly engaged stakeholders who were active on the study team. The research centered on conducting a survey of the stakeholder population, focus groups, and a qualitative assessment. Study procedures were reviewed and approved by the Tulane University Institutional Review Board (IRB # 2021 – 910).

Project Timeline

This report closely documents the timeline of study procedures because the pandemic has been marked by uncertainty (which affects planning) and volatility with respect to case rates, mitigation approaches, and scientific understanding (which affect the concerns of the day). The research team conceived of the study and developed the proposal from December 2020 through April 2021, submitting a funding proposal in May 2021 for rapid review. The proposal was revised lightly in July 2021 based on the

funder's feedback, funded in August 2021, and launched in September 2021 while much of the team was evacuated out of town for up to a month due to Hurricane Ida and an extended power outage. The project ran through February 2023, with specific dates noted for each study activity.

Stakeholder Engagement on the Study Team

Scientists and stakeholders oversaw the research as a part of a scientific advisory board. Stakeholder engagement and input guided the development of information, collection of data, and ideas behind this manuscript. The project involved four types of stakeholders. The primary group was comprised of local food service workers, which is the immediate population of interest, directly impacted by the identified problems, and most capable of informing potential solutions. The secondary group of stakeholders was family members of food service workers, who have been indirectly impacted. Next, we included people with more ancillary knowledge of issues affecting food service workers, including food business executives and locals knowledgeable of schools since many have children. These stakeholders joined the academic scientists as equal members of the scientific advisory board.

Stakeholders contributed comprehensively to the project. They helped craft the original project proposal that was funded and supported the research, assisted with IRB, project materials, and project design, attended research team meetings, contributed to presentations, guided interpretation of the data, helped draft documents and the current manuscript, engaged in strategic planning surrounding the long-term partnership, and disseminated information to the stakeholder community. Budget planning and time commitments were discussed with each stakeholder, who provided a letter of support to align expectations, ensure equity and transparency, and ensure fair compensation. Each stakeholder was compensated for their involvement on the scientific advisory board.

Survey of the Stakeholder Population

Participants were people currently working in a New Orleans food service occupation who completed a survey about their experience dealing with the pandemic. Study data were collected at the tail end of the Omicron BA.1 surge, from February 2022 through April 2022. Participants were recruited via word of mouth, email, and social media, and the research team confirmed occupational eligibility through a conversation about their work. They completed the survey online via Qualtrics. The survey assessed health and safety precautions, the stress and mental health effects of the COVID-19 pandemic, long-term health and social impact of COVID-19, and other pandemic-related concerns. Participants were compensated with a $25 gift card for completing the survey.

Focus Groups

The research team conducted three sets of focus groups from April 2022 to October 2022. Each focus group corresponded to one of the three identified problem areas affecting frontline essential food service workers and their families: COVID-19 health and safety precautions (April 2022), stress and mental health (June 2022), and the long-term impact of the pandemic (October 2022). We sought to involve stakeholders most committed to each meeting's specific problem area. Focus group meetings lasted

approximately one hour each and occurred at times convenient for stakeholders. The focus group meetings were facilitated by the lead investigator (MH) and held remotely via Zoom to ensure safety during the pandemic. Participants were compensated with a $100 gift card for participating in a focus group.

The first focus group topic focused on health and safety issues, surrounding vaccination and other COVID-related precautions. Due to high interest in the first focus group, we split participants into two subgroups held separately, one in the evening, and one the next morning. Attendees selected which time to attend. The groups discussed difficulties (e.g., biggest challenges, difficult decision-making), successes (e.g., things that have gone well), and areas for future improvement (e.g., needed resources) in relation to COVID-19 health and safety precautions.

The second round of focus groups focused on stress and mental health during the COVID-19 pandemic. The meeting discussed challenges (e.g., negative feelings, stressors), successes (e.g., financial support, local initiatives, empathy and understanding), and areas for future improvement (e.g., access to mental healthcare, support groups) in relation to stress and mental well-being.

The third round of focus groups discussed perceptions, thoughts, or opinions on long-term impacts of the COVID-19 pandemic on food service workers. The meeting discussed long-term impacts on health (e.g., long COVID-19 symptoms, long-term health needs), financial status and career goals (e.g., challenges, goals, resources, and strategies), and other items (e.g., inflation, mistreatment, attitudes).

Each meeting was audio-recorded and transcribed for the purpose of analysis. The research team coded transcripts in Atlas.ti using thematic analysis, an iterative process that allows researchers to identify and refine themes within the data. Codes, coded transcripts, and emerging themes were reviewed by members of the research team to ensure agreement. In the instance of disagreement among research team members, concepts were discussed until consensus was reached.

Rapid Qualitative Assessment

The research proposal stipulated that the research team would conduct a rapid qualitative assessment focused on a key issue or setting that stakeholders identified in the survey or focus groups as paramount. The flexibility surrounding the key issue was intentional, given the inherent uncertainty of the course of the pandemic. The assessment was conducted near the end of the project (December 2022 to January 2023) to maximally inform the next steps of planning for future research.

Stakeholders and the academic scientists agreed that the assessment should focus on understanding and supporting the stakeholder population in grappling with a key issue lingering in late 2022: reducing the in-home spread of COVID-19 when a family member or housemate tests positive. Each assessment asked participants to describe their occupation or expertise and answer five open-ended questions, taking 10–20 minutes total. We approached this issue bidirectionally. First, food service workers completed a rapid qualitative assessment about their experiences attempting to avoid in-home transmission, challenges, and areas of uncertainty. Specifically, they were asked to describe their biggest challenges

surrounding reducing in-home transmission, tips and challenges using key COVID-19 mitigation approaches, tips and challenges communicating with others about the rationale for behavior changes, advice requested from experts, and other comments. Second, a national panel of COVID-19 mitigation experts who were colleagues of the corresponding author completed a parallel assessment advising on best practices for reducing in-home transmission and handling social interactions. They were provided a scenario of a working-class two-parent family with children ages 3, 5, and 7, and asked what they would recommend the family do if the 3-year-old tested positive. Follow-up questions varied the ages of the children to make them older (i.e., 13, 15, and 17), asked about recommendations for single-parent families, asked about recommendations for higher-income families, and any other comments.

Results

Survey of the Stakeholder Population

Participants (N = 23) ranged from 19 to 58 years old (Mean, SD = 35.35 [9.60]), with 52.2% female, 56.5% non-Latino/a white, 47.8% having a college degree, 39.1% married or living with a partner, 60.9% employed full-time in the food services industry as opposed to part-time. They worked in their current job for an average of 3.10 (SD = 3.53) years and had been in the food service industry for an average of 7.28 (SD = 3.28) years, with nearly half (47.8%) having over 10 years of experience working in a food service-related occupation.

Participants experienced widespread concerns related to health and safety precautions, stress and mental health, and the long-term impact of the COVID-19 pandemic (Table 1). Regarding employer-provided health and safety benefits, most employers took droplet precautions (free soap, hand sanitizer, and gloves, 56.5%-73.9%) but did not take airborne precautions (CO_2 monitoring, HEPA filters, free high-quality masks, 4.3%-21.7%). Although employers encouraged food service workers to stay home when sick (69.6%), few provided paid sick leave (21.7%) nor comprehensive health benefits (mental health, vision, dental, and health insurance, 8.7%-39.1%). Job satisfaction was modest (3.66 on a 1–5 scale), and they estimated that many co-workers were dealing with financial concerns, a history of a COVID-19 infection, mental health concerns, and Long COVID (8.0%-71.3%).

Table 1
Results from Food Service Worker Survey Following the BA.1 Omicron Surge

Survey Result	Statistic
Employer-provided health and safety benefits, No. (%)	
Free hand sanitizer, well stocked	17 (73.9%)
Encouraged to stay home when sick	16 (69.6%)
Free soap, well stocked	15 (65.2%)
Free gloves	13 (56.5%)
HVAC (heating/air conditioning) system is well-maintained	10 (43.5%)
Health insurance	9 (39.1%)
Free cloth masks	9 (39.1%)
Free surgical masks	9 (39.1%)
Free COVID-19 testing	7 (30.4%)
Paid sick leave	5 (21.7%)
Free high-quality masks, e.g., N95, N99, N100, KN95, KF94	5 (21.7%)
Dental insurance	4 (17.4%)
Vision insurance	3 (13.0%)
Mental health services/counseling	2 (8.7%)
HEPA filters are provided in areas with many people	1 (4.3%)
CO_2 monitor is used to assess indoor air quality	1 (4.3%)
Job satisfaction (α = .89), average rating from 1 (low) to 5 (high), M (SD)	3.66 (0.89)
Estimate, percentage of co-workers dealing with a concern, M (SD)	

Survey Result	Statistic
Financial concerns related to the pandemic	71.3% (32.0%)
History of COVID-19	53.1% (28.6%)
Mental health concerns	46.0% (34.8%)
Long COVID	8.0% (12.8%)
Estimate, whether any co-workers experience decision fatigue by area, No. (%)	
What to do if possibly sick with COVID-19	20 (87.0%)
What to do if a family member is diagnosed with COVID-19	19 (82.6%)
How to interact with customers about showing proof of vaccination	19 (82.6%)
When to return to work after COVID-19	19 (82.6%)
What to do if a family member may have COVID-19	18 (78.3%)
What to do if diagnosed with COVID-19	17 (73.9%)
How to interact with customers who dislike vaccines	17 (73.9%)
How to interact with customers who dislike masks	16 (69.6%)
When a child should return to school after COVID-19	15 (65.2%)
How to find at-home rapid tests	15 (65.2%)
Type of mask to wear	14 (60.9%)
Whether to get vaccinated against COVID-19	14 (60.9%)
Which COVID-19 vaccine to get	14 (60.9%)
Whether to get a booster	14 (60.9%)

Survey Result	Statistic
How to deal with family members who have different levels of COVID-19 precautions	12 (52.2%)
What to do if their kid's school lacks COVID-19 precautions	12 (52.2%)
What precautions to take when visiting an older family member who lives outside the home	12 (52.2%)
Whether to wear a mask	12 (52.2%)
Whether to use at-home rapid tests	8 (34.8%)
What masks their kids should wear	7 (30.4%)
How to monitor indoor air quality	5 (21.7%)
How to manage ventilation, windows or HVAC	4 (17.4%)
How to manage air filtration with HEPA or other portable air filters	3 (13.0%)
Vaccination status, No. (%)	
None	1 (4.3%)
Johnson & Johnson, 2 shots	1 (4.3%)
Moderna, 2 shots	2 (8.7%)
Pfizer, 2 shots	5 (21.7%)
Any combination of 3 shots	14 (60.9%)
Received a COVID-19 vaccine dose in the past 6 months, No. (%)	20 (87.0%)
All eligible members of household receiving a vaccine, No. (%)	20 (87.0%)
Anyone in household too young to receive a vaccine, No. (%)	4 (17.4%)
Perceptions of vaccine safety, 0 (unsafe) to 10 (safe), M (SD)	8.87 (1.84)
Likely or extremely likely to recommend COVID-19 vaccines to others, No. (%)	20 (87.0%)

Survey Result	Statistic
Before vaccines, concern about getting COVID-19, No. (%)	
Not at all	1 (4.3%)
A little	0 (0.0%)
Moderately	5 (21.7%)
Very	17 (73.9%)
Present concern about getting COVID-19, No. (%)	
Not at all	4 (17.4%)
A little	12 (52.2%)
Moderately	5 (21.7%)
Very	2 (8.7%)
Extent the pandemic has negatively affected one's mental health, No. (%)	
Not at all	0 (0.0%)
Very little	2 (8.7%)
Somewhat	10 (43.5%)
To great extent	11 (47.8%)
Extent discussing mental health is stigmatized in the food services, No. (%)	
Not at all	2 (8.7%)
Very little	3 (13.0%)
Somewhat	11 (47.8%)
To great extent	7 (30.4%)
Ease of access of mental health care among food service workers during the pandemic, No. (%)	
Easy	2 (8.7%)

Survey Result	Statistic
Neutral	3 (13.0%)
Difficult	10 (43.5%)
Very difficult	8 (34.8%)
"Most pressing" COVID-19-related mental health concerns among food service workers, No. (%)	
Anxiety and worry	22 (95.7%)
Depression and sadness	18 (78.3%)
Substance use	16 (69.6%)
Loneliness	11 (47.8%)
Anger	11 (47.8%)
Bereavement	6 (26.1%)
Suicidal thoughts	4 (17.4%)
Violence and abuse	4 (17.4%)
"Primary Sources" of anxiety related to the pandemic, No. (%)	
Uncertainty about when things will return to normal	19 (82.6%)
Making ends meet financially	17 (73.9%)
Getting COVID-19	17 (73.9%)
Family members getting COVID-19	15 (65.2%)
Loss of income during recommended quarantine if getting COVID-19	12 (52.2%)
Job loss	11 (47.8%)

Survey Result	Statistic
Missing work	11 (47.8%)
Having to work regardless of having symptoms	10 (43.5%
Businesses shutting down	9 (39.1%)
Lack of guidance from institutions	8 (34.8%)
Schools closing	5 (21.7%)
Finding childcare	2 (8.7%)
Coping	
COPE Emotional support, 1 (low) to 4 (high), M (SD)	3.09 (0.65)
COPE Instrumental support, 1 (low) to 4 (high), M (SD)	2.87 (0.91)
Self-medicating, 1 (low) to 4 (high), M (SD)	2.52 (1.31)
COVID-19 Stress Scale, 1 (low) to 5 (high), M (SD)	2.90 (0.76)
PROMIS Life Satisfaction, 1 (low) to 7 (high), M (SD)	5.00 (1.41)
PROMIS Meaning and Purpose, 1 (low) to 5 (high), M (SD)	3.99 (0.76)
Neuro-QoL, Satisfaction with Social Roles and Activities, 1 (low) to 5 (high), M (SD)	3.26 (1.16)
PROMIS, Sleep Disturbance, 1 (low) to 5 (high), M (SD)	2.87 (0.81)
PROMIS, Sleep-Related Impairment, 1 (low) to 5 (high), M (SD)	2.91 (1.15)
Level of concern among food service workers about long-term effects, 1 (not at all) to 4 (very), M (SD)	
Underemployment or reduced hours	3.22 (0.80)
Long-term unemployment	3.13 (0.87)

Survey Result	Statistic
Long-term mental health effects	3.04 (0.77)
Business closing or going under	3.04 (0.88)
Pay rate cut, e.g., reduced tips, hourly pay, or salary	3.04 (1.11)
Loss of insurance	2.87 (0.97)
Long COVID	2.83 (0.83)
Family financial concerns resulting from the COVID-19 pandemic	
Work hours cut	11 (47.8%)
Pay rate cut	10 (43.5%)
Postponed travel	10 (43.5%)
Short-term unemployment, 1–6 months	9 (39.1%)
Postponed medical or dental care	9 (39.1%)
Took an additional job	7 (30.4%)
Switched jobs	7 (30.4%)
Extra medical bills, >$500	7 (30.4%)
Loss of health insurance	7 (30.4%)
Extra expenses for comfort items, e.g., junk food, clothing, kids toys	7 (30.4%)
Difficulty making car payments	6 (26.1%)
Moving expenses	6 (26.1%)
Extra expenses for alcohol	6 (26.1%)

Survey Result	Statistic
Long-term unemployment, > 6 months	5 (21.7%)
Late rent or mortgage payment	5 (21.7%)
Difficulty paying for utilities	5 (21.7%)
Difficulty paying tuition or student loans	5 (21.7%)
Difficulty paying for food	5 (21.7%)
Lack of stable housing	3 (13.0%)
Major health or dental issue from delayed care	3 (13.0%)
Difficulty keeping phone service	3 (13.0%)
Difficulty paying for clothing	3 (13.0%)
Difficulty paying for medications	3 (13.0%)
Extra expenses for cigarettes	3 (13.0%)
Home eviction	2 (8.7%)
Car repossessed	2 (8.7%)
Extra travel expenses, >$500	2 (8.7%)
Temporary unemployment, < 1 month	2 (8.7%)
Awareness of someone personally in the food service industry dealing with a symptom or side effect > 3 months after getting COVID-19 that the participant attributed to the virus	
Fatigue or overtired	15 (65.2%)
Anxiety	13 (56.5%)
Depression	12 (52.2%)
Loss of taste	11 (47.8%)

Survey Result	Statistic
Difficulty sleeping	11 (47.8%)
Headache	9 (39.1%)
Attention difficulties	9 (39.1%)
Loss of smell	7 (30.4%)
Cough	7 (30.4%)
Joint pain	6 (26.1%)
Sick to one's stomach	6 (26.1%)
Pain	5 (21.7%)
Difficulty breathing	5 (21.7%)
Digestive problems	4 (17.4%)
Weakened lung capacity	4 (17.4%)
Weight loss	3 (13.0%)
Chest pain	2 (8.7%)
Sweats	2 (8.7%)
Occasional fever	2 (8.7%)
Vomiting or throwing up	1 (4.3%)
Hair loss	1 (4.3%)
Memory loss	1 (4.3%)

Overall, food service workers faced considerable burdens related to health decision making. Employees struggled with what to do if they or a family member were sick or testing positive (73.9%-87.0%), how to deal with customers surrounding precautions (69.6%-82.6%), testing concerns (34.8%-65.2%), masking (30.4%-69.6%), vaccinations (60 – 9%-82.6%), and reducing transmission risk within one's family (30.4%-82.6%).

Food services workers viewed vaccines positively. They were highly vaccinated (95.7%, 87.0% receiving a dose in the past 6 months). Participants' households were highly vaccinated. They viewed vaccines as safe, would recommend them to others, and were "very" concerned about COVID-19 before vaccines but less so after (73.9% vs. 8.7%).

Participants described the pandemic as negatively affecting mental health, that mental health was stigmatized, and that mental healthcare access was very difficult. They estimated that the most pressing mental health concerns among food service workers were anxiety (95.7%), depression (78.3%), and substance use (69.6%). As well, 17.4% of respondents identified suicidal ideation as the most pressing concern among food service workers, and another 17.4% reported violence or abuse as a pressing concern. The leading primary sources of anxiety were the uncertainty of when things would return to normal (82.6%), financial concerns (up to 73.9%), and getting COVID-19 (73.9%). Ratings of personal coping, stress, life satisfaction, meaning and purpose, social satisfaction, and sleep quality were highly variable.

Food service workers were variable in terms of the key areas where they observed long-term consequences of the COVID-19 pandemic. Key long-term concerns included underemployment/unemployment, mental health, business closures, pay cuts, insurance loss, and Long COVID (means of 2.83 to 3.22 on a 1–4 scale). The most common financial concerns of food service workers and their families included hour cuts, pay cuts, postponed travel, short-term unemployment, and postponed medical and dental care (39.1%-47.8%). Other standout concerns include extra medical bills surpassing $500 (30.4%), extra alcohol expenses (26.1%), long-term unemployment > 6 months (21.7%), late rent/mortgage payments (21.7%), difficulty paying utilities (21.7%), home eviction (8.7%), and car repossession (8.7%). When participants were asked whether they were personally aware of someone in food services experiencing Long COVID symptoms, top reported concerns were fatigue, anxiety, depression, loss of taste, and difficulty sleeping (47.8–65.2% of participants aware of someone experiencing such symptoms).

Focus Groups

The first focus group (N = 11) was split into two subgroup meetings (n of 4 and 7) and focused on COVID-19 health and safety precautions (Table 2). Key challenges included conflicts with customers, limited business due to closures and then reduced demand, personal challenges surrounding health decision making, and a lack of workplace support. Key successes included city safety precautions, workplace safety precautions, and some of the available resources. Areas for future improvement were maintaining mandates, financial support, the dissemination of information, and improvements in benefits.

Table 2

Summary of Themes in Focus Group 1 on COVID-19 Health Safety and Precautions

Theme	Description	Quote
Challenges		
Conflict with patrons	Participants described difficulty enforcing city-wide mandates, leading to conflict with patrons that often resulted in name-calling and anger directed at food service workers.	"When the vaccine mandate was enacted, we had to check the vaccination cards, and that was really hard. People fight us, telling us how it's just theater and stupid." "It was difficult having to be like a covid police." "Asking people for their vaccine cards, I've been called a Nazi, and a lot of name calling." "People just needed a place to vent and a person to be angry at, and we [food service workers] were those people."
Limited business	Participants described the limited indoor dining options and staffing challenges that took a toll on business.	"In the beginning, it was really hard for us when there had to be a six feet distance between tables. Some parts of our restaurant had barely six feet between two walls. If we could only see every other table, it severely impacts the number of heads that we can serve one night." "I remember during omicron, some restaurants had to close because all the employees were sick, out, and tested positive."

Theme	Description	Quote
Challenges		
Personal challenges	Participants described their confusion around COVID-19 tests, vaccines, and symptoms which resulted in challenges for decision-making. They often were worried about putting family members at risk. Some pointed out the financial difficulties that they faced to be the biggest challenge during the COVID-19 pandemic.	"As a small business owner, if we caught covid, we would have to close for two weeks which means two weeks of no pay." "Before vaccinations, you had to choose between putting yourself at risk or not making money which was definitely challenging." "When Omicron first started, some people were testing negative one day and then testing positive the day after. It was really hard to figure out what to do." "When my older kids went back to school and got sick, we were not sure if they had a cold or covid. So the youngest one had to get tested several times." "I haven't seen my own mother in three years now. I just feel like working in a restaurant will always be too much of a risk."
Lack of workplace support	Participants expressed frustration about lack of abiding to health policies, not feeling heard by managers or employers, and being dismissed when talking openly with their managers or employers.	"I have a daughter that's a hostess at a restaurant. When she was having symptoms, her boss asked her not to get tested for covid." "When I felt crappy, everybody at work just kept me there because they needed me to stay." "It was just a bunch of not regulated, not stringent boundaries. What happened is we found out about covid at work after the fact, and then the manager would say things like oh well it's fine. When we said we wanted to go get tested, it was a problem for him as an employer."
Successes		
City safety & precautions	Participants feel supported and protected by the city-wide implementation of safety and precautions, such as masking, during the pandemic.	"Hundred percent supported the city's mask mandate and vaccine mandates. It did make me feel safer at work, even after we understood that there would be breakthrough cases."

Theme	Description	Quote
Challenges		
Workplace safety & precautions	Participants feel supported and protected by their workplaces' implementation of safety precautions, such as providing health insurance and requiring vaccination, during the pandemic.	"My current employer requires all employees to be vaccinated, which I appreciate. It makes me feel a little bit better about working there." "I was very lucky that they [my employer] provided tests for us if we felt symptomatic." "Restaurant I worked at got us health insurance. It's really nice to work in an environment where they say to not come in if you feel sick. They're also working on getting us paid sick days now. But I do think that's bare minimum human decency."
Availability of resources	Participants described that resources such as unemployment benefits or mutual aid, free school lunch, and community-based resources were helpful during the pandemic.	"In the service industry, we eventually did get some unemployment and financial help, which I thought was really good." "I know mutual aid became a much bigger thing and I became aware of mutual aid organizations after getting laid off during the pandemic." "I appreciate that my kids are able to go to school and get free lunch. Not having to worry about paying or packing lunch is something good that happened from covid." "Even though I haven't utilized it, I know that people are trying to keep community fridges and pantries full during the pandemic, and I hope that people who need them are able to access them."
Future Improvements		
Maintaining Mandates	Participants would like to continue or reinstate city-wide and workplace mandates and wish to see improvements in mandating safety precautions.	"I would like to see mask mandates if there's a future pandemic." "Bringing back the mask and vaccine mandates is always going to be on the table."

Theme	Description	Quote
Challenges		
Financial Support	Participants describe the value of financial support and wish to continue and expand support in the future.	"Financial help is always always welcomed. Just like the stimulus really helped me through it." "Housing should be part of the financial support too, especially in New Orleans. People are being kicked from their homes because they don't have the money to pay rent. It's incredibly difficult to secure your housing [during the pandemic]."
Dissemination of Information	Participants desire easier access to quality information and resources about the pandemic.	"I would definitely want to see more streamlined and more available local information. I felt like all the information was coming from a lot of places and there wasn't just one place to go for it."
Benefits	Essential workers express a need for benefits, such as health insurance, from their employers; a need exacerbated by the pandemic.	"I hope to figure out a way to get people health insurance." "For many reasons, there has to be a fundamental change for the restaurant workers. I was thinking about some kind of union and a livable wage."

The second focus group (N = 9) focused on stress and mental health concerns resulting from the pandemic (Table 3). Key challenges included emotional distress (guilt, hopelessness, and uncertainty), specific stressors especially related to their families, and mental health difficulties (substance use, anxiety, and depression). Key successes included financial support that – although limited – reduced stress, and social support from friends and family. The key area of need for improvement was access to mental healthcare.

Table 3
Summary of Themes in Focus Group 2 on Stress and Mental Health

Theme	Description	Quote
Challenges		
Emotional distress	Participants described their emotional distress during the COVID-19 pandemic, including feelings of guilt, helplessness, and uncertainty.	"One time I didn't feel well but I had tested negative so I worked a shift because my symptoms were similar to allergies, lots of sneezing and congestion. For me, it came with a lot of guilt, thinking 'Oh my god, I just potentially exposed 60 people and a lot of them are old.' I felt really bad because I made a lot of money while putting 60 people at risk."
		"During the pandemic, there's this uncertainty like there's no control over who gets covid and who doesn't. There's also no control over who gets vaccination and who doesn't or who wears a mask and who doesn't. Because you have no control over pretty much anything except yourself, it causes a lot of stress."
		"Even if I was following all the rules, there were all these people who were not following the rules. So there was very little actually in my control about what was happening to me and my safety. That was probably the biggest drain on my mental health."
Stressors	Participants described issues that were most stressful for their families, households, and schools in dealing with the pandemic, including staffing, changes in protocols, and constant trauma.	"For cafeteria workers, it was a huge stressor for everyone to adapt to enormous changes at the last minute. The cafeteria staff and the teachers had to pivot from eating in the cafeteria to eating in the classroom when covid protocols came into place. That was a whole new skill set that cafeteria staff had to learn immediately. And there was a short period of flip flopping back and forth."
		"So many people have left the industry during covid, so there are a lot of people now who are being given tasks and roles that maybe they're not necessarily prepared for. So I think that causes a lot of acute stress at the moment just trying to push the food out."
		"The whole lockdown and pandemic caused trauma because we lost our loved ones and good friends. Then the hurricane hit which was like trauma on top of trauma. So there has been a lot of trauma that hasn't been addressed or taken care of when people have to go to work just to keep on going in their days as if nothing has happened."
		"There's a lot of uncertainty among people because you don't know what you're going to walk with every night. You could make 60 bucks or you could make 300 bucks. It's really hard to count on that, so I think financial stress has been a huge source of anxiety for people."

Theme	Description	Quote
Challenges		
Mental health difficulties	Most participants strongly agree that substance abuse and addiction are prevalent among food service workers. Anxiety and depression are also described as common mental health issues in the industry.	"The elephant in the room with the service industry is addiction, and that's the number one biggest mental health issue in the industry. I'm sure we all know people that we've worked with who died of a drug overdose. I'm not sure how much of it is self-medication because we don't have access to mental healthcare but it's definitely a huge huge problem." "I had one patient that his anxiety significantly improved after the vaccine mandates were dropped because that was one of his biggest anxiety producing things, having to do that at the door and having people fight him." "For addiction, people use alcohol to numb after a long day a lot of times. You kind of forget about how your body hurts, aches, and pains in the drink and think you can do it again."
Successes		
Financial support	Participants agreed that being financially supported helped to mitigate their stress and support their mental health.	"The fact that the pay rate has increased decently is something that has been better." "I worked for a restaurant, and after hurricane Ida, they paid us $250 a day which helped a lot. It was a huge support because I was able to pay my bills and everything." "I think the mutual aid that cropped up and is still happening in places was really huge and very affirming."
Social support	Participants highlighted that the pandemic resulted in more communication, flexibility, and empathy from people.	"I would agree that the pandemic definitely helped some people because some restaurants realized that they need to take better care of their staff." "People in general have been more understanding of you. And there has been some flexibility like mental health days." "Communication has been a little better just on a day to day basis with people."
Future Needs		

Theme	Description	Quote
Challenges		
Mental healthcare	Participants express a need for access to mental health services. Participants also agree that support groups or workshops would mitigate stress and mental health issues exacerbated by the pandemic.	"If I could do it, I would love to provide healthcare that is provided through restaurants. ECM access to mental health professionals right now is extremely difficult." "I think people would be interested in a program mixture of traditional therapy and urgent care where people could regularly meet but also pop in when they're dealing with crises. Since telehealth is huge now, it could be helpful too." "For people who may experience substance abuse due to stress, I was thinking that support groups could be helpful." "It would help if the restaurants would not put a black mark on somebody who needed help in that area [substance abuse] and allow them the dignity to come back to work. I think it's important that a person can work on something they need without being ostracized and not get their job."

The third focus group (N = 6) focused on the long-term impact of the COVID-19 pandemic (Table 4). The key issues related to health impacts were Long COVID, reinfections, and the role of employer support. Key issues related to financial and career impacts included repercussions of the larger economy, changing career plans, extra income sources, and changes in the employer's financial strategy.

Long Term Impact of COVID-19		
Theme	Description	Quote
Health Impact		
Long COVID symptoms	Participants described the Long COVID symptoms that workers in the food service industry experienced and how those impacted their lives. Most commonly discussed symptoms include breathing problems, loss of taste and smell, and weakened immune system.	"I know people who have breathing problems after getting covid that they didn't have before. And one person actually got asthma." "I have a friend, a server who said that she can't taste wine anymore. She lost the flavor profile so she can taste that something is alcohol but not the kind of taste. She said she can't pick up any nuances anymore. The idea of not being able to taste wine is deeply troubling to me. I can see that really affecting someone's career and finances." "I have had covid twice and since then I feel like covid weakened my immune system. I am more susceptible to being sick now."
Reinfections	Participants notice and express concern for contracting COVID-19 more than once.	"I've noticed that people are getting reinfected multiple times. I worked with a young lady who got covid for the fourth time and was still coming to work."
Role of employer support	Participants have positive experiences when supported by their employers (i.e., tip pooling, health insurance, sick days), but also describe there can be a "lack of safety net" for their health without this support.	"We decided to tip pool. We take all of our tips and put them all together, and we all get paid the same wage and have five sick days a year. The way that works for us is that if we need a sick day, we're a part of the tip pull for that day. Then we will get paid whatever everyone else does for that day." "I started working somewhere that had been offering the employees health insurance since the pandemic." "We still lack health care insurance and sick days. All these mean that we don't have some sort of safety net."
Financial/Career Impact		

Long Term Impact of COVID-19		
Theme	Description	Quote
Repercussions of larger economic stress	Participants noticed the negative economic impacts, such as inflation and shortages of food, creating negative financial stress for those in the food service industry.	"The restaurant I worked at during the worst of covid was located in the convention center. But there was no convention. I think for people who work in certain sectors of downtown, you're pretty reliant on the tourism industry, and it was just gone." "The inflation and shortages of food are horrible. Now it's like how do you make a profit?" "Working at places where other service industry people hang out, we've seen the effects of all of us not making any money. Service workers don't spend at those places anymore and they were the best tippers to other service industry people. So we've lost a big chunk of our income from us."
Changing career plans	Participants described changes in their career plans due to financial necessity such as returning to school for further education or finding a new position.	"The pandemic accelerated me to wanting to get out of the service industry. If it wasn't for the pandemic, I would be comfortable making that money and doing things that I wanted to do for awhile, but when covid happened, I thought I should go to school and figure something out. This is not stable." "I just started a new job myself, and almost every single person that I've spoken to in the last couple of weeks were in the process of their next career jump."
Extra income sources	Participants described ways to diversify their income sources during the pandemic including finding a side job or taking more shifts.	"I think one of the things that people have realized in the service industry is to branch out and diversify the income streams." "I've been working more, picking up more shifts."

Long Term Impact of COVID-19		
Theme	Description	Quote
Changes in employer financial strategy	Participants described feeling supported by many of the financial strategies implemented by their institutions during the pandemic (i.e., tip pooling, connecting on social media).	"At my restaurant, they instituted an auto-gratuity during the pandemic. I know that there's a lot of pros and cons but it actually makes me a better server because I'm not worried about whether I'm going to make my money." "It seems like pooled houses work really well in terms of teamwork because all staff work together for the same amount of money." "Pooling tips gets rid of the power dynamic between the kitchen workers and people at front of the house as well as a customer." "I saw a restaurant on Facebook that made a post asking people to please come eat with them because they were not doing well. As a restaurant owner, I know it's a lot of pride to put that on Facebook."

Rapid Qualitative Assessment

Food service workers (N = 7) completed a rapid qualitative assessment focused on key challenges surrounding themselves or someone in their home testing positive, and COVID-19 mitigation experts (N = 8) provided insights into various mitigation strategies aimed at reducing the likelihood of transmission (Table 5). For food service workers, key challenges included reducing in-home COVID-19 transmission, navigating work, school, and other social interactions, using different approaches to limit the spread of COVID-19, and making informed decisions about appropriate COVID-19 precautions. Specifically, food service workers expressed concerns about balancing financial risks of prolonged isolation with safety, sought guidance on reducing transmission both at home and in the workplace, and managing the stress and mental health challenges associated with the pandemic. The workers emphasized the need for clear guidelines and support systems to navigate these complex situations, particularly in decision-making about when to drop precautions and return to work without compromising safety.

Table 5
Summary of the Rapid Qualitative Assessment on COVID-19 Mitigation: Perspectives from Food Service Workers and COVID-19 Mitigation Experts

Scenario	Theme	Examples
Food Service Workers		
Challenges if you or someone in your home were to test positive for COVID-19	Financial	"Navigate the financial ramifications of missing work as a service industry professional if infected"
	Household safety	"Keeping my family from becoming sick"
		"Not having enough non-shared rooms to properly distance at home"
	Work impact	"Employers don't really care anymore about who's been exposed or about making people work while they're sick."
	Exposure	"Ensuring that I don't become infected and transmit the illness to others at work."
	Mental health	"Dealing with anxiety to keep my child safe from catching COVID"
Tips and challenges about COVID-19 mitigation strategies	Guidelines	Challenges: "Hard to keep up with constantly changing guidelines from the CDC, state, city"
	Precautions	Tips: "Maintaining social distancing and reintegrating with mask use seems really beneficial even if someone tests positive."
	Resources	Challenges: "Running out of covid tests at the testing sites was a constant pain."
		Tips: "It would be great if air purifiers were used in public spaces"
	Household safety	Challenges: "It is hard to stay distant from your child who has covid. You want to protect yourself but you also don't want your loved one to feel alone."
	Mental health	Challenges: "The constant arguments with guests in order to get them to comply with policy was a constant stress adding factor."
Tips and challenges about COVID-19 precaution and decision-making	Work issues	Challenges: "Last year my coworkers thanked me when I still masked after being exposed or when I was feeling sick. Now I've had coworkers mock me for doing so."
		Challenges: "People at work catch COVID but precautions are not taken seriously to avoid spread."
	Social interaction	Challenges: "It always throws me for a loop when I'm casually discussing what I consider to be basic human decency and someone responds with annoyance. It's baffling and discouraging."

Scenario	Theme	Examples
Food Service Workers		
	Precautions	Challenges: "Not knowing the views of other people regarding COVID and the precautions that they are taking. It's intimidating."
		Challenges: "I feel as though people have truly become laxed in how they respond to covid in the workplace and may not take the precautions we did two years ago."
COVID-19 Mitigation Experts		
In-home mitigation	Masks	Wear N95 respirators (masks) or P100/N100 elastomerics if finances permit.
	Filtration	Use HEPA filters or do-it-yourself (DIY) air cleaners called Corsi-Rosenthal boxes or SAFE air purifiers.
	Ventilation	Open windows. Use fans to blow clean air in. Use fans to blow infected air out of isolation rooms.
	Isolation	Create an isolation room at home. Family members testing negative stay outside as much as possible. The person who is ill should eat outside if possible.
Testing and Treatment	Testing	Get PCR testing if possible. Use at-home rapid-antigen tests too, or at-home loop-mediated amplification (LAMP) tests if finances permit.
	Treatment	Seek Paxlovid, monoclonal antibody treatment, or other early treatments, as guidelines recommend.
Community Involvement	Work issues	Take paid sick leave or paid time off, to the extent allowed. Look for possible remote work options to make up for financial gaps.
	Social support	Reach out to family and friends to watch children while parents work, if needed. Reach out to local community resources for help.

COVID-19 mitigation experts recommended a multi-layered approach to reducing in-home transmission that included using high-quality masks (e.g., N95), improving ventilation by bringing in outdoor air where feasible, enhancing air cleaning through HEPA filters and do-it-yourself (DIY) air cleaners, such as Corsi-Rosenthal boxes. The experts also stressed the importance of testing, including PCR or rapid tests, to ensure accurate isolation for positive individuals. The experts suggested reaching out to friends, family, and local communities for additional support and exploring remote job opportunities in case of financial difficulties.

Discussion

This research has documented the pandemic-related concerns of food service workers surrounding health and safety, stress and mental health, and the long-term effects of the COVID-19 pandemic. The research also provided an illustrative example of CBPR by demonstrating success developing an academic-community partnership amid crisis. The project included retrospective reports of information dating back to the pandemic onset, as well as prospective data collection from September 2021 through February 2023, providing reasonably comprehensive coverage of the first 3 years of the pandemic from the perspective of New Orleans food service workers. Findings have implications for future research aimed at mitigating the lingering impact of the COVID-19 pandemic, future pandemics and health crises, and other airborne respiratory illnesses among individuals at high risk of occupational exposure.

Regarding COVID-19 transmission during the height of the pandemic, there was often a gap between what food service workers were offered and what was needed. Adhering to common public health guidance, employers provided precautions mainly against basic droplet transmission (e.g., soap, hand sanitizer, gloves, low-quality masks), rather than airborne transmission (e.g., high-quality masks, ventilation, filtration via air cleaners, and air-quality monitoring). However, COVID-19 is now widely accepted to transit predominantly through the airborne route (28–32), with White House COVID-19 Response Coordinator, Ashish Jha, MD, referring to COVID-19 transmission as "purely airborne" in October 2022 (33). This discrepancy between droplet precautions and airborne transmission helps explain why food services workers have experienced worse COVID-19 health outcomes than most other workers (1–11). Like COVID-19, many illnesses transmit through the indoor air people breathe (32). Recognizing the dangers of airborne illness transmission, the highest-ranking building engineering organization with 50,000 members in 130 countries, called the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), has published draft standards (to be finalized in summer 2023) for indoor air cleaning (34). The draft standards indicate that restaurants and similar establishments should clean the air approximately 26.7 times per hour (20 liters per second per person) to reduce airborne illness transmission, nearly double the historic standard of 15 air changes per hour in U.S. operating rooms, and a firm indication of the occupational hazards of food service work. More research is needed to improve health and safety for food service workers, particularly during airborne illness crises.

Similarly, food service workers experienced a gap between what was offered and what was needed with regard to other COVID-19 health and safety concerns, stress and mental health, and the long-term impact of the COVID-19 pandemic. Regarding health and safety, employers encouraged food service workers to stay home when sick, but did not always provide free tests, guidance on testing, paid sick leave, or even health insurance. In general, food service workers faced challenging decisions surrounding vaccinations/boosters, masking, testing, isolation, quarantine, and how to reduce in-home transmission. Additionally, participants indicated key concerns surrounding stress and mental health, especially related to anxiety, depression, and substance use and called for more mental health support in the community. Food service workers also indicated that they were experiencing long-term consequences of the COVID-19 pandemic in terms of mental health, Long COVID, and financial strain. Overall, food service workers were under-supported, often provided the 'wrong' tools or no tools at all, with broad impacts on health and mental health in the short- and long-term.

This research had strengths and limitations. The key strengths were stakeholder-engagement, community-centeredness, the use of multiple methods of assessment to triangulate priorities and capture variation over the course of the pandemic, and the innovation of responding to the pandemic in real-time, submitting a funding proposal in May 2021, when many thought the pandemic was "over," instead of in a low point before viral evolution that produced the Delta variant, Omicron variant, and many Omicron subvariants. Limitations include the small sample sizes that are common when gathering detailed and sensitive information, the subjectivity of participants' perspectives, and the dynamic nature of the pandemic, which means that findings at one point in time may be less relevant at a future timepoint.

Future research should focus on evaluating interventions to support the top concerns identified by stakeholders. In a world where most mitigation has been dropped, stakeholders universally cared about avoiding spreading COVID-19 within the home. At this point in time (June 2023), COVID-19 continues to transmit at a high rate, with U.S. wastewater data suggesting 29% higher average transmission the past year than during the Delta wave (35). In-home transmission has remained a concern throughout the pandemic (36–38). Mitigation experts identified actionable interventions to reduce in-home spread when someone has illness symptoms at home, including opening windows, using fans strategically, using DIY air cleaners called Corsi-Rosenthal Boxes, wearing high-quality masks, and testing to end isolation periods. Although these interventions have underlying efficacy data (28–32, 39–46), the question remains whether these specific interventions would work in the context of a comparative effectiveness trial to reduce in-home transmission under community-based circumstances with less scientific control. Such studies would be of high value for people working in settings with high transmission risk (9, 10), as well as for vulnerable populations like people with cancer or who are immunocompromised (44, 47). Future studies should also examine interventions for reducing mental health concerns, like anxiety, depression, and substance use, as well as the financial strain exacerbated by the pandemic. This program of research would help reduce the pandemic impact experienced by people working in settings with high risk of exposure.

Conclusions

In closing, this research provides an illustrative example of how to partner with stakeholders to conduct CBPR during public health crises and prioritize future research topics. The top priority for future pandemic research among food service workers was to reduce in-home transmission when someone in the family tests positive for COVID-19.

Abbreviations

ASHRAE = American Society of Heating, Refrigerating and Air-Conditioning Engineers; CBPR = community-based participatory research; COVID-19 = Coronavirus Disease 2019; DIY = Do it yourself; HEPA = high efficiency particulate air; SD = standard deviation

Declarations

Ethics Approval and Consent to Participate

The study was reviewed and approved by the Tulane University Institutional Review Board (IRB # 2021-910). All participants provided informed consent to participate in the research. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

Funding

Authors' Contributions

MH, SA, JCC, KW, EN, AD, and CNB prepared the research funding proposal. MH and CNB submitted the funding proposal and served as dual principal investigators of the funded research. MH, KX, JCC, KW, EN, JM, TD, and CNB served on the scientific advisory board, which oversaw methodologic decisions and operational management of the research. MH, KX, and TP collected the data. MH, SK, BM, KX, and TP analyzed the data. MH, SK, BM, SA, KX, TP, AD, DZ, DR, NM, and CNB conducted the literature review and drafted the manuscript. All authors read, provided feedback on, and approved the final version of the manuscript.

Acknowledgements

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engagement. JCC, KW, JM, and TD are community stakeholders with expertise in the local food services industry, worker concerns, and family issues. SK, BM, SA, KX, TP, AD, DZ, DR, and NM are academic scientists in training focused on health, healthcare, and community outreach.

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