



Transformation in culinary behaviour during the COVID-19 pandemic: In-depth interviews with food gatekeepers in urban India

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ABSTRACT

COVID-19 and its associated regulatory measures including lockdowns, curfews, and physical distancing norms have significantly affected individual's dietary and culinary behaviours. Although there is ample empirical evidence available on dietary changes within the Indian context, very limited evidence exists about the factors influencing these dietary modifications and changes in culinary behaviours during COVID-19 lockdown. Therefore, the aim of this qualitative study was to explore the views of Indian household food gatekeepers towards meal planning, food purchasing, and meal preparation during the pandemic and its associated lockdowns. A convenience sample of 34 female gatekeepers from the Mumbai metropolis participated in online interviews. Interviews were conducted in English and Hindi (then translated in English), audio-recorded and transcribed verbatim. Underpinned by Template Analysis technique, transcribed data were analysed manually and using the NVivo software program. The interview structure guided the development of themes. The emerging themes included were: Increased household cooking; Involvement of children and male members in food-related activities; Experimentation in the kitchen; Adoption of meal planning skills; Increase in online food shopping; Bulk buying; Shortage of food items; Reduced consumption of outside home food; Increased variety of home-cooked meals; Increase in snacking and overall food intake; Determinants of food choices; and Family meals-a new norm. In the light of these findings, developing family-focussed, web-based nutrition programs to enhance gatekeepers' and their families' food literacy including declarative and procedural nutritional knowledge would be beneficial. The importance of organisational culinary behaviours such as planning meals in advance, shopping with a food list should be promoted to prevent hoarding and subsequently reduce strain on the food supply system. With a surge in domestic cooking, low cost nutritious recipes with the use of local and seasonal produce should be emphasized promoting healthy eating among the gatekeepers and their family members. The inclusion of food studies in the school curriculum will facilitate the development of culinary skills among children and youth. Also, there is a need for further research and surveillance to strengthen understanding of sustainability of healthy culinary behaviours practiced during the pandemic.

1. Introduction

The World Health Organization in March 2020 declared the Coronavirus outbreak as a global pandemic (World Health Organization, 2020). The Indian government initiated a nation-wide lockdown as a counteractive measure from March 25, 2020 to May 31, 2020 (Ghosh et al., 2020). According to the stringency index by Oxford COVID-19

Government Response Tracker (OxCGRT), this lockdown was identified as one of the most stringent lockdowns implemented worldwide (Hale et al., 2021). Citizens were given a 4-h notice to prepare for the restrictions to be imposed. This immediate closure policy caused disarray in many aspects of civilian life such as bottlenecks in the food supply chain (Narayanan & Saha, 2021).

The alarming rate of spread of the novel COVID-19 virus was cause

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for unprecedented changes in food availability and pandemic restrictions which resulted in an overall shift in food behaviors (Snuggs & McGregor, 2021). This led to Indian families hoarding food by identifying stores and points of purchase to stock up on food supplies considered as staples and essentials (Bandyopadhyaya & Bandyopadhyaya, 2021). Services of online food and grocery applications and local grocery stores were sought due to imposed social distancing norms and restrictions on physical movement (Bandyopadhyaya & Bandyopadhyaya, 2021).

Food skills such as meal planning and cooking have an impact on dietary practices (Murphy et al., 2021). The practice of home cooking has been ever changing in India witnessing a greater use of dine out and food ordering mobile applications (Roy & Zain, 2018). During the lockdown, Indians (Basu et al., 2020) like other population groups (Ben Hassen et al., 2020; De Backer et al., 2020; Murphy et al., 2021; Ronto et al., 2021) had developed a renewed outlook towards home cooking with available ingredients to suit the needs of all members in a family. Interestingly, food choice motivations over lockdown were identified amongst families in UK indicating family involvement as one of the key motivators in meal preparation during the lockdown (Snuggs & McGregor, 2021). Increased time spent at home due to flexible 'work from home' opportunities and high rates of unemployment have contributed to gravitating towards home cooking as cited in our recently published Australian study (Ronto et al., 2021). However, whether these reasons for increased household cooking are also applicable in the Indian context needs to be verified.

1.1. COVID-19 pandemic and diet in India

Several online surveys have been conducted in India to collect quantitative data on dietary intakes during the COVID-19 lockdown (Basu et al., 2020; Paul et al., 2020; Rawat et al., 2021). These surveys have been able to provide some insights to changes in diets of the Indian population (Basu et al., 2020; Paul et al., 2020; Rawat et al., 2021). For example, it was found that overall food consumption increased (Rawat et al., 2021), with enhanced preference for fresh produce like fruits and vegetables to boost immunity (Paul et al., 2020) as well increased consumption of sugar and fat (Rawat et al., 2021). This overeating was coupled with reduced physical activity resulting in weight gain (Rawat et al., 2021). These lifestyle changes have been linked with stress and psychosocial factors (Arora & Grey, 2020). Paul and colleagues further reported an increased intake of herbal tonics and vitamin supplements in their participants whereas few of their participants became vegans during confinement (Paul et al., 2020). Likewise, Basu and coworkers also reported a rampant use of ginger and garlic as well as multivitamins as immunity boosters by their surveyed participants (Basu et al., 2020).

Although there is ample empirical evidence available on dietary changes within the Indian context, very limited evidence exists about the factors influencing these dietary modifications and changes in culinary behaviours (e.g. meal preparation, meal planning, family meals, and grocery shopping). Therefore, the current study aims to gain an in-depth understanding of culinary behaviours of food gatekeepers in Indian households in Mumbai city during this unprecedented crisis. The views of household food gatekeepers are integral to this study as they have the biggest influence on the food behaviours of their family members that are related to food preparation, health, and food acquisition (Burton et al., 2017; Reid et al., 2009). In India, women have culturally served as nutritional gatekeepers at the household level (Rathi et al., 2017, 2020). In addition, this exploratory study aimed to identify food preparation behaviours that could be adopted among Indian families for healthier food consumption (e.g. greater intake of nutrient dense, low energy density foods; reduced intake of energy dense, nutrient poor foods) post COVID-19 and prepare for future disruptions.

2. Methods

2.1. Study design

The present study implemented a qualitative research design (Sandelowski, 2000) which was informed by the social constructivism paradigm (Creswell, 2014). Through this interpretative paradigm, the investigators aim to capture useful insights from participants' experiences and interactions with the members of the society (Creswell, 2014). The use of social constructivism framework in the current context proved valuable as it allowed the researchers to investigate the household food gatekeepers' experiences regarding meal preparation, food shopping, and meal planning during COVID-19 and its associated lockdowns in India. The research methodology described here has already been used previously in an Australian context with similar research objectives and study design (Ronto et al., 2021). The SMES's (Seva Mandal Education Society's) Institutional Ethics Committee approved the research protocol for this project in February 2021 (SMES/IEC/125).

2.2. Sample and recruitment

Indian household food gatekeepers were selected as informants for this study as they are primarily responsible for food-related activities including cooking, grocery shopping, meal planning in their respective households (Burton et al., 2017; Wijayarathne et al., 2018). Convenience sampling was used to recruit gatekeepers from Mumbai, India through professional links. None of the interviewees shared any kind of personal associations with the authors. Mumbai is a cosmopolitan city and therefore the study sample was expected to be representative of urban India rather than one particular state or region. Food gatekeepers were approached to participate in the study over the phone where the researchers provided a detailed description of the intended study. A recruitment pack including a Plain Language Statement and a Consent Form was sent to all the interested participants via email. Upon receipt of signed consent forms over email, the participants were asked to share their preferred time and day for the online interview with the researchers (LM & NR).

2.3. Data collection

Online, in-depth interviews were used to collect data on culinary behaviours between March and June 2021. Two interviewers (LM & NR – Fluent in both English and Hindi) facilitated the online discussion either in English or Hindi using Zoom. Prior to the commencement of the interviews, the gatekeepers were verbally informed that the conversation would be audio recorded and they were ensured of their right to confidentiality (King, 2004a). They were further notified that their participation was voluntary, and they could withdraw from the interview any time (King, 2004a). Data analysis was carried out simultaneously with the data collection which assisted the researchers in determining data saturation (Patton, 1990). Data saturation was reached at 30th interview as no new themes were reported. However, four additional interviews were carried out to confirm saturation of themes. The duration of the online discussions ranged from 12 min to 45 min. No gifts or inducements were provided to the interviewees for their participation.

An interview guide (Table 1) with a series of open-ended questions was designed and pre-tested with five informants to confirm the face validity of the interview guide. These questions were based on the study aim and the literature on culinary behaviours. Besides these questions, socio-demographic information on age, occupation, employment status, income, number of family members living in the household was also sought from the interviewees. Since, no modifications in the phrasing and deletions or additions were made in the interview guide, the pre-tested data were merged with data derived from the full-scale study.

Table 1
Open-ended questions posed to the household food gatekeepers.

Q1	Can you tell me about your culinary experience before and during lockdown?
Q2	What were the factors which impacted your meal choice during lockdown?
Q3	Can you explain about your food shopping experience before and during lockdown?
Q4	From which sources do you usually procure food on a regular basis (before and during lockdown)?
Q5	Did you face any food availability/accessibility issues during the lockdown? If yes, please discuss.
Q6	Can you explain about your meal planning behaviour before and during lockdown?
Q7	Can you tell me about your social eating dynamics (i.e. family mealtime) before and during lockdown?
Q8	Is there anything else you would like to add?

2.4. Data analysis

A professional transcription service was employed to transcribe and translate digital recordings verbatim; while two competent researchers (LM & NR) in both English and Hindi languages checked 25% of the translated transcripts to ensure the accuracy. Subsequently, all gatekeepers were invited to review their transcripts and provide feedback on accuracy and completeness of the transcribed information. Nevertheless, none of the gatekeepers provided any additional inputs. Adopting the Template Analysis technique (King, 2004b), the transcribed data were thematically analysed both manually as well as by using the NVivo 12 software program (QSR International Pvt Ltd. 2010). This technique of thematic analysis demonstrates rigor in qualitative study (Fereday & Muir-Cochrane, 2006) as it involves both the data-driven inductive approach (codes were found directly from the raw data) and the deductive approach of designing *a priori* template (codes are identified based on research questions and previous research). On the basis of a subset of data (20% of transcripts), four researchers (LM, DRC, RR, & NR) developed a set of codes ('template') representing themes derived from the interviewee accounts. Thereafter, the remaining transcripts were coded by two investigators (LM & NR) and the pre-defined 'template' was further modified, refined, and applied to the complete data set. Additionally, three professionals (one psychologist, one home economist, and one dietician) independently analysed a subset of five transcripts to confirm inter-rater reliability (Marques & McCall, 2005). In case of any discrepancy, the template was amended until a consensus was reached that the identified themes were representative of the transcribed information (Creswell, 2014). Moreover, the engagement of authors from different disciplines further minimised the likelihood of any personal or disciplinary biases. LM and DRC are nutritionists, RR is a public health professional, RS is a biochemist, SK is a medical doctor and NR is a Home Economist. Finally, the direct narratives from the interviewees were linked to the template themes and subthemes. A comprehensive analysis of the interviewees' culinary experiences associated with the themes and descriptive quotations is presented in the results section.

3. Results

3.1. Socio-demographic characteristics of the interviewees

Online interviews were conducted with 34 female primary food gatekeepers. The sociodemographic characteristics of the participants are presented in Table 2. Most of the gatekeepers were aged between 41 and 50 years of age. Half the gatekeepers (53%) had completed their undergraduate collegiate education. A similar proportion (50%) of the sample was employed before the lockdown was announced due to COVID-19; while the employment status reduced to 35% during the lockdown period. A large section of the sample (71%) reported reduction in the household income during lockdown. Based on self-reported household income, around three-fifth of the interviewees belonged to

Table 2
Socio-demographic characteristics of the primary food gatekeepers (N = 34).

	N (%)
Sex	Female 34 (100)
Age	21–30 years 2 (6) 31–40 years 8 (24) 41–50 years 21 (62) 51–60 years 3 (9)
Education	Middle school 2 (6) Highschool 8 (24) Undergraduate 18 (53) Postgraduate/Doctorate 6 (18)
Employment status before lockdown	Yes 17 (50) No 17 (50)
Employment status after lockdown	Yes 12 (35) No 22 (65)
Reduction in household income during lockdown	Yes 24 (71) No 10 (29)
Socio-economic class ^a	Upper Class 24 (73) Upper Middle Class 5 (15) Middle Class 1 (3) Lower Middle Class 3 (9) Lower Class 0 Did not reveal income 1
Children < = 16 years living in the household	0 13 (38) 1–2 21 (62)

^a (Khairnar et al., 2021).

upper class (Khairnar et al., 2021). Participants were from diverse regional backgrounds including Indian states of Gujarat, Maharashtra, Rajasthan, Delhi and Uttar Pradesh. All our participants were responsible for feeding their family members including children (both below and above 16 years), husbands, and in-laws residing in their households.

3.2. Themes

The interview structure guided the development of themes. A number of themes were developed through analysis of the 34 interviews which included: Increased household cooking; Involvement of children and male members in food-related activities; Experimentation in the kitchen; Adoption of meal planning skills; Increase in online food shopping; Bulk buying; Shortage of food items; Reduced consumption of outside home food; Increased variety of home-cooked meals; Increase in snacking and overall food intake; Determinants of food choices; and Family meals - a new norm. These themes were categorised into three groups of food-related behaviours as follows: i) Changes in cooking behaviours; ii) Changes in meal planning and food shopping behaviours; and iii) Changes in food choices and behaviours. These three groups along with their themes are described below. Representative quotes for each theme are presented in Table 3. Each quote is followed by a Participant ID, number of adults and children living in the household e.g. P4, 4A (4 adults), 1C (1 child less than 16 years of age).

3.2.1. Changes in cooking behaviours

3.2.1.1. Increased household cooking. The majority of the household food gatekeepers reported spending more time in the kitchen cooking homemade meals during the lockdown phase. Participants stated that the main reasons contributing to increased home cooking were increased availability of free time, the presence of all family members at home from morning to night and the preparation of all three meals i.e. breakfast, lunch, and dinner. As one of the gatekeepers explained:

"When you are free and all, we tend to think more about food and eating. So, we had free time and more time to cook food during lockdown ... Also all the members were at home from morning to night. So, comparatively

Table 3
Themes associated with culinary and dietary behaviours during the COVID-19 pandemic and associated lockdowns.

Themes	Illustrative quotes
Changes in cooking behaviours	
<i>Increased household cooking</i>	<p>“... In lockdown I had to cook more because everyone was at home and even the frequency of cooking food increased.” (P30, 4A, 1C)</p> <p>“Yeah, I started spending more time in the kitchen during lockdown.” (P22, 5A, 2C)</p> <p>“During lockdown there was more food preparation as the whole family used to stay at home.” (P1, 5A)</p> <p>“... Before the lockdown I had to cook only one main meal that is dinner ... But after lockdown I had to cook three meals since my husband was not going to office and son was not going to school and they were always hungry ...” (P33, 2A, 1C)</p>
<i>Involvement of children and male members in food-related activities</i>	<p>“... During lockdown my maid was not coming so everyone used to help little ... little ... for example, chopping vegetables and all ... my daughter used to knead the dough but earlier could not help as she had to go to college.” (P26, 4A)</p> <p>“... I cooked by myself but sometimes the men (i.e. husband and father-in-law) in the family helped in cutting vegetables ... Before lockdown they did not touch anything in the kitchen but during lockdown, they helped a lot.” (P27, 5A, 2C)</p>
<i>Experimentation in the kitchen</i>	<p>“After the Government announced lockdown, I was 24 h in the kitchen only making new items, trying new things ... I did baking and all, which I had never tried before and it was fun! Cakes, muffins, even ‘pav’ (bun) I made. So many things I tried ... I was watching YouTube, calling my friends, sisters, mother for the recipes.” (P15, 3A)</p> <p>“I tried baking a cake. I tried it for the first time. I didn’t try it before as I did not have so much time for it. So, lockdown was the only time wherein I could try something different in cooking like a cake which I wanted to try since a very long time.” (P21, 4A, 1C)</p> <p>“... We definitely tried many new varieties of dishes as consumption of outside food was stopped. So as per our mood to eat something tempting and new we used to cook it at home.” (P10, 4A)</p>
<i>Changes in meal planning and food shopping behaviours</i>	
<i>Adoption of meal planning skills</i>	<p>“Yeah, we used to decide beforehand only during lockdown like we will cook this in the morning or like we have this particular vegetable available so will cook it in the lunch. So, I did the planning because we had no other option, also there was free time... No...No... I never planned any meals before lockdown. Even in the morning if any ingredient was missing, the shops were always open, so it was not an issue. My husband used to go for morning walk so I used to tell him that please bring this particular thing while returning. So, it was not like this during lockdown. There was a huge change in the scenario.” (P23, 4A, 1C)</p> <p>“... we started making list. I used to visit the store once in 8 days ... Never prepared any list on normal days ...” (P3, 3A, 1C)</p>
<i>Increase in online food shopping</i>	

Table 3 (continued)

Themes	Illustrative quotes
	<p>“... I normally go once in 2 days for vegetables but during lockdown we didn’t have any other option so went once in a week to avoid contact with more people.” (P32, 5A)</p> <p>“... I tried to stock up for at least 10 days. For vegetables I use to bring more potatoes as they can be stored for longer period, and then adjust accordingly. I couldn’t go out as often as before ... We avoided going outside as much as possible.” (P13, 3A)</p> <p>“... Previously we used to go to malls and supermarkets quite often. It was fun going out like a stressbuster. But now there is fear of infection, social distancing; because when we go out there are so many people we meet and we come in contact with so many of them but we never know if they are infected ... so to avoid that we needed to be at home and go out less for shopping ...” (P15, 3A)</p> <p>“Before lockdown, we never ordered anything online but because of crowd and fear of infection we ordered stuff online from D-Mart (Name of supermarket)” (P4, 4A, 1C)</p>
<i>Bulk buying</i>	<p>“Yes, earlier in March I was in tension whether I will get the flour, dal (pulse), rice or not. So, I kept full stock of everything.” (P15, 3A)</p>
<i>Shortage of food items</i>	<p>“... I was not able to find biscuits because their stocks used to get finished very soon ... Sometimes I could not find apples, and so I had to buy other fruits like sapota and watermelon ...” (P26, 4A)</p> <p>“... We had an issue in getting fruits and vegetables. Some days no vegetables were available, so we had to prepare moong dal (Whole Green Gram Pulse).” (P1, 5A)</p>
Changes in food choices and behaviours	
<i>Reduced consumption of outside home food</i>	<p>“... The only change I felt was that we didn’t eat out for more than six months I would say. So, everything was cooked at home and therefore it was obviously healthier and more nutritious. We did not even order any food from the restaurant because of the fear of infection ... Definitely we missed eating outside food and especially my daughter missed it a lot.” (P12, 3A)</p>
<i>Increased variety of home-cooked meals</i>	<p>“Yes, there was a difference i.e. everyone wanted to eat different food items, so I had to try different recipes. Moreover, in ordinary days we can bring something from outside and eat it like a vada pav (a savoury item typical to Mumbai) or pizza, etc. but we were not getting these things during the lockdown but everyone wanted to eat it, so it was made at home. I made pizza, samosa ...” (P2, 3A, 1C)</p>
<i>Increase in snacking and overall food intake</i>	<p>“Snacking increased terribly!!! Basically, munching increased. I mean let’s have something since we are just sitting. If we are occupied with something, we tend not to feel hungry. Since, everyone was free at home, we used to play cards, and so we needed something for munching continuously, like popcorn, nachos, packaged food etc ...” (P9, 4A, 1C)</p> <p>“Yes, during the lockdown the need for everything had increased twice, like earlier snacks were made only once a day, but then</p>

(continued on next page)

Table 3 (continued)

Themes	Illustrative quotes
Determinants of food choices	<p><i>since everybody was at home and everybody was hungry, so we had to prepare more snacks ...</i>" (P6, 5A, 1C)</p> <p><i>"I tried so many new items so food consumption would have definitely increased as compared to earlier ..."</i> (P7, 3A, 2C)</p> <p><i>"... Meal portion had also increased ... Yes ... Yes ... we were eating more ... the quantity increased."</i> (P26, 4A)</p> <p>Health and immunity: <i>"By extra immunity boosters, I mean we were eating more salads, using more lemons ... means in the form of lemon juice or lemon sherbet (cordial) ... Secondly, we reduced spicy foods and avoided refined flour products like breads and other items."</i> (P21, 4A, 1C)</p> <p><i>"... Since there wasn't any physical exercise, I thought of preparing healthy stuff. I ensured not to use any refined wheat flour, sugar in cooking ... The dosas (a pancake prepared with rice and pulse batter) which I used to prepare with rice have been completely replaced with ragi (a millet with high calcium content) ..."</i> (P28, 3A, 1C)</p> <p><i>"Nowadays people are into fast food. I was the same but due to COVID I became health conscious and got into healthy eating like I started preparing and eating more veggies, fruits, green leafy vegetables and all ... Junk food, oily (food high in fat) food, restaurant food was stopped, and we had as much homemade food as we could."</i> (P14, 4A)</p>
	Determinants of food choice (continued)
Family meals - a new norm	<p><i>"Before lockdown we used to eat together only on weekends as my son was in hostel and, daughter in college, but during the lockdown we ate all our meals together. We got a lot of family time ... It was a blessing in disguise! I enjoyed that very much ..."</i> (P14, 4A)</p> <p><i>"We used to eat together; we were very happy. Because we rarely get a chance to do that. Earlier I had my office, girls were somewhere else, etc., so we rarely got the chance to eat together. So, it was cooking and eating together. We felt really nice."</i> (P8, 4A)</p>

the frequency of cooking food increased. Like when we go to office, we cook everything at one time and leave ..." (P4, 4A,1C)

3.2.1.2. Involvement of children and male members in food-related activities. Half of the gatekeepers complained about excessive workload during lockdown which was attributed to the absence of domestic help. They reported that usually, Indian food gatekeepers are supported by domestic helps/maids/cooks (i.e. paid help) in completing the household chores including cooking. Since the lockdown restricted the movement of people including domestic help, the gatekeepers were

overburdened with household tasks. Nevertheless, family members including children, partners, parents-in-law shared responsibilities (e.g. chopping vegetables, kneading the dough etc.) with the gatekeepers to minimize their workload. This was viewed as a positive change by the participants as they received very limited support from family members particularly from male family members in pre-pandemic times. The following response exemplifies this:

"... One problem was that maid's absence due to which there was too much load. But everyone at home helped me. Both my girls and husband helped me in cooking. So, it became a little easier." (P8, 4A)

3.2.1.3. Experimentation in the kitchen. COVID-19 and its associated lockdowns offered exciting opportunities for the gatekeepers to learn new culinary skills, in particular baking was identified as the most popular cooking skill. Besides baking, participants tried experimenting with different cuisines like Chinese, Italian, and Mexican. This need for experimenting resulted from two main reasons: participants had more free time in hand; and participants and their family members could not relish outside food. The new recipes were derived from a range of sources, for example family, friends, and the internet.

"Yeah, we tried new things like Mexican, Italian cuisine ... We made ras malai (an Indian dessert - steamed cottage cheese dumplings served in sweetened condensed milk) for the first time. It was very nice and soft. We also made burrito bowl ... We even tried baking and made some cakes." (P3, 3A, 1C)

3.2.2. Changes in meal planning and food shopping behaviours

3.2.2.1. Adoption of meal planning skills. Besides the development of new cooking skills, nearly half of food gatekeepers also gained meal planning skills over the course of lockdown. They started planning their menus in advance depending on the availability of ingredients as well as preparing food shopping lists to avoid frequent, unnecessary visits to the supermarkets. Moreover, unlike the pre-pandemic times when stores were open round the clock and food availability was not an issue, the grocery stores and supermarkets were only functional for limited duration during the lockdown which compelled gatekeepers to adopt meal planning skills.

"... Before lockdown there were no issues ... Even at 7.00 pm if we planned on cooking something, it was possible. Unlike during lockdown where we had to plan and get the ingredients beforehand ... So, we would write the whole list and go for shopping." (P31, 3A, 1C)

3.2.2.2. Increase in online food shopping. Overcrowded marketplaces, long queues in supermarkets, and physical distancing norms during the pandemic deterred gatekeepers and their family members to curtail their outdoor visits for purchasing food items. In pre-COVID days, the gatekeepers reported usually engaging in food shopping on a daily basis but since the pandemic started, they consciously reduced their visits to the supermarkets as they were afraid of being infected by the virus. The following quotation as an example of this:

"Before lockdown I used to go to the market every day. But in lockdown I used to bring vegetables for a week, even milk I used to bring more and store it in the freezer. I was scared if I go every day, I may get infection." (P2, 3A, 1C)

Nearly half of the participants who were hesitant to venture outdoors for food shopping amidst the lockdown opted for online shopping as it was considered safe and convenient. Undeniably, a considerable rise in the online shopping of food products was observed during the crisis period.

“... In Dadar (name of a locality in Mumbai) there was a market put up by the Government, but we didn't go due to the rush and therefore ordered from Amazon ...” (P3, 3A, 1C)

Nonetheless, online shopping received mixed views i.e. a couple of participants expressed dissatisfaction over the quality of food delivered through online portal. As one interviewee explained:

“Yes, we did online shopping of fruits, but the quality was not good. Fruits were not fresh.” (P26, 4A)

On the other hand, there were some gatekeepers who were quite happy purchasing grocery items and fresh produce via online shopping apps, as this gatekeeper reports:

“... Basically, we did try online shopping during lockdown because we didn't want to go out ... Definitely there was fear of infection ... It was a nice experience to buy vegetables and stuff online. We used to get fresh vegetables and door to door service. The rates were also not that high as we expected.” (P9, 4A, 1C)

3.2.2.3. Bulk buying. At the onset of the lockdown, there was lot of confusion and panic among the consumers regarding the availability of food items which in turn compelled some of our gatekeepers to buy staples in bulk for future use. The following quote illustrates how one of the gatekeepers hoarded food products such as dry grains:

“Actually, at the start of lockdown there was lot of confusion and rumours that things will not be available, so I brought rice and stuff in bulk ...” (P5, 4A, 1C)

3.2.2.4. Shortage of food items. During the lockdown, the interviewees reported facing challenges in procuring essential food items like fruits and vegetables, animal-derived products, and grains. In view of this shortage, the interviewees had to modify their recipes and food choices accordingly, indicative of high order food skills. Here is what one of the interviewees had to say about this issue:

“Actually, we weren't getting any meat or fish during the lockdown, all the shops were shut. Chicken we used to order from a shop close by; but we did face shortage of meat and fish ... even, we didn't get all the vegetables we wanted so had to settle with whatever was available in the market.” (P3, 3A, 1C)

3.2.3. Changes in food choices and behaviours

3.2.3.1. Reduced consumption of outside home food. The fear of infection associated with the COVID crisis inhibited several participants from ordering outside home food. The interviewees further acknowledged that home cooked food was much healthier and hygienic than restaurant food. Nevertheless, they further reported that they wanted to consume take away food but could not get it or order it. The constraints on consuming outside food led to disappointment particularly among the children and adolescents within the household. However, our interviewees efficiently tackled this disappointment by preparing restaurant-like food at home, therefore, satisfying the tastebuds of their younger ones. The following quote, as an example of this:

“... All outside food was stopped. Because of the lockdown we couldn't order food from outside or go to the hotels. So, we had to prepare those food in house only and have it.” (P24, 4A)

3.2.3.2. Increased variety of home-cooked meals. In contrast to pre-COVID times, an increase in the variety of home cooked meals during the lockdown was noted by some gatekeepers. Given that all family members were at home and had different food preferences, the

gatekeepers tried to prepare a variety of meals and snacks to fulfil their demands. Also, the interviewees pointed out that no such demands were observed before lockdown as the members had the liberty to consume or order food of their choice from restaurants.

“... In lockdown everyone was at home. So, we used to have more variety in our meals.” (P3, 3A, 1C)

3.2.3.3. Increase in snacking and over all food intake. According to the interviewees, COVID and its associated lockdowns had altered the snacking patterns in many households. They further explained that sitting idle at home led to binge eating. Ready-made packaged snacks (e.g. nachos, popcorn) and home-made snacks (e.g. samosas, pizza, burgers – pizza and burger are commonly recognised as snacks in urban India which is contrary to the Western world where they are regarded as meals) were commonly consumed during the period of crisis as demonstrated by this quote:

“Usually, we don't eat snacks but during lockdown our snacking patterns changed as we were at home, so we started preparing and eating more snacks than usual. Like we used to eat samosa, pakoras (deep fried vegetables coated with roasted gram flour batter), pizza, burger ...” (P27, 5A, 2C)

In addition to increased snacking, some gatekeepers also reported an increase in overall food intake while they were in lockdown. The subsequent quotation highlights this increase:

“... Because everyone was tensed and thinking about what's going to happen with the Corona situation, we started eating more.” (P15, 3A)

3.2.3.4. Determinants of food choices. Amidst the lockdown, health and immunity, family members' food preferences and taste, and food availability were cited as the main determinants of food choice.

Health and immunity: Due to the fear of being infected by COVID-19, about half of food gatekeepers incorporated healthy changes in their meal preparation. For example, some reported using of lemon juice, ginger and garlic, some refrained from using refined and processed foods and making healthy modifications in the recipes by using whole grains. They also refrained from preparing and consuming food high in fat because they associated the same with increase in calories. Moreover, since all gymnasiums and parks were closed during the nationwide shutdown, the gatekeepers could not engage in physical activity and therefore avoided the intake of food high in fat. Another significant dietary change was identified by informants such as increase in fresh fruits and vegetable intake. These healthy alterations were made to achieve a healthy body and to keep illness at bay.

“So, we used to cook food keeping the health factor in mind because everybody was very much in shock and everyone was afraid that we shouldn't fall ill. So, we used ginger, garlic and likewise immunity booster items more ...” (P4, 4A, 1C)

Family members' preferences and taste: Some participants stated that they were bound to prepare dishes as per the demands of their children (both sons and daughters) and partners. For example, two interviewees stated:

“... whatever my son liked, or my husband liked, I had to prepare.” (P15, 3A)

“... since both the girls were at home, everything was prepared as per their choice ...” (P21, 4A, 1C)

Food availability: Some food gatekeepers also talked about the impact of the availability of food ingredients in their households on their food preparation choices as discussed by one of the interviewees:

"I used to open my fridge, I used to see what is available in the house and used it to make my breakfast, lunch and dinner." (P20, 4A, 1C)

3.2.3.5. Family meals - a new norm. Eating meals with the family was viewed as one of the most favourable outcomes of the pandemic crisis. Before the pandemic, because of different work schedules, family members could hardly enjoy the pleasurable experience of having family meals as reported by majority of participants. The following quote explicitly demonstrates the happiness of the gatekeeper in savouring all her meals with her loved ones:

"... After so many years we all sat together and ate. When the kids were small, I had only got 3 months of maternity leave. After that the kids were at home only while I went for job. So, since their birth, it's the first time that I have been able to spend 9 months straight with them. My husband was never there at home for such a long duration. This was a very nice experience and we enjoyed it to our fullest. We were eating all meals in the day together. We enjoyed a lot ..." (P18, 5A)

4. Discussion

This qualitative study explored the culinary behaviours and practices adopted by Indian primary household food gatekeepers due to COVID-19 lockdown-imposed restrictions. We observed that primary food gatekeepers experienced significant changes in their cooking behaviours as compared to the pre-pandemic times such as increased time spent on food preparation and experimentation in the kitchen, increased food literacy in terms of food planning and increase in food intake. Also, the food gatekeepers identified a number of factors impacting the food preparation and intake which could be important in developing strategies to improve food preparation and dietary behaviours. These findings contribute to the current literature on culinary behaviours in several ways.

The majority of participants reported an increase in the frequency of cooking including the number of meals during the day as all family members were at home and experimentation with different recipes during the lockdown period. This finding aligns with other studies showing an increase in cooking during the lockdown period in other countries, for example in Australia (Ronto et al., 2021), Croatia (Pfeifer et al., 2021), China (Dou et al., 2021), and the United States of America (Dou et al., 2021). This is a positive change for several reasons: the unavailability of domestic help and increased chores led to shared responsibilities of food preparation and home management amongst the family members including children and there was less reliance on take-away food. In fact, active engagement of children in cooking was found to positively impact the intakes of healthier foods like fruits and vegetables (DeCosta et al., 2017; Radtke et al., 2019). However, most of the home cooking was done by females, which confirms the findings of a study conducted, which looked at the gender differences of home cooking frequency at a global scale prior to COVID-19 pandemic showing that females cooked more often (Wolfson et al., 2021). Nonetheless, the increase in home cooking can be seen as a solution towards better diet quality (Lavelle et al., 2020; Uggioni et al., 2020) and it leads to lesser reliance on take-away food which can be seen as a positive outcome of the COVID-19 pandemic (Wilkins, 2020).

The majority of our participants reported an increase in meal planning behaviours, a finding which was also highlighted in another qualitative study carried out in the Australian context (Ronto et al., 2021). They reported that during the pre-pandemic times, there used to be instantaneous meal planning, but during the lockdown they were forced to plan their meals due to restricted availability of food, and this, in some instances, led to healthier food choices. Previous findings demonstrate the significance of meal planning as an important determinant of meal size and energy intake (Fay et al., 2011). In addition, higher frequency of meal planning has been associated with greater

weight loss as observed in a 40-week behavioural weight loss intervention conducted in the US (Hayes et al., 2021). Meal planning has been identified as one of the most important food skills, which assists individuals to choose, purchase, and prepare nutritious snacks and meals on a day-to-day basis for themselves and their family members (Fernandez et al., 2020). Meal planning is often referred to as a potential strategy to overcome the main barrier to healthy eating i.e. lack of time (Fernandez et al., 2020). Other advantages related to meal planning include helping individuals reduce stress and an increase in the number of family meal episodes (Fernandez et al., 2020).

Our participants reported that they adopted online grocery shopping behaviours, since online grocery shopping offered delivery services without causing the consumers to worry about physical movement or geographical boundaries. Online shopping for groceries was also triggered by limited time allotted for opening of stores which did not match the busy work-from-home schedules of many. Similar shopping behaviours were observed in other countries such as Australia (Ronto et al., 2021), New Zealand (Martin-Neuninger & Ruby, 2020), Italy (Alaimo et al., 2020), Taiwan (Chang & Meyerhoefer, 2021), Saudi Arabia (Alhousseini & Alqahtani, 2020), and the United States of America (Dou et al., 2021; Ellison et al., 2021; Loxton et al., 2020). The need to maintain social distancing in public spaces and avoid crowding has added to this shift. Koch and coworkers reported that consumers were not concerned about the quality and price of the online purchases made during the pandemic but the ease of shopping (Koch et al., 2020). Researchers claim that online food shopping provides convenience and flexibility as the shopping hours are not limited and the consumers have the liberty to shop at all hours (Chocarro et al., 2013). Indian primary food gatekeepers further reported limited availability of certain food items during the lockdown which led them to adopt different food purchasing behaviours such as bulk and/or panic buying. Likewise, panic buying has been frequently reported in other countries such as Italy (Di Renzo et al., 2020), Russia (Ben Hassen et al., 2021), Saudi Arabia (Alhousseini & Alqahtani, 2020), and Australia (Ronto et al., 2021). Panic buying was positively influenced by customers' attitude, subjective norms, scarcity, perceived competition, and time pressure as observed in a Fijian study (Singh et al., 2021). Studies from the USA and Australia highlights social media as a significant determinant of panic buying behaviour. According to a systematic review, panic buying is influenced by four factors, which are as follows: (i) consumers' perception of the fear of viral crisis and the scarcity of products; (ii) the fear of the unknown which is triggered by negative emotions and insecurity; (iii) coping behaviour (iv) social psychological factors (Yuen et al., 2020). Panic buying can have long-term negative effects like disruption in the supply chain management. Therefore, government bodies and policymakers should be prepared (e.g. keeping contingency plans in place); in future to minimize the unfavourable and unintended consequences of panic buying (Prentice et al., 2020).

A significant change from dining out and purchasing take-aways from restaurants to cooking at home emerged with fear of spread of infection. This coupled with the varied likes and dislikes of foods among family members prompted the need to prepare a variety of meals and snacks which in turn led to an increase in bingeing of main meals and snacks. In the same vein, people in New Zealand (Gerritsen et al., 2021), the UK (Snuggs & McGregor, 2021) and Iran (Galali, 2021) also reported bingeing on unhealthy sweet and savoury items. Drastic changes in lifestyle during the COVID-19 lockdown have been identified with negative emotions such as stress and fear, which in turn has caused emotional eating and overeating during the lockdown around the world have been attributed to psychological factors such as anxiety, boredom, or lower motivation (Ammar et al., 2020). Likewise, a scoping review noted that there were associations between unhealthy dietary choices and mental health conditions including depression and anxiety, and sedentary time and weight gain (Bennett et al., 2021). Disappointingly, if bingeing on comfort food sustains post pandemic, it is likely to result in negative health outcomes across various population groups.

Therefore, public health professionals should design interventions which will reinforce the maintenance of healthy lifestyle habits in order to prevent long-term health consequences of the on-going viral disease.

Our study participants also highlighted some factors that determined the food preparation and intake during the COVID-19 lockdown. One of the factors was health and immunity, since the gatekeepers made a conscious effort to select plant-based foods that provided health and nutritional value to the meals. In fact, there has been an increased consumption of fruits and vegetables both among children and adults during the confinement as reported in a recent review analysing studies from several countries e.g. China, India, Spain, Italy, France, Poland etc (Bennett et al., 2021). Perhaps, this increased intake of fresh produce could be attributed to the World Health Organization's extensive promotion of the importance of consuming fruits and vegetables during the coronavirus pandemic-induced lockdown (Bennett et al., 2021). Interestingly, a recent review endorses the effectiveness of plant-based foods in enhancing immunity of individuals against COVID-19 virus (Arshad et al., 2020). Another factor which surfaced during the interviews was food availability which was consistent with findings from another local study (Parmar & Rathod, 2020). Certainly, triple A factors namely availability, accessibility, and affordability have been well documented as being influential in developing food choices and food behaviours (Leng et al., 2017). For example, both accessibility and availability of fruits and vegetables at home and in the neighbourhood have consistently been associated with healthier population dietary intakes as indicated by higher intake of fresh fruits and vegetables (Bodor et al., 2008; Loth et al., 2016; Moayyed et al., 2017). On the other hand, unhealthy food consumption can be curtailed by limiting access to unhealthy foods as seen in a Netherlands based study where the researchers made the unhealthy snacks less accessible by placing them further away which in turn reduced the likelihood and amount of intake of these snacks (Maas et al., 2012). In this light, weight-loss focussed environmental interventions can adopt the manipulation of food accessibility as a viable strategy to reduce overeating and overweight (Faith et al., 2007).

Despite the reduction in income in nearly three quarters of the households, paradoxically, no impact of the reduced income was observed on the culinary behaviours in our study. This could be partially explained by the fact that the majority of our interviewees belonged to either upper or upper middle class. Moreover, since the lockdown was not prolonged the impact of income on the culinary behaviours was not so apparent. Contrary to our findings, studies from urban settings in other lower-middle income countries (LMICs) like Bangladesh (Mandal et al., 2021), Kenya (Kansiime et al., 2021), and Uganda (Kansiime et al., 2021) clearly depict the impact of reduced income on food behaviour. For example, in Dhaka, the capital of Bangladesh, fish consumption per household and the frequency of grocery shopping decreased during the pandemic as an outcome of pay cuts or loss of job (Mandal et al., 2021). As a coping measure, Bangladeshis reduced the intake of highly priced food (Mandal et al., 2021). Nevertheless, richer segments were less affected by the income reduction (Mandal et al., 2021). In this view, the future studies in India should include sample from different socio-economic strata to explore the implications of pay cuts on culinary and dietary behaviours.

Finally, our gatekeepers threw light on the increased frequency of family meals during the lockdown, a dining experience also reported in other cultural contexts including the USA (Hammons & Robart, 2021), Russia (Ben Hassen et al., 2021), and Qatar (Ben Hassen et al., 2020). They thoroughly enjoyed having all their meals and snacks with their loved ones, which was rarely witnessed prior to the COVID-19. Sharing mealtimes provides an opportunity for families to feel connected during times of uncertainty such as the unprecedented pandemic and its resultant lockdown restrictions (Hammons & Robart, 2021). Empirical evidence portrays mealtimes as a setting for difficult conversations to take place between family members (Skeer et al., 2018), thus offering relief to the families during times of stress (Hammons & Robart, 2021).

Besides offering solace, family meals have also shown to have a positive impact on diet among children (Dwyer et al., 2015), youth, and adults (Fulkerson et al., 2014).

4.1. Research limitations and future scope

This research inquiry provides some valuable insights on the Indian primary food gatekeepers' experiences with regards to culinary behaviours during the COVID-19 lockdown. The choice of selecting a cosmopolitan city like Mumbai has largely helped to understand the culinary practices of persons with different cultural and regional backgrounds as our participants were natives of five different Indian states. However, some limitations of our study should be acknowledged while interpreting the findings. The findings of this study cannot be generalized to the Indian population on the whole because this study was based primarily on an urban sample. Perhaps, to improve the generalisability of the findings, there is a need to execute this study in different geographical settings (diet in India varies from one state to another) as well as rural settings. The use of convenience sampling could have also impacted the generalisability of our results. Simple random sampling or stratified random sampling could have been employed. Nevertheless, researchers often recommend the use of convenience sampling in qualitative research (Luborsky & Rubinstein, 1995; Moser & Korstjens, 2018; Polit & Beck, 2010; Robinson, 2014) because the aim of qualitative studies is not to generalize but rather to provide an in-depth understanding of some aspect of human experience (e.g. transformation in culinary behaviour) through an intensive inquiry of the situation under study (Polit & Beck, 2010). In addition, Moser and Korstjens (2018) note, "*In qualitative research, you sample deliberately, not at random.*" Convenience sampling is a form of deliberate sampling strategy (Moser & Korstjens, 2018). Moreover, convenience sampling is affordable, quick, and the participants are easily accessible to the researchers (Etikan et al., 2016). Considering the on-going pandemic and its associated restrictions as well as the qualitative nature of our study, the use of convenience sampling was considered viable in the present context.

Another limitation could be that the gatekeepers provided socially laudable responses. The predominance of upper and upper middle class gatekeepers in the study sample could have further limited the generalisability of the findings. Interestingly, the dietary and culinary behaviours among the richer segments in other LMICs like Bangladesh (one of our neighbouring countries) were minimally impacted during the on-going pandemic (Mandal et al., 2021) as observed in our study. Nonetheless, the views of gatekeepers belonging to economically weaker sections of the society are also critical for designing nutrition interventions. For example, studies from Kenya (Kansiime et al., 2021), Uganda (Kansiime et al., 2021), and Bangladesh (Mandal et al., 2021) highlight the impact of reduced income on food behaviour amidst the pandemic. Thus, to gain a comprehensive view on the present topic, future studies should also investigate the perspectives of gatekeepers living in low-income settings on the newly adopted dietary and culinary behaviours during the pandemic.

Overall, both healthy and unhealthy culinary behaviours were practised during the COVID-19 pandemic and its associated lockdowns. Unhealthy dietary behaviours have negative repercussions for nutritional and overall health. Therefore, it would be useful to develop web-based nutrition education programs (e.g. videos demonstrating recipes incorporating seasonal, indigenous, low calorie food ingredients) for gatekeepers and their families to enhance their declarative as well as procedural nutritional knowledge, which in turn, will improve their culinary practices and diet quality. There is scope for development in the areas of food skills and healthy eating practices for gatekeepers. The importance of organisational culinary behaviours such as planning meals in advance and shopping with a food list should be promoted to forestall hoarding and reduce strain on the food supply system. With a surge in household cooking, economical recipes with the use of indigenous and seasonal produce should be emphasized for promoting healthy

eating among the gatekeepers and their families. In addition, for the purpose of developing effective public health policies, the sustainability of the healthy culinary behaviours practised during the pandemic need to be verified through a follow-up study after the end of COVID-19 crisis. Also, there is a need for further research and surveillance to strengthen understanding of sustainability of healthy culinary behaviours practiced during the pandemic.

Authors contributions

N.R. and R.R. conceived the study and its original design. L.M. and N.R. collected the data. L.M., D.R.C, R.R., R.S., and N.R. analysed the data. L.M., R.R., R.S., and N.R. drafted the initial form and all revisions of this paper. L.M., D.R.C, R.R., R.S., S.K., and N.R. reviewed and approved the final manuscript.

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Ethical statement

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the SMES's (Seva Mandal Education Society's) Institutional Ethics Committee (SMES/IEC/125)). The procedures performed were in accordance with the ethical standards of the committee. Written informed consent was obtained from all respondents before commencement of the study.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this research article.

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