



The Impact of the COVID-19 Pandemic on Young Australian Adults' Food Practices

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ABSTRACT

Background: Young Australian adults exhibit poor food behaviors. These include increased consumption of Energy-Dense, Nutrient-Poor (EDNP) foods, sugar-sweetened beverages, and low consumption of fruit and vegetables. However, little is known about how the coronavirus disease 2019 (COVID-19) pandemic affected young Australian adults' pre-existing adverse food behaviors.

Objectives: The present study aimed to understand the impact of the COVID-19 pandemic on food practices by exploring views of young adults living in Australia.

Methods: Through qualitative descriptive methods, data gathered through individual interviews were thematically analyzed. Participants included 38 young adults aged 18–30 y with a mean age of 24.1 y (76% female).

Results: Five themes emerged: 1) disruption of routines, 2) increased flexibility, 3) changes in food practices, 4) heightened psychological distress, and 5) impact on future behaviors. Disruption of routines and increased flexibility associated with working/learning from home resulted in both positive and negative changes in food practices. Negative changes included increased consumption of EDNP foods, increased consumption of foods prepared outside of home, decreased purchases and consumption of fresh foods, meal skipping, and a lack of meal planning. Positive changes included an increase in home cooking; consistent weekly eating patterns; decreased consumption of EDNP foods; smaller, more frequent meals; and decreased consumption of foods prepared outside of home.

Conclusions: Young Australian adults reported more negative and fewer positive changes in food practices. The observed negative changes in food practices are likely to have accentuated young Australian adults' previously known poor food behaviors. This study adds to the international literature by reporting ways that young adults implemented positive changes during the pandemic and future directions of their food practices. *Curr Dev Nutr* 2022;6:nzac009.

Keywords: young adults, coronavirus disease, COVID-19, food practices, Australia, qualitative

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Abbreviations used: COVID-19, Coronavirus disease 2019; EDNP, Energy-Dense, Nutrient-Poor; IPAN, Institute for Physical Activity and Nutrition.

Introduction

The WHO declared the Coronavirus disease 2019 (COVID-19) outbreak a global pandemic in March 2020. This pandemic has affected >218 countries and territories, catastrophically affecting public health globally. In line with other countries, Australia introduced stringent measures to curb transmission of the virus. These strategies included bio-security measures such as social distancing, lockdowns, home confinement, self-isolation, abolition of mass outdoor and indoor events, closure of retail outlets, and safe work practices (1). These changes not only affected Australia's economy but also altered individuals' food practices and health (2).

International research focusing on a broad age range of adults has demonstrated that lockdowns and the resulting home confinement have led to alterations in daily routines (3), an increase in boredom (3, 4), and increased consumption of "comfort" foods in order to deal with the stress and monotony brought about by the various lockdowns (5). In Australia, negative changes have been observed in adults' selected health behaviors including sleep, smoking, and alcohol consumption (1). These changes have in turn been associated with adverse mental health consequences such as stress, anxiety, and depression (1). In addition, a rise in sedentary behaviors and abnormal eating habits, including binge eating patterns, has been reported (6).

Australia had the world's longest and most stringent lockdown restrictions as a result of the COVID-19 pandemic, lasting on average for >200 d across some of its states, the city of Melbourne in Victoria having been in 262 d of lockdowns. In Victoria, restrictions included closure of all nonessential retail and services including pubs, clubs and hotels, gyms, sporting venues, cinemas, and casinos. Restaurants and food outlets were limited to takeaway orders and supermarkets had limited trading hours. Night curfews were in place and all educational institutions, schools, and most workplace offices closed. Work-from-home restrictions were enforced. Most health care appointments, unless emergencies, were dealt with via teleconferences. Therefore, the daily routines of all Australians, including those of essential workers, were affected because of the varying degrees of restrictions imposed by the Australian Federal and State governments. Further, the COVID-19 pandemic interrupted the normal food supply chain, which altered food availability (7). This may have led to changes in food practices including purchasing, planning, preparation, and consumption. Little research has examined how young adults experienced changes in food practices in accordance with the unforeseen conditions brought about by the pandemic.

It is important to study how the COVID-19 pandemic affected the food practices of young Australian adults because they are at a transition phase from adolescence to adulthood (8). Young adulthood is marked by instability, self-focus, and development of identity and values (9). Long-term healthy habits often develop during young adulthood and young people are susceptible to developing suboptimal food behaviors (10). More importantly, the steep rise in the prevalence of overweight and obesity among young adults as indicated by the Australian National Health Survey (11) increases their risk of developing chronic diseases and ill health (12). In addition, excessive consumption of Energy-Dense, Nutrient-Poor (EDNP) foods and sugar-sweetened beverages (11), noted during previous National Nutrition Surveys, further raises the risks for this age group. Therefore, there is a need to assess and ameliorate young adults' food practices during this transition period to lay the foundation for improved health behaviors. (9, 10, 12, 13).

During the COVID-19 pandemic, research by Gallo et al. (14), focusing on 509 Australian university students (aged 19–27 y), noted the impact of social isolation on energy intake and physical activity. The study showed that energy intake in 2020 was 20% higher than in 2018/2019 (14). In addition, changes in food behaviors included an increase in snacking patterns and a simultaneous increase in the consumption of EDNP foods (14).

In contrast, Di Renzo et al. (15) investigated eating and lifestyle changes among 12- to 86-y-old Italians and noted a greater adherence to Mediterranean diet among the 18- to 30-y-old young adults than among the other age groups. The Italian young adults demonstrated an increased intake of fruit, vegetables, nuts, legumes, and fish (15), unlike the young Australian adults (14) during the COVID-19 pandemic.

In Britain, McPherson (16) explored young adults' (aged 18–26 y) experiences of food insecurity before and during the COVID-19 pandemic. McPherson (16) observed that the COVID-19 pandemic significantly worsened food insecurity among young adults. Consumption of nutritionally inadequate food contributed toward increased stress, anxiety, depression, ill health, and physical exhaustion during the pandemic (16). Although Gallo et al.'s (14) observational study compared dietary and physical activity data, it did not include a qualitative

examination of participants' food-related experiences like McPherson's (16) study. More recently, the international COVID-19 EAT survey noted the emergence of disordered eating among American young adults during the pandemic, due to the disruption of routines, financial difficulties, psychological distress, and poor stress management (17). However, the survey lacked in-depth and contextual information concerning the ways the pandemic affected eating behaviors of young adults. There is no existing qualitative enquiry concerning the ways the pandemic affected young Australian adults' food practices, further emphasizing the need for this study.

Finally, the COVID-19 pandemic provides a unique opportunity to study this cohort's food practices under unprecedented conditions that appeared with little notice. It is, therefore, important to understand whether the current pandemic may have negatively exacerbated previously reported unhealthy food behaviors among young adults. This will help to identify specific food practices developed by young adults that increase their health risk, which can then provide direction for future public health programs aimed at protecting and promoting community health, not only during this pandemic but at other times in a challenging life stage. In summary, the aim of this study was to gain an understanding of changes in food practices by exploring the views of young adults living in Australia during the COVID-19 pandemic.

Food practices are defined as any activity that involves food, ranging from food shopping or procurement to preparation and consumption. These activities take into account a variety of factors, including current food supplies and budgets, personal preferences and habits, scheduling and time management, shopping list creation, issues of food and other resource access, self-efficacy in food preparation, family demands, and attitudes towards food in general (18, 19). In addition, these also encompass the way that foods are prepared and the place where one consumes food displaying sociocultural aspects and traditions (20).

Methods

Design

This study was informed by the interpretivist research paradigm, which relies on participants' views of the situation being studied (21). Qualitative descriptive methods (22) using individual interviews with thematic analysis (23) was chosen as the appropriate method to explore the changes in food practices experienced by participants during the COVID-19 pandemic. This study was part of a larger project with a broad focus on understanding the food behaviors of young adults. The timing of this study provided an opportunity to understand this cohort's food practices under different conditions. Therefore, an interpretivist approach helped to provide unique perceptions about the ways the pandemic affected young adults' food practices. In line with the interpretivist approach (24), the authors acknowledge that the results have been socially constructed and that the individual participants' beliefs, content, and experiences are central in shaping their perspectives. The researchers acknowledge themselves as part of the knowledge generation process and are not detached from it. The researchers' background and experience are further explored in the section "Researcher reflexivity." To improve methodological rigor and transparency, reporting follows the Consolidated Criteria for Reporting Qualitative Research (COREQ) (25).

TABLE 1 Interview questions¹

1.	Main question	Could you please elaborate on your ways of eating before lockdown and during lockdown?
	<i>Probe</i>	<i>How/in what ways do they differ?</i>
2.	Main question	How do you perceive your eating patterns during the COVID-19 pandemic?
3.	Main question	Are the meals or snacks consumed differently during a weekday and during the weekends?
	<i>Probe</i>	<i>In what ways do they differ? Could you please elaborate?</i>
4.	Main question	What is the frequency of purchasing food through food-delivery/meal-kit services or take-away services before lockdown and during lockdown?
	<i>Probe</i>	<i>How/in what ways do they differ?</i>
5.	Main question	How do you go about meal preparation and planning?
	<i>Probe</i>	<i>How/in what ways do they differ before lockdown and during lockdown?</i>
6.	Main question	How, when, and where do you shop for foods?
	<i>Probe</i>	<i>How/in what ways do they differ before lockdown and during lockdown?</i>

¹COVID-19, Coronavirus disease 2019.

Recruitment

Young adults between 18 and 30 y of age were recruited Australia-wide by posting advertisements online. The advertisements were posted between July and September 2020 on Deakin University's Institute for Physical Activity and Nutrition (IPAN) website and social-media accounts such as Facebook and Twitter. Three criteria for eligibility were outlined. Young Australian adults needed to be aged between 18 and 30 y, English speaking, and living in Australia.

Education (student status), living arrangements, and employment status were the key demographic factors considered in using a maximum variation sampling strategy during recruitment. This sampling strategy was used to allow selection of a variety of participants to ensure heterogeneity (26). This enabled an exploration of common characteristics of the target phenomena across several demographic factors (27).

Data collection

Individual semistructured in-depth interviews were conducted with participants. An interview guide was designed using a comprehensive literature review. Previous interviews and focus group studies that have explored young adults' food practices influenced the development of the interview guide (28). This article reports findings relating to 6 out of 17 questions in the broader study. Questions that specifically focused on the effects of the COVID-19 pandemic on food practices (see Table 1) were included in this analysis. The interview guide was pilot-tested with a small sample of PhD students who were young adults similar to the target age group and refined by discussion with coauthors.

Each interview began with a series of questions about participants' background and demographic characteristics. Questions such as date of birth, gender, and postcode were presented to participants to understand their living arrangements, education (student status), and employment status (see Table 2). The core set of 17 questions were then administered to all participants. Prompts and probing questions were also used, which enabled further clarification of participants' responses.

Young adults expressed their interest to participate in the study by emailing the researcher (KTK). The researcher then contacted

prospective participants to confirm the eligibility criteria and to schedule an appointment. All interviews were conducted over the phone or online using Zoom/Skype, after receiving electronically signed consent forms. Interviews were conducted between July and September 2020. Thirty-eight interviews were conducted, at which time data saturation (29) was reached, so no further interviews were conducted. Interviews lasted between 39 and 72 min (mean duration: 46 min) and were digitally recorded. There were no repeat interviews or field notes used during or after the interviews. To reimburse participants for their time, they were provided with a \$25 eGift voucher.

Data analysis

Initially, KTK (lead author) transcribed 2 interviews manually to get familiar with the transcripts. The remaining interviews were transcribed verbatim by a professional transcription service (Rev.com). All identifying information of participants was replaced by study codes to protect participants' identity and maintain confidentiality.

Transcripts were imported to NVivo 12.0 Plus for Windows (QSR International 2018) where data were organized and analyzed thematically in accordance with the template analysis method (30). The steps included 1) familiarization with transcripts; 2) preliminary data coding; 3) organization of themes into major clusters and defining their relations with each other within and between the groups; 4) description of the initial coding template; 5) making use of the initial template and applying to a sub-set of the data and modifying as necessary; and 6) finalization of the template and application to the rest of the data (30).

Thematic analysis allowed for the emergence of inductive themes from the data. KTK performed preliminary coding after which the coauthors repeatedly refined the themes with KTK. Audio recording, intercoder agreement, and member checks were performed to ensure rigor, reliability, and validity. Member checks (respondent validation) were conducted to improve the reliability of findings. All participants were asked if they wished to review their interview transcript and 8 did so. The participants were then asked to check and comment on the precision of the interpretation of results (31). Five participants returned the transcripts without suggesting any changes concerning the interpretation. Three did not return the transcripts; they were included in further analysis. KTK conducted member checks promptly within

TABLE 2 General characteristics of study participants

Characteristics	Participants, <i>n</i>
Age, y	
18–24	23
25–30	15
Gender	
Female	29
Male	8
Unknown	1
State of residence	
Victoria	32
New South Wales	5
Queensland	1
Continent of birth	
Australia	24
Asia	11
Europe	3
Living arrangements	
Parental households [includes living with parent or parents as a single (<i>n</i> = 14) or living with parent or parents as a couple (<i>n</i> = 3)]	17
Independent households [includes living alone independently (<i>n</i> = 4) or living independently with partner without children (<i>n</i> = 7) or living independently with partner with child or children (<i>n</i> = 1)]	12
Living in a shared household with unrelated flatmates/housemates (as a single)	9
Education (student status)	
Currently studying	25
Not studying	13
Employment status	
Employed part-time	13
Employed full-time	11
Not employed [includes volunteering (<i>n</i> = 2)]	11
Employed casually	3

2 wk of each interview to reduce misinterpretation of data with an overall aim of stating authentic and accurate findings (31). In addition, 25% of the transcripts were coded by a second coder to reduce bias associated with the personal interpretation of data and to increase reliability (32). Any differences that arose owing to differences in coding ideas and themes between the coders were resolved through discussion (33).

Themes and categories obtained through manual coding were confirmed using Leximancer version 4.5, an automatic content analysis tool. The themes and concepts obtained through Leximancer were in good agreement with the thematic analysis obtained through manual coding (NVivo), validating to some extent the study findings.

The changes in food practices noted were classified as positive or negative based on previous health research (34–36); that is, based on the evidence concerning the impact of the specific food practice on dietary intake, health, and well-being.

Researcher reflexivity

KTK is a PhD student conducting research in the field of behavior nutrition. KTK was funded for this project by an internal grant. KTK is an early-career researcher with a master degree in food science and nutrition. She has acquired training in qualitative research during her PhD candidature. KTK did not hold previous relationships with any participants. The participants were provided with a Plain Language Statement which detailed the study design and the researcher's reasons for

doing the study. That is, the researcher aimed to explore participants' views of the changes in food practices during the COVID-19 pandemic. KTK, having prior nutrition knowledge, was able to probe and ask further questions (when any closed-ended answers were provided) during the interviews to obtain greater detail from participants. Further, KTK being a young adult herself understands the participants' perspectives well, which could have played a role in the types of questions asked and probes during the interviews.

Ethics

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Deakin University Faculty of Health Ethics Advisory Group (HEAG-H 18_2020). Written and verbal informed consent were obtained from all subjects and verbal consent was witnessed and formally recorded.

Results

Thirty-eight participants (76% females and 21% males) aged between 18 and 30 y with a mean age of 24.1 y were interviewed (see Table 2). Five major themes were noted: 1) disruption of routines, 2) increased flexibility, 3) changes in food practices, 4) heightened psychological distress, and 5) impact on future behaviors.

It should be noted that the themes and subthemes were not mutually exclusive and that participants reported experiencing >1 change. However, for the purpose of the article, we will first detail the changes experienced in the Results section. Further, in the Discussion section, we will note which of the changes were positive or negative. Their implications for young adults' health behaviors will be explored.

Theme 1: Disruption of routines

Disruption in daily routines due to the imposed restrictions and home confinement was likely to have affected vital activities of daily living (3, 37). This is because routines help to establish a sense of structure and normality around day-to-day activities. Three participants outlined how the disruption of routines affected their food practices. Several participants noted that structured daily routines were a primary requisite for consuming food in the right portions and in a timely manner. The imposed home confinement displaced most daily activities including those of food. Because of the displaced routines, some participants experienced altered sleep-wake cycles, boredom, sedentary behaviors, and a lack of food-related planning, which influenced their appetite. The changes in appetite led to several changes in food practices, which have been outlined in theme 3. For example:

“I do not usually follow a routine... Depends on when I am awake these days... I'll just eat whenever I feel ... Before during the weekdays when I took food with me, I'd have my food planned out more... I'd have the appetite to eat.” (Participant 30)

Theme 2: Increased flexibility

The increased flexibility while working or learning from home affected participants' food practices in both positive and negative ways. They described how working or learning from home was a means by which they took care of themselves, prioritizing their food decisions before work. For example, 3 participants described how the increased flexibility equipped them with more time and space to think about their food choices and plan their daily eating habits. Another participant discussed how the reduced need to meet competing demands associated with working from an office (e.g., travel, meetings, and short lunch hours) enabled them to extend the durations of their eating occasions. Others talked about how it was possible to make small, healthy changes to their otherwise unhealthy food practices. For example:

“It was easier for me being at home to prepare healthy snacks and healthy food. ... instead of having a toasted cheese sandwich or a croissant from a shop near my office at work, I would be able to take the time to cut up carrot sticks and have that with hummus.” (Participant 17)

In contrast, 2 participants reported that the increased flexibility negatively affected their food practices. Working or learning from home blurred boundaries for eating. This in turn paved the way for making poor food choices, including opting for convenience foods that were most often energy dense and nutrient poor:

“It's very easy to just stick yourself at the computer, and not give yourself the proper breaks that you normally would have provided in an office, where I'm going to take my proper lunch break.” (Participant 12)

Theme 3: Changes in food practices

In theme 3, participants noted numerous changes in their food practices, which have been categorized into 5 subthemes. These include food-related planning and preparation disruptions, changes in use of takeaway and food-delivery services, changes in eating patterns, increased home cooking, and altered food purchasing patterns.

Food-related planning and preparation disruptions.

Both increased and decreased food preparation and planning activities were noted. Participants designated food-related planning and preparations as ensuring appropriate food supplies at home, cooking ahead (bulk cooking), developing a repertoire of easy-to-make food, or packing food to take to university or work. Fifteen participants experienced disruptions in routines that resulted in changed food practices. Their meals were prepared “on the go,” which resulted in decreased storage of cooked food for future consumption. In contrast, 4 other participants noted increased food-related planning and preparation during lockdowns, which enabled them to opt for home-cooked foods as convenient food choices at times when they were busy:

“Before lockdown, I was... much more prepared because I would have to put [food] in a box and take it in the morning... now there's a bit more freedom in terms of being able to cook during lunchtimes.” (Participant 35)

Changes in use of takeaway and food-delivery services.

Participants discussed both increased and decreased use of takeaways and foods procured through food-delivery services. Fourteen of them reported a decline in their consumption. They discussed several reasons that led to this decreased food consumption. Social contexts and interactions were closely related to the consumption of these foods. A decline in such interactions culminated in decreased food consumption. Increased financial costs, a desire to save money, as well as decreased accessibility were factors that reduced consumption:

“Financial reasons, because I'm a student who doesn't own a lot of money and buying takeaway food it's expensive compared to how cheaply I can prepare. I used to not mind going... because it was kind of like paying for the social experience... I don't feel like that's the same, getting takeaway delivered to home for myself.” (Participant 15)

Foods procured outside of home were viewed as a threat because of fear of contracting the virus. Increased cooking and home gardening were activities that helped to reduce consumption. In contrast, 7 participants noted increased purchase of takeaway foods and food deliveries. They discussed the convenience associated with ordering foods online and having them delivered to one's doorstep in a positive manner, as time and effort saving.

Changes in eating patterns.

Participants reported 5 major changes in eating patterns. The first major change, noted by 22 participants, was that of skipping meals. Breakfast was skipped most often. Lack of appetite ($n = 2$), altered sleep patterns such as waking up late during the day ($n = 3$), sleeping late at night ($n = 2$), lethargy ($n = 3$), diets such as intermittent fasting ($n = 2$), food insecurity ($n = 4$), busy schedules ($n = 6$), frequent episodes of snacking ($n = 7$), and replacing meals with beverages or snacks ($n = 3$) were

commonly mentioned as factors negatively affecting the consumption of regular meals. It is to be noted that some of these factors were overlapping and that >1 factor contributed toward skipping of meals as stated by participants:

“Before lockdown, when at Uni before my class, sometimes the staff would offer some breakfast. I sometimes got there earlier just to eat before classes, but now, I don’t get a hand though. I just skip that.” (Participant 28)

Further, it was participants living in shared households ($n = 4$) who reported meal skipping as a way of managing financial instability and food insecurity. Three participants living in independent households discussed financial instability. In addition, some study participants [living in shared ($n = 2$) and independent households ($n = 2$)] reported that they had become unemployed or had their hours of work reduced; several had moved back to live with their families and sought financial support during this pandemic. However, participants living in parental households did not report on food insecurity or financial instability.

Second, participants discussed either increasing or decreasing their consumption of EDNP foods. Fourteen reported an increased consumption of EDNP foods, particularly snacks. In contrast, 4 participants decreased their consumption of EDNP foods. Boredom, increased sedentary behaviors, fear of weight gain, self-restraint, and increased cost of food-delivery services were mentioned as possible causal factors:

“... I have so much more time now, I am just working from home so I can just go to the kitchen and snack whenever I want.” (Participant 5)

“Since working from home, I’ve cut down on unhealthy snacking and just made sure that I eat enough at normal times.” (Participant 22)

Third, some participants mentioned that they observed consistent weekly eating patterns. There were no longer differences in eating patterns between a weekday and a weekend, which was most likely the case before the lockdowns. These consistent eating patterns were associated with consumption of home-cooked meals, improved meal quality, resultant savings, and consumption of cultural foods among 7 participants:

“In the past, I’d be at university all week, so I would eat differently... lot of pre-packaged stuff... because I’m at home there’s a lot easier access to foods and I can have pretty better meals all week rather than just at the weekends.” (Participant 2)

Lastly, participants reported variation in the amounts and frequency of food consumption. They resorted to consumption of either smaller meals more frequently or larger meals less frequently. In addition, some participants chose to experiment with new diets and resorted to “intermittent fasting” to try to improve their food practices:

“I eat more frequent, with less portion each time... I can reach food whenever I want. If I eat all the time, I probably gain like 10 kilos after lockdown.” (Participant 10)

“Whilst we were in lock-down I was just curious... I wanted to try intermittent fasting... I did try it for about two weeks... it was an interesting experience.” (Participant 33)

Increased home cooking.

Sixteen interviewees noted cooking more often than before the pandemic. Consumption of home-cooked foods helped to improve portion control, increased intake of fresh foods, and reduced consumption of unhealthy foods. These practices were regarded as cost-effective, reducing dependence on takeaway and food-delivery services. Furthermore, 5 participants prepared different cuisines and experimented with new foods/recipes. Increased availability of time, home confinement, boredom, and social-media posts were listed as contributing factors:

“...My portions of meals are a lot smaller... because I am the one that’s in control of how much I put on my plate... it’s quite different to when I used to work in office... a lot of my meals, I would buy them... the serving sizes were a lot bigger....” (Participant 22)

“During my free time I cook everything. I usually look for special recipes on YouTube, and I try the recipes at home.” (Participant 9)

Altered food purchasing patterns.

Participants negotiated changes in purchasing patterns through changes in shopping frequency, adapting to decreased availability of food, and increasing purchases of shelf-stable foods and hoarding. Nine participants reduced their frequency of food shopping and 2 participants decreased visits to multiple food outlets. Five participants mentioned the reduced availability of food at stores and the need to substitute missing foods and to rely on the available stock in shops. One participant resorted to meal-kit services because they ensured all the ingredients were available for a meal:

“We can’t go to the supermarket and be guaranteed that we’re going to get exactly what we want for that dish... getting HelloFresh takes out a meal for the week, knowing that you’ve got everything for that meal.” (Participant 23)

“...Fresh foods don’t usually last a long time so I’m going with the ones that last a long time... ready-made foods like noodles, pastas, pasta sauce... frozen foods.” (Participant 14)

“For example, I haven’t been eating a lot of fruit & veggies that I would eat normally.... I shop very rarely and so I don’t buy them because I cannot store them for several weeks.” (Participant 20)

Theme 4: Heightened psychological distress

This theme includes the various psychological impacts experienced by participants.

Lack of self-control.

Five participants expressed concern over their lack of ability to control their food habits. Increases in the amounts and frequency of unhealthy food consumption were reported, for example 1 participant noted:

“I think my food habits have gone bad because I feel like I should have more self-control, but then part of me is like, “Well, I’m in lockdown, there’s nothing else to do.” (Participant 38)

Increased focus on food.

“Food” was a key focus for some participants. Four expressed their increased reliance on food as a way of seeking “comfort” and reprieve during lockdown, for example:

"I've noticed since lockdown... I feel I'm a lot more likely to find comfort in food and I definitely have been eating a lot more chocolates than usually." (Participant 24)

Emotional impact.

Four participants expressed feelings of social isolation, anxiety, boredom, and loneliness as some of the psychological outcomes of COVID-19 restrictions, for example:

"I'm eating better... also snacking a lot more... I think the relationship towards food is a lot, it's become more of a thing to do just out of boredom rather than out of necessity." (Participant 16)

Theme 5: Impact on future behaviors

The participants held varied beliefs about their changed food practices developed during the pandemic. They discussed the ways these would influence their future food habits. Three directions emerged: improved awareness, uncertainty, and excitement.

Improved awareness.

Enjoying food preparation and noticing the benefits of consuming home-cooked foods in combination with the goal of saving money provided positive incentives toward the development of future food practices. These included a desire for reliance on home-cooked foods, reduced consumption of takeaways, and reduced dining outside the home. Some participants linked this with a diminished craving for takeaways and dining outside the home. These culminated as improved awareness.

Uncertainty.

Three other participants discussed the barriers associated with continuation of positive food practices. Perceived lack of time and increased travel time were listed. Contrastingly, 3 participants expressed fear and uncertainty concerning continuation of negative food practices developed because of the pandemic:

"I'll be more inclined to cook more, bake more. For example, in Melbourne, we weren't allowed to go to cafes for a long period of time so my weekend routine of eating out, has diminished and that now I understand that for the same amount of money you can produce a larger feast at home." (Participant 21)

"I will have three hours less time per day, that's the time I spend in commute... just things like that, preparation times, storage space... it will be just hard to find things to pack and take somewhere rather than just making them." (Participant 5)

Excitement.

Two participants portrayed excitement, looking forward to dining out as a "treat" upon the lifting of restrictions:

"But also I think there's novelty of it all that I'm very excited to be able to go to a restaurant because I haven't been able to in so long, but more of a treat maybe because it's been removed from my routine basis." (Participant 21)

Discussion

The COVID-19 pandemic and its associated lockdowns affected the food practices of young Australian adults considerably. This study identified 5 key themes. First, disruption of routines; second, increased flexibility; third, changes in food practices; fourth, heightened psychological distress; and, lastly, impact on future behaviors. These findings are in accord with recent studies noting disruption of routines, changes in food practices, and psychological distress (3, 4, 38). However, our study provides novel insights by exploring how the increased flexibility associated with working/learning from home affected food practices. In addition, this study reports participants' perceptions of positive food practices implemented during challenging times and how they will be carried forward. These results provide important findings about a cohort less explored in Australia, whose counterparts in the United Kingdom have been identified as most likely to experience changes in eating behaviors during the COVID-19 pandemic (38, 39).

Theme 1 suggests how the disruption of routines may have led to changes in food practices. Research conducted in other countries among a broader range of adults has indicated that the disruption of routines during the COVID-19 pandemic was associated with significant effects on food habits including overeating, increased consumption of EDNP foods, eating to cope, and unhealthier meal patterns (3, 37). Our study confirms these findings but in addition suggests the ways participants' food practices were affected owing to the disruption of routines during the pandemic. Participants reported that disruption of routines led to altered sleep-wake cycles, boredom, and a lack of food-related planning contributing toward changes in appetite. The disruption of routines was central to changes in food practices. The changes in food practices were negotiated by way of changes in appetite. Appetite and hunger have been well-recognized situational influences on eating behavior in the past (40) and during lockdowns (15).

Theme 2, increased flexibility, captures how flexibility associated with working or learning from home affected participants' food practices. Although past research has highlighted how flexible employment options and online learning have improved outreach and reshaped traditional ways of working or learning (41), limited research has explored their impact on food practices. Whereas increased availability of time provided some participants with more time to make better food choices, overworking and the inability to separate work and personal life led to decreased duration of eating occasions and decreased physical activity among other participants. These findings suggest that increased flexibility had varied impacts on participants. The experience of lockdowns appears to have been associated with long-term changes in eating behaviors (38).

Theme 3 reports changes in food practices. Unhealthy changes were reported as increased use of takeaways, increased consumption of restaurant or fast food procured through food-delivery services, increased reliance on shelf-stable foods, meal skipping, lack of meal planning, and eating more EDNP foods owing to increased access to a kitchen. However, there were also reports of more positive food practices such as increases in home cooking, decreased consumption of EDNP foods, smaller and more frequent meals, decreased use of takeaways, and decreased consumption of restaurant/fast food procured through food-delivery services.

Other research conducted during the pandemic has noted changes in food practices. These include consumption of home-cooked foods (42), increased home cooking and decreased consumption of fast foods (42, 43), increased consumption of foods with longer shelf life (44), increased or decreased consumption of EDNP foods (5, 42), and decreased consumption of takeaways (45). Although these studies do report some similar changes in food practices, they do not provide any additional contextual information surrounding the changes or impact of the changes noted. More importantly, specific changes such as increased consumption of takeaways and foods procured through food-delivery services, meal skipping, use of meal-kit services, changes in frequency and quantity of food consumed, and a lack of meal planning have not been reported before.

Several participants reported increased consumption of EDNP foods. This finding is important in the context of research conducted before the COVID-19 pandemic, where an emergence of unhealthy eating patterns including frequent consumption of unhealthy meals and snacks among young adults was noted (46, 47). Therefore, this additional increase to the previously common unhealthy food practices in this age group suggests an even greater health risk among participants (43). This is important because increased consumption of EDNP foods and unhealthy eating patterns may have led to additional weight gain; increased intake of fats, sugar, and salt; and reduced intake of fresh foods (43). Overall, these could raise the risk of future chronic weight retention and morbidity (48). Reduced junk food consumption during the COVID-19 pandemic has been suggested to reduce the “obesogenic environment,” which predisposes some people to weight gain (49).

A substantial proportion of participants started skipping meals. Breakfast was reported as the most skipped meal. Previously, time scarcity, low education levels, and smoking status have been shown to be positive correlates of young Australian adults’ meal skipping behaviors (50). Lack of time was also reported as a factor related to meal skipping in the present study; however, additional factors were noted including financial difficulties, lethargy, lack of appetite, disturbed sleep routines, disrupted meal routines, and diets such as intermittent fasting.

These findings have 2 implications. First, meal skipping suggests poor diet quality (51), associated with increased total energy intake (51) as well as a higher risk of developing chronic diseases (52). Second, 4 participants living in shared households ($n = 4$) resorted to meal skipping as a way of managing food insecurity. Further, some study participants [living in shared ($n = 2$) and independent households ($n = 2$)] reported that they had become unemployed or had their hours of work reduced; several had moved back to live with their families and sought financial support during this pandemic, suggesting underlying financial distress (16). Likewise, British young adults resorted to skipping breakfast as a strategy to mitigate food insecurity (16).

Participants reported they had increased their consumption of takeaways, ready-to-eat foods, restaurant foods procured through food delivery, convenience foods, and prepackaged foods. A pre-COVID study showed that frequent consumption of takeaway food negatively affected the quality of young Australian adults’ dietary intake (53) and contributed toward weight gain (54), suggesting a negative change in food practice. Subsequently, participants’ diet quality may have been further compromised during lockdown.

Further, the lack of food planning activities is an unhealthy change that may indicate a lack of food variety and poor diet quality. This is

because meal planning has been cited as the central barrier to healthy eating (55). Meal planning has been shown to improve consumption of fresh foods, decrease consumption of processed convenience foods (55), and be a way to manage food insecurity (16).

Some of our participants reported altered food purchasing patterns, including changes in shopping frequency, increased reliance on long-lasting shelf-stable foods, and decreased purchases of fresh foods. Laguna et al. (56) reported less frequent food shopping and reliance on shelf-stable foods among Spanish adults. As young Australian adults already exhibit low consumption of fruit and vegetables (57), changes in purchasing habits driven by the pandemic may have further decreased their consumption of fruits and vegetables. Low consumption of fruit and vegetables is associated with an array of poor health outcomes including diabetes, cardiovascular diseases, obesity, and chronic kidney diseases (58).

Limited food availability in retail stores led some participants to substitute ingredients and resort to meal-kit services. This novel finding is an important insight into the emergence of increased popularity of meal-kit services in Australia. Moores et al. (59) examined the nutritional composition of foods procured through meal-kit services; however, the reasons for the use of these services were not determined. Our study contributes toward understanding the determinants of the use of meal kits during the COVID-19 pandemic.

In contrast to these unhealthy practices, there were some reports of healthier food practices in the present study. The increase in home cooking reflects estimations made by Kantar Worldpanel of a 38% rise in consumption of home-cooked meals during the initial days of the pandemic (60). Kantar Worldpanel also predicted that people may try to prepare restaurant meals that are usually prepared outside of the home (60). Likewise, our study participants attempted to replicate meals prepared outside the home. This novel finding appears to be unique to the Australian context. In Germany, adults were more likely to rely on convenient ready-made meals instead of cooking from scratch during lockdowns (45). An increase in home cooking is classified as a positive food practice because home cooking has been associated with improved diet quality, due to the relatively lower calorific, fat, and sugar content of home-cooked foods than of foods cooked outside of home (61). Home cooking has been identified as a preventative health measure (62).

The decreased consumption of foods procured through takeaway and food-delivery services suggests a positive change. However, the reasons stated by participants, including decreased social interactions, increased home cooking, food safety concerns, understanding the true financial costs, and home gardening, provide useful information for future public health programs aimed at reducing consumption of such foods. All reasons except home gardening match those observed in studies conducted before the COVID-19 pandemic (63).

The consistent weekly eating patterns suggest improved diet quality and increased consumption of fresh foods, at least among some participants. They reported having inconsistent eating patterns before lockdowns including less optimal intake of fresh foods and consumption of takeaway and fast foods. This novel finding has not been reported elsewhere. Eating consistency was impaired by eating away from home, eating with others, physical activity, time of the day, and alcohol consumption (64).

Theme 4 explores varying levels of psychological distress. Our study findings are in line with other research that has noted increased

consumption of sugary foods by adults as a coping strategy during the pandemic (38). Young adults appear to have resorted to unhealthy eating behaviors to cope with negative emotions such as loneliness, depression, and perceived stress (16, 65). Our findings provide additional information by noting how boredom affected participants' appetite. That is, participants noted increased or decreased consumption of food as a result of boredom.

Lastly, theme 5 indicates participants' perceptions concerning the ways their changed food practices may influence their future food practices. These insights are new, not reported in the limited research concerning the changed food practices brought on by the pandemic. The 3 perceptions—improved awareness, uncertainty, and excitement—reflect the varied changes experienced by participants. These insights reflect the ways in which young adults were able to implement lasting positive changes during challenging times. Second, this also implies that young adults want to move out of the pandemic and wish to return to how they were before. This coincides with the high demand for vaccinations posed by enthusiastic young Australian adults who perceive vaccinations as a means to get on with their lives and step toward the new normal (66). The findings concerning this theme have not been reported previously.

Future recommendations

The current study identified both positive and negative changes in the food practices of young Australian adults during the COVID-19 pandemic. Future research could aim to identify which young adults were able to make positive changes in food practices during the COVID-19 pandemic. The ways that participants made positive changes to their food practices could be incorporated into nutrition education programs: e.g., increased food planning and preparation, home gardening, understanding the true financial costs of foods procured outside of home. Future studies might focus on further examination of the unknown long-term effects of any additional weight gain among young adults due to the pandemic. They could also explore the potential impacts of factors such as financial stability, lethargy, lack of appetite, disturbed sleep routines, altered meal routines, and altered diet regimes on young adults' food practices. Findings concerning the increased flexibility emphasize the need for modifying public health policies to accommodate the varied changes in food practices experienced to encourage healthy food practices during future lockdowns. This is crucial as part of ongoing efforts to prevent the further development of chronic diseases linked to poor food practices during the pandemic. The implementation of home gardening suggests a novel potential avenue toward reducing consumption of takeaway foods and dining outside the home.

Strengths and limitations

This research is the first study, to our knowledge, that has explored the impact of the COVID-19 pandemic on the food practices of young Australian adults. The strength of this exploratory study is its examination of unique contextual and in-depth information that is difficult to capture in quantitative studies. Because our participants possessed different demographic characteristics, including student and employment statuses, the study provides a rich-in depth exploration of changes in young people's food practices experienced across 3 states in Australia. Our study further contributes to existent research by providing unique insights including the impacts of increased flexibility on food

practices and translation of changed food practices into future habits. However, the qualitative nature of the study design prevents generalization of study findings to the population at large. The assessment of current student status (currently studying or not) and employment status (full-time/part-time/casual employment) of study participants suggests that the participants may have had higher socioeconomic standing and education status than the general population of young adults. Most participants were currently studying ($n = 25$) and in paid employment ($n = 27$). We captured less data from young adults from lower socioeconomic levels. Therefore, the generalizability of findings to the young Australian adult population at large requires further testing. The self-reported changes in food practices may be considered a limitation. Participants may have offered biased estimates of changes experienced owing to a lack of understanding of the phenomenon being explored (67). In addition, they may have also provided less accurate information because of socio-desirability bias (67). Interpretation of findings must take into consideration the lack of objective, longitudinal dietary data collection in this study. However, this formative study has identified important changes which could pay the way for future research. Future prospective cohort studies could consider the use of validated dietary methods to measure changes in food practices. Nevertheless, findings from the present study can form a basis for further quantitative investigation. Lastly, we did not ask participants if they had essential employment leading to little disruption in their daily routines. However, the restrictions were strict enough to affect all individuals.

Conclusions

This research provides unique insights into ways young Australian adults' food practices changed during the COVID-19 pandemic. Overall, the findings suggest that many interrelated factors contributed to the changes in food practices experienced by these young adults. Both positive and negative changes in food practices were noted. Enforcement of restrictions and home confinement may have created a more challenging environment, thus affecting the food practices of many young adults. The findings could help in the development of effective public health strategies and the design of interventions to improve young adults' food practices and overall health status, not only during a pandemic, but also in "normal" times.

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Data Availability

Data were newly collected for the purpose of the study. Data described in the article, codebook, and analytic code will not be made available publicly because they are subject to ethics requirements outlined by the Deakin University Faculty of Health Ethics Advisory Group.

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