COVID-19 AND FOOD SECURITY IN URBAN CHINA: WUHAN AND NANJING COMPARED

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Introduction

To contain the spread of COVID-19, governments around the world have adopted various regulatory measures, many of which have drastically and often unintentionally interrupted food supply chains and reshaped the food environment in cities (Aday and Aday 2020, Carducci et al 2021, Crush and Si, 2020, Swinnen and McDermott, 2020). The measures taken by the Chinese government were especially interventionist and included locking down a whole city, closing all food outlets, and establishing a state-organized food distribution network (Zhong et al 2021). The original epicentre of the pandemic, Wuhan, was subject to a 76-day shutdown of all normal economic and social activity. Other Chinese cities also experienced varying degrees of restrictions on movement and residential lockdowns between late January and April, 2020. The control measures were unable to completely stop the spread of the coronavirus within Hubei Province and to most other Chinese provinces, although the pandemic would have been far worse without them (Kraemer et al 2020, Li et al 2021, Pan et al., 2020; Tian et al., 2020). The Chinese experience of controlling and mitigating the spread of COVID-19 also offers lessons for management of this and future global pandemics (Zhang et al 2020). This brief also contributes empirical depth to the general emerging discussion on the food security impacts of COVID-19 (Devereux et al 2020; Fitzpatrick et al 2021).

Regulations, restrictions and other policies were changing almost daily during this period and urban household food security was greatly affected (Zhong et al 2020a, 2020b). The challenge of accessing food was the lived experience of millions of urban residents. In order to quickly evaluate the impacts of the pandemic on the food security of urban residents in China and understand how people experienced these challenges, the Hungry Cities Partnership COVID-19 and Food Security Project conducted an online household food security survey between March 24th and 31st

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Find all project information at hungrycities.net/covid-19-and-food-security-projects

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2020. The survey targets were adults living in Wuhan and Nanjing between January 21st and when the survey was conducted in late March. The survey collected demographic information, household food security condition, the status of food access, and perceptions of policy and social countermeasures. The survey questions were based on an abbreviated version of the HCP household food security survey instrument, contemporaneous news reports on the pandemic's food security impacts, and consultations with experts on China's food security.

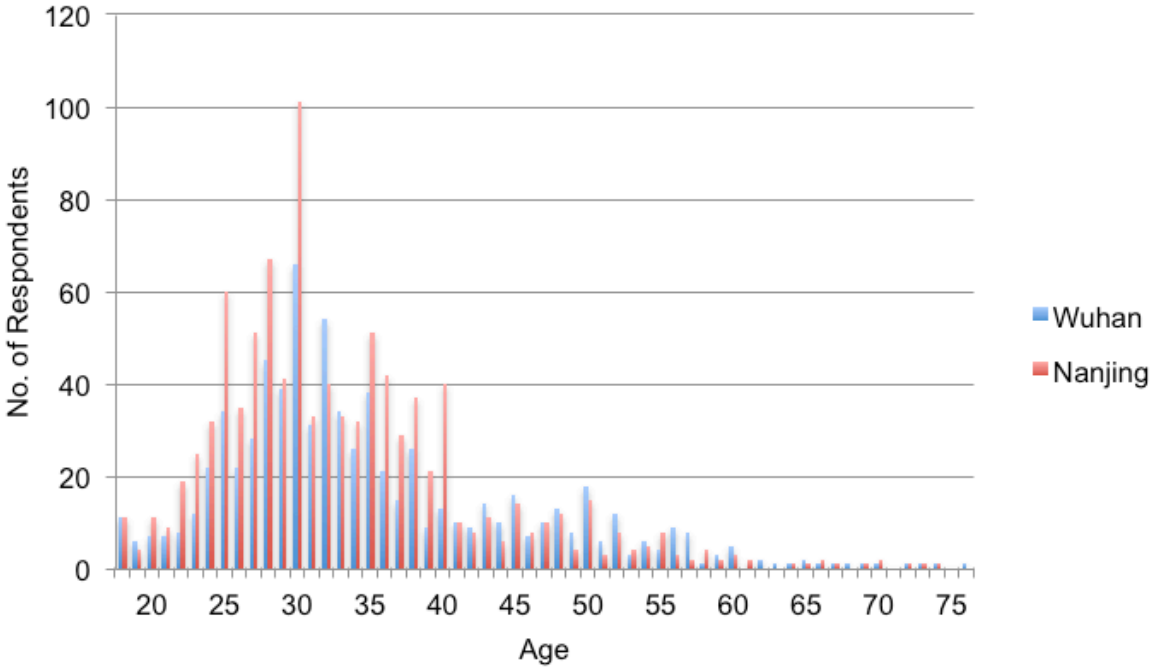
The survey was administered online through Wenjuanxing (https://www.wjx.cn/), the most commonly used online survey platform in China. The questionnaire was posted there and the link and invitation distributed through the most widely used social network in China,WeChat. Only respondents with an IP address in Wuhan or Nanjing were able to access the questionnaire. However, the fact that only respondents accessible via WeChat could participate and that all participants were self-selected means that this was not a fully representative survey. Nevertheless, it is unique in that it was conducted while the lockdown was in progress and draws attention to critical food security impacts of the pandemic and people's responses to the quarantine measures. It also means that indicative comparisons are possible between the two cities as the same methodology was used for both. In total, the questionnaire link was clicked and opened by 6,409 persons, while 2,363 completed the survey. Of these, 1,445 were in Nanjing and 918 were in Wuhan. During data cleaning, cases with a response time of less than 150 seconds and with respondents younger than 18 years of age were dropped, leaving an 1,817 valid responses for analysis (793 from Wuhan and 1,024 from Nanjing).

By analyzing the datasets with SPSS and Excel, this Research Brief summarizes the demographic information of respondents and identifies the immediate impacts of the pandemic on people's food security. It also explores potential socioeconomic factors that affected food security during the lockdown. Future analysis will build on the preliminary findings presented in this Brief.

Demographic Profile of Respondents

Figure 1 shows that the age profiles of respondents from the two cities have a similar pattern. The most common age group is between 25 and 40 with 66% and 73% of respondents in Wuhan and Nanjing respectively falling into that age group. The low numbers of people over the age of 60 is probably a function of their lack of familiarity with social media platforms (particularly WeChat) on mobile phones and with filling out online questionnaires. According to the Statistical Yearbook of Wuhan (Wuhan Bureau of Statistics 2020), 21% of Wuhan's population was 60 years of age or older in 2019. In 2020, 22% of Nanjing's total population (excluding children) was 60 years of age or older (Yangtze Evening Post 2020). These numbers suggest that the survey may under-represent the experience of elderly population of the city. At the same time, it is likely that elderly relatives living with respondents were captured in the responses although time-constraints on an online survey did not permit collection of household demographic beyond type and size.

FIGURE 1: Distribution of Age of Respondents



In terms of the gender breakdown, we found that females were more likely to complete the survey than males in both cities (Table 1). In total, 55% of the respondents were female.

TABLE 1: Sex of Respondents

	Wuhan		Nanjing		Total	
	No.	%	No.	%	No.	%
Male	325	41.0	417	40.7	742	40.8
Female	440	55.5	569	55.6	1,009	55.5
Not known	28	3.5	38	3.7	66	3.6
Total	793	100	1,024	100	1,817	100

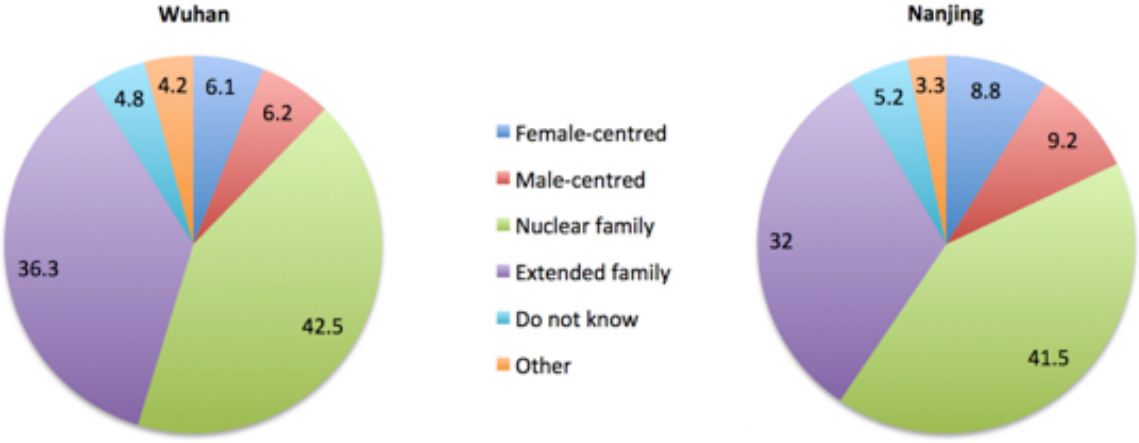
Only 10% of the respondents to the survey lived alone, with 82% in Wuhan and 87% in Nanjing living with up to five other household members (Table 2). Big households with more than five members were relatively uncommon in the survey. The average household size was 3.97 in Wuhan and 3.51 in Nanjing.

TABLE 2: Number of Other Household Members

	Wuhan		Nanjing		Total	
	No.	%	No.	%	No.	%
I live alone	80	10.1	106	10.4	186	10.2
1	70	8.8	124	12.1	194	10.7
2	196	24.7	292	28.5	488	26.9
3	174	21.9	274	26.8	448	24.7
4	117	14.8	141	13.8	258	14.2
5	94	11.9	61	6.0	155	8.5
6	33	4.2	20	2.0	53	2.9
7	11	1.4	2	0.2	13	0.7
8	6	0.8	0	0.0	6	0.3
9 or more	12	1.5	4	0.4	16	0.9
Total	793	100	1,024	100	1,817	100.0

In both cities, the nuclear family is the most common household structure (43% in Wuhan and 42% in Nanjing) (Figure 2). This refers to a husband/male partner and a wife/female partner living with or without children. Extended families (households with a husband/male partner, a wife/female partner, children and relatives) is the second most common household structure (36% in Wuhan and 32% in Nanjing). Female-centred households (with a female head and no male spouse/partner) and male-centred households (with a male head and no female spouse/partner) are relatively uncommon in both cities (12% combined in Wuhan and 18% combined in Nanjing). The earlier HCP city-wide survey of Nanjing also found that nuclear households were the most common household type (at 57%), although the proportion was considerably higher than in this survey sample (Si and Zhong 2018: 11). The proportion of extended households is more similar (29% versus 32%), as is the proportion of female and male-centred households (13% versus 18%).

FIGURE 2: Household Structure



In Wuhan, 4% of the respondents were either pregnant women or living with pregnant women and 26% of the respondents were living with infants/toddlers. In Nanjing, the numbers were 2% and 22%, a little lower than those in Wuhan. Not only might these households have special food needs, such as milk or baby formula, but the longer-term impacts of sustained food insecurity (particularly diminished food quality and variety) would be more severe on the young.

Household Registration Status

The household registration status (or *hukou* system) is a social and rural-urban migration management system in China (Chan and Zhang 1999). Having *hukou* in major cities like Wuhan and Nanjing means significant differences in access to educational resources, social services, health benefits and even permissions to drive cars or buy properties. Living through the lockdown was also most challenging for people with no local household registration status as they might have families outside of Wuhan while being stranded there. The majority of survey respondents did, in fact, have the local *hukou* and live in Wuhan and Nanjing for more than six months per year (Table 3). However, a significant minority of the households did not have the local official *hukou*, including 20% in Wuhan and 21% in Nanjing. Only a small number of respondents were visitors caught in the two cities during the pandemic (4% in Wuhan and less than 1% in Nanjing).

TABLE 3: Household Registration (*Hukou*) Status

	Wuhan		Nanjing		Total	
	No.	%	No.	%	No.	%
I have the *hukou* and live in Wuhan/Nanjing (for 6 months or more per year)	542	72.8	404	77.5	946	74.8
I have the *hukou* and am visiting Wuhan/Nanjing	27	3.6	6	1.2	33	2.6
I do not have the *hukou* and live in Wuhan/Nanjing (for 6 months or more per year)	115	15.5	108	20.7	223	17.6
I do not have the *hukou* and am visiting Wuhan/Nanjing (e.g. business trip, vacation, short term employment, visiting family)	30	4.0	2	0.4	32	2.5
Other	30	4.0	1	0.2	31	2.5
Total	744	100.0	521	100	1,265	100.0

Housing Type

Different housing types had variable implications for people's mobility restrictions during the lockdown and, by extension, their food access (Table 4). Gated commercial residential compounds were the most common housing type occupied by respondents in both cities (39% in Wuhan and 47% in Nanjing). These residential compounds of high-rise apartment buildings have one or several gates which control entry and exit to the compounds as a whole and

were easily locked down during the pandemic. Food access in these communities was mainly dependent upon delivery services operated by the local government or private businesses. There was usually coordination among multiple high-rise apartment buildings within one compound. Food delivered to the compound could be picked up in an open space by each household at certain times of the day (Zhong et al 2020a).

In contrast, open commercial residential compound living was more common amongst Nanjing than Wuhan residents (19% versus 11%). Each building in the compound has its own entrance which were used to restrict people's mobility during the lockdown. In this case, residents could not even go out of their building and access to food was more dependent upon others. More respondents lived in homesteads (traditional courtyard housing in peri-urban and rural areas) in Wuhan than in Nanjing (19% versus 11%). During lockdown or quarantine, each homestead had to organize and coordinate its own food delivery which proved a significant challenge. Non-commercial residential compounds in Table 4 refers to residential buildings owned by large enterprises, government departments or the military to house their employees. The employer of these residents played a more important role in ensuring food access. Only a few respondents were living in other housing conditions, such as student dormitory, independent houses and hotels.

TABLE 4: Housing Types of Respondents

	Wuhan		Nanjing		Total	
	No.	%	No.	%	No.	%
Gated commercial residential compound	306	38.6	481	47.0	787	43.3
Homestead	154	19.4	111	10.8	265	14.6
Open commercial residential compound	90	11.3	199	19.4	289	15.9
Gated non-commercial residential compound	89	11.2	84	8.2	173	9.5
Open non-commercial residential compound	54	6.8	65	6.3	119	6.5
Employee/student dormitory	30	3.8	12	1.2	42	2.3
Independent houses/townhouses	5	0.6	4	0.4	9	0.5
Hotel/Airbnb	1	0.1	2	0.2	3	0.2
Recreational vehicle/tent	1	0.1	2	0.2	3	0.2
Other	39	4.9	34	3.3	73	4.0
Prefer not to say	24	3.0	30	2.9	54	3.0
Total	793	100.0	1,024	100.0	1,817	100.0

The number of floors that respondents in high-rises in residential compounds lived on and whether they had access to elevators in their building would greatly affect food accessibility, particularly for the elderly. In China, residential buildings with seven or more floors are officially categorized as high-rise buildings and elevators are mandatory in these buildings, except for those built before 1999 when the regulation was enacted. Table 5 shows that just over a third of the respondents lived on the seventh floor or higher with elevators. Only a small number lived on the 7th floor or higher without elevators. However, in total, 22% of the Wuhan respondents and 33% of the Nanjing compound respondents were in buildings without elevators.

TABLE 5: Building Floor Respondents Live On

	Wuhan		Nanjing		Total	
	No.	%	No.	%	No.	%
7th floor or higher with elevator	285	35.9	361	35.3	646	47.2
6th floor or lower without elevator	137	17.3	279	27.2	416	30.4
6th floor or lower with elevator	52	6.6	111	10.8	163	11.9
7th floor or higher without elevator	34	4.3	58	5.7	92	6.7
Other	31	3.9	20	2.0	51	3.7

Rates of ownership of residential property were high in both cities (69% in Wuhan and 76% in Nanjing), although many owners carry significant mortgages (Table 6). The second most common property was rental accommodation (15% in Nanjing and 11% in Wuhan).

TABLE 6: Residential Property Ownership

	Wuhan		Nanjing		Total	
	No.	%	No.	%	No.	%
I own the property	548	69.1	773	75.5	1,321	72.7
I'm renting the property	87	11.0	153	14.9	240	13.2
This property is allocated to me by my employer	37	4.7	23	2.2	60	3.3
Other	43	5.4	21	2.1	64	3.5
Did not say	78	9.8	54	5.3	45	2.5
Total	793	100	1,024	100	87	4.8

Lockdown Policies

In total, 569 respondents (72%) in Wuhan and 841 respondents (82%) in Nanjing answered the questions about the types of lockdown measures they faced. The majority of Wuhan residents (61%) experienced complete lockdown, such that they were not allowed to exit their residence (residential complex or building) except for medical emergencies for 76 days (Qian and Hanser 2020). The equivalent number in Nanjing was only 20%. Another 20% of Wuhan respondents but 60% of those in Nanjing experienced a partial lockdown. These responses confirm that Wuhan as the early epicentre had a much stricter lockdown than Nanjing. The measures in Nanjing were more typical of those enacted in other major Chinese cities. However, the responses do need to be interpreted with care, particularly the fact that not all Wuhan households appear to have been in complete lockdown. First, because the question was multiple choice, some households checked both boxes as the lockdown was not implemented on exactly the same day throughout the city. Thus, some households experienced partial and then full lockdown. Second, some respondents might have been allowed to go out without permits as they were providing essential services so they would consider their personal experience a partial lockdown although their residential neighbourhood was in fact under complete lockdown. Third, there might also be cases of misinterpretation if people thought they were under partial lockdown but in fact they were under complete lockdown.

In Nanjing, the minority of households that experienced complete lockdown were living in neighbourhoods with confirmed cases of COVID-19. Also, because government kept emphasizing stay-at-home messaging, it is possible that some interpreted this as a complete lockdown.

Residents of households in partial lockdown were only allowed to exit their residence during specified hours and only with a permit. Permits were typically issued by the management company of the residential complex to residents who needed to submit an application with their personal information and proof of their residency or property ownership. Permits could usually be used for multiple entry and exit. However, different residential complexes enforced the permit system differently. In some areas, people only needed to show the permit to the gatekeeper upon returning to the complex while in others, they also needed to be checked when leaving the compound. The overall purpose was to reduce the mobility of people within the city.

TABLE 7: Lockdown Measures Implemented

	Wuhan		Nanjing	
	No.	%	No.	%
Complete lockdown	486	61.3	205	20.0
Partial lockdown	162	20.4	606	59.2
Neither	9	1.1	85	8.3
Other	3	0.4	13	1.3
Note: Multiple-response question				

The survey also asked respondents the number of days their place of residence had been in complete lockdown since beginning of the COVID-19 outbreak. Among the 486 respondents in Wuhan, 80% had been living in complete lockdown for more than eight weeks by the time of the survey (indicated by the blue bars in Figure 3). The length of time of complete lockdown was clearly shorter in Nanjing than in Wuhan. Only 26% of the lockdown respondents in Nanjing had been living in complete lockdown for more than eight weeks. Another interesting observation from Figure 3 is that the lockdown in Nanjing seems to have gone through two waves.

Figure 4 suggests that in both cities, the duration of partial lockdowns was shorter than complete lockdowns. Among the 20% of respondents in Wuhan who lived under partial lockdown, 39% had experienced this for more than eight weeks (compared to the 80% of those in complete lockdown. In Nanjing, where 59% experienced a partial lockdown, only 21% experienced this for eight weeks or more. As with the complete lockdown, there appear to have been two waves of partial lockdown in Nanjing.

FIGURE 3: Length of Time in Complete Lockdown

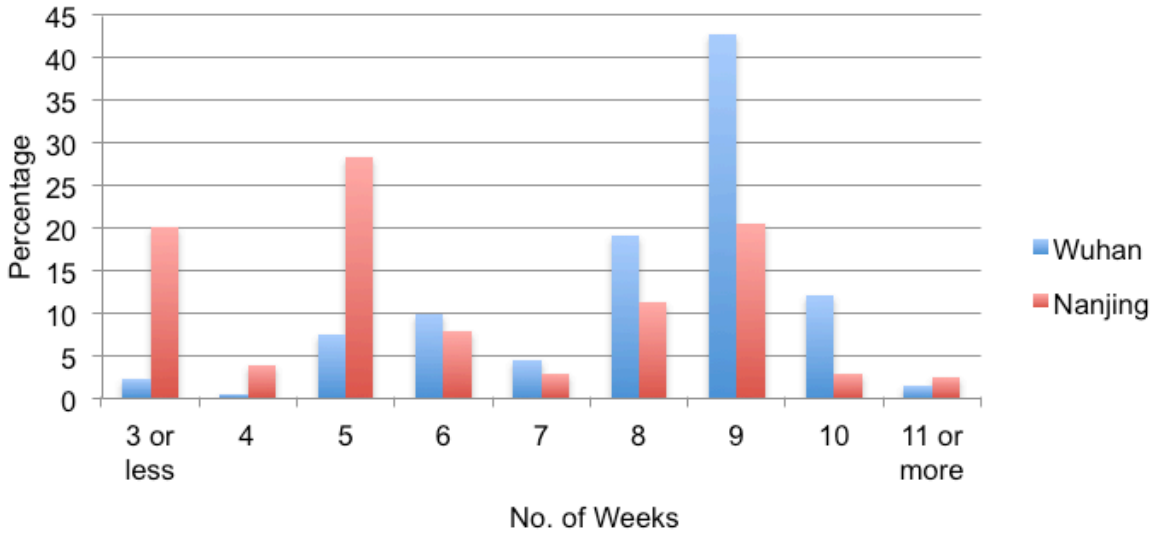
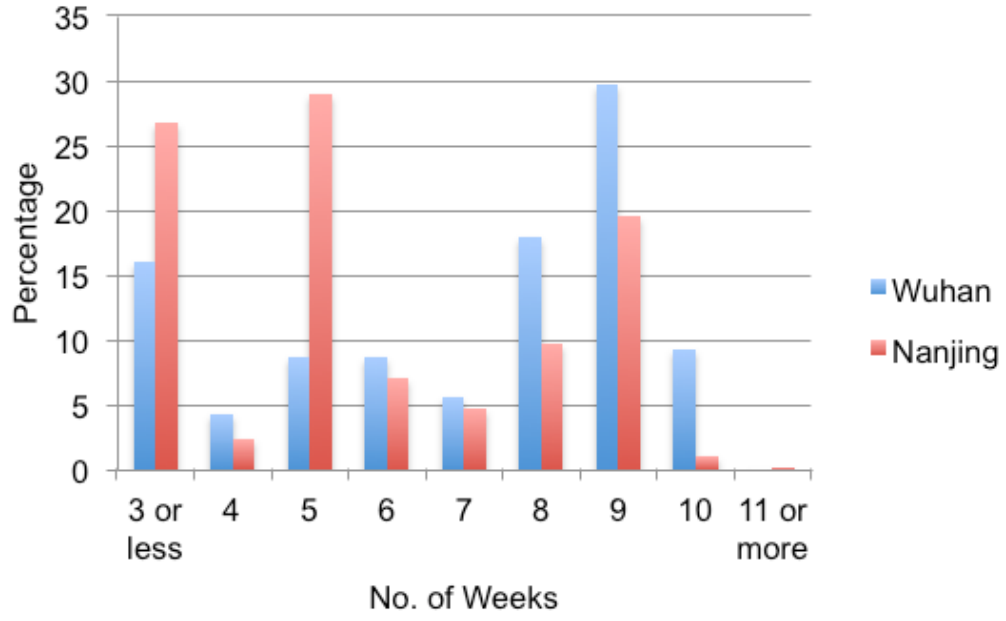


FIGURE 4: Length of Time in Partial Lockdown



The number of confirmed COVID-19 cases was much higher in Wuhan (and Hubei Province) than in Nanjing (and Jiangsu Province). According to official data, Hubei has had 68,151 cases compared with only 703 in Jiangsu. This difference was reflected in the survey responses with almost 50% of respondents in Wuhan claiming that people had tested positive for COVID-19 in their place of residence compared to only 5% in Nanjing. Of the respondents themselves, 8% in Wuhan said that they and/or their household members had been tested for COVID-19, with only one diagnosed positive case and another categorized as suspected. In Nanjing, 2% of the respondents had been tested and none were positive.

Levels of Food Insecurity

The survey employed the Household Food Insecurity Access Scale (HFIAS) and Household Food Insecurity Access Prevalence (HFIAP) typology to evaluate the food insecurity condition of households during the lockdown. The HFIAS is based on nine standard HFIAS questions about household access to food and each household is assigned a value on a scale between 0 (complete food security) and 27 (very severe food insecurity). The lower the number, the more food secure a household is. The average HFIAS scores in Wuhan and Nanjing were 9.4 and 4.8 respectively. Figure 5 shows different distributions for the two cities and clearly indicates that Wuhan households had much greater levels of food insecurity overall. However, even in Nanjing there was a marked increase in food insecurity: for example, the HCP household survey in Nanjing reported an average HFIAS of only 0.61 (Si and Zhong 2018).

FIGURE 5: HFIAS Score of Households in Wuhan and Nanjing During the Lockdown

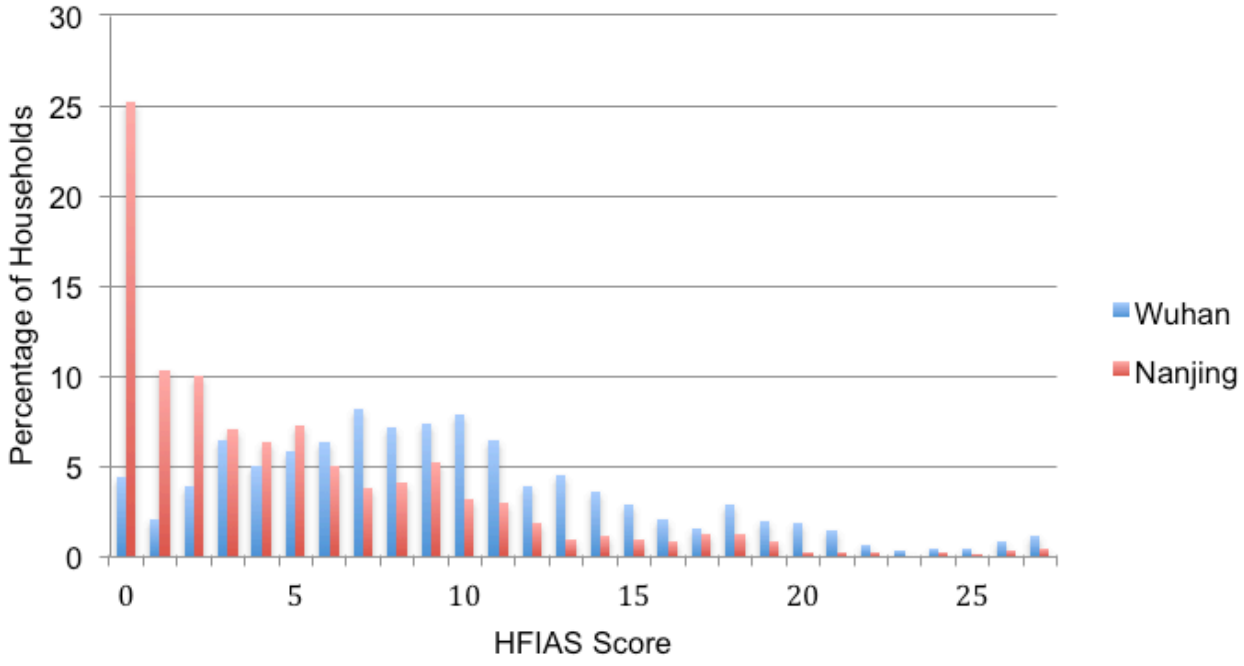


Table 8 provides a more detailed breakdown of the responses in both cities to the 9 HFIAS frequency-of-occurrence questions and confirms that a greater proportion of the households in Wuhan experienced each restriction than in Nanjing. For example, 55% of the respondents in Wuhan had worried about whether they would have enough food, compared with 30% in Nanjing. Or again, two-thirds of Wuhan respondents had experienced limitations on food variety, compared with 25% in Nanjing. The other notable feature of Table 8 is that in both cities, more households had experienced declines in the quality of food access (items 2-4) than in food quantity (items 5-9). Nevertheless, in Wuhan in particular a significant minority had to adjust their eating behaviour because of a lack of food; for example, 28% had eaten fewer meals, in a day, 24% had eaten smaller meals, and 13% had experience of having no food of any kind in the household.

TABLE 8: Frequency of Experiencing Elements of Food Insecurity

	City	All the time (%)	Sometimes/ Often (%)	Never/ Rarely (%)
1. How often did you worry that your household would not have enough food?	Wuhan	6.8	47.7	45.5
	Nanjing	2.3	27.2	70.4
2. How often were you not able to eat the kinds of foods you preferred?	Wuhan	6.4	58.7	34.8
	Nanjing	2.2	28.3	69.5
3. How often did you have to eat a limited variety of foods?	Wuhan	9.0	57.3	33.8
	Nanjing	2.0	22.8	75.3
4. How often did you have to eat some foods that you really did not want to eat?	Wuhan	3.8	35.7	60.6
	Nanjing	1.1	11.1	87.9
5. How often did you have to eat fewer meals in a day because there was not enough food?	Wuhan	5.7	22.0	72.3
	Nanjing	1.3	7.3	91.4
6. How often did you have to eat a smaller meal than you needed because there was not enough food?	Wuhan	3.2	21.4	65.4
	Nanjing	1.0	7.8	91.2
7. How often did you have no food to eat of any kind?	Wuhan	1.4	11.3	87.5
	Nanjing	0.6	5.0	94.5
8. How often did you go to sleep at night hungry because there was not enough food?	Wuhan	1.6	9.7	88.7
	Nanjing	0.5	5.0	94.5
9. How often did you go a whole day and night without eating anything because there was not enough food?	Wuhan	1.0	6.0	93.0
	Nanjing	0.6	4.5	94.9

When the HFIAS scores are converted into the four HFIAP categories using the developers' algorithm (Coates et al 2007), only 5% of households in Wuhan and 31% of households in Nanjing were classified as completely food secure (Table 9). More than 40% of households in Wuhan were categorized as moderately food insecure and 38% were severely food insecure. Nanjing households were generally more food secure compared to Wuhan with 22% of households severely food insecure and 19% moderately food insecure. However, these numbers still represent a massive increase over 2015 when only 2% were severely and 5% were moderately food insecure.

TABLE 9: HFIAP Categorization of Households in Wuhan and Nanjing During Lockdown

	Wuhan		Nanjing		Total	
	No.	%	No.	%	No.	%
Food secure	40	5.0	315	30.7	355	19.5
Mildly food insecure	124	15.6	297	29.0	421	23.2
Moderately food insecure	328	41.4	191	18.7	519	28.6
Severely food insecure	301	38.0	221	21.6	522	28.7
Total	793	100.0	1,024	100.0	1,817	100.0

Determinants of Food Insecurity

Various socioeconomic factors have been shown to affect levels of household food security in China (Si and Zhong 2018). To understand who was affected most by the lockdown, we cross-tabulated the HFIAS and HFIAP with several socioeconomic variables, including the gender of respondents, household structure, household registration status, and lockdown measures.

Gender clearly plays a role in the level of food insecurity. Male respondents were slightly more likely than female respondents to report higher levels of food insecurity. The average HFIAS scores in Wuhan were 9.57 (male) and 9.20 (female) respondents. In Nanjing the equivalent scores were 5.02 and 4.65. Figures 6 and 7 provide a breakdown of all HFIAS scores and do not suggest major distributional differences between male and female respondents in the two cities, although in both cases (despite the higher mean HFIAS scores) more male respondents reported being food secure (0-3).

FIGURE 6: Distribution of HFIAS in Wuhan by Sex

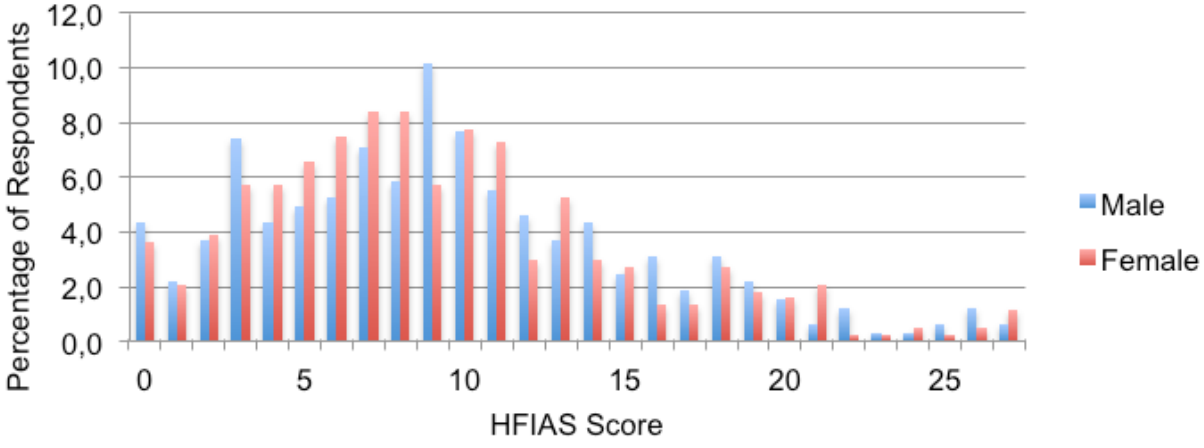
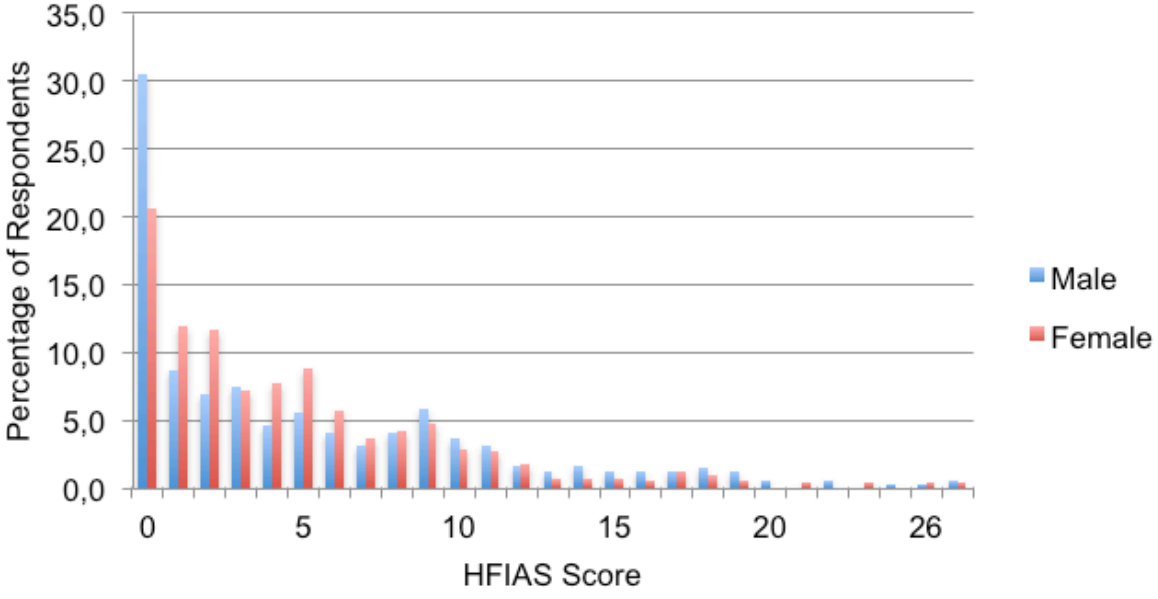


FIGURE 7: Distribution of HFIAS in Nanjing by Sex



Notwithstanding this observation, the HFIAP does indicate greater differences between the sexes in Nanjing than Wuhan. Table 10, for example, shows that the distribution of male and female respondents by the four HIAP categories is very similar, whereas in Nanjing, every category shows a 7-10% difference. For example, 36% of males but only 27% of females reported being food secure. The obverse was also true with 27% of males and 17% of females reporting severe food insecurity.

TABLE 10: Comparison of HFIAP Between Male and Female Respondents in Wuhan and Nanjing

	Wuhan (%)		Nanjing (%)	
	Male	Female	Male	Female
Food secure	4.6	4.5	35.5	26.9
Mildly food insecure	16.6	15.5	22.3	34.1
Moderately food insecure	41.2	42.0	14.9	21.6
Severely food insecure	37.6	38.0	27.3	17.4
Total	100.0	100.0	100.0	100.0

The type of household structure that respondents were part of also had a significant relationship with food security during the lockdown in both cities. Table 11 shows that in both Wuhan and Nanjing, male-centred households had the highest HFIAS scores and were therefore on average the most food insecure, followed by female-centred households. Nuclear families in Wuhan and extended families in Nanjing had the lowest HFIAS scores and level of food insecurity on average. The reason could be that nuclear and extended families have more than one household member who can generate income for the family. In the earlier Nanjing survey, female-centred households actually had the highest HFIAS scores (1.75) followed by male centred-households (0.75). Comparing the two surveys, although all categories of household had higher levels of food security during COVID-19, it would appear that male-centred and nuclear family households were more negatively affected.

TABLE 11: Mean HFIAS Scores by Household Structure

	Mean HFIAS Scores		
	Wuhan	Nanjing	Nanjing (2015)
Male-centred	10.1	6.6	0.75
Female-centred	9.6	5.7	1.75
Extended family	9.4	4.2	0.56
Nuclear family	9.1	4.6	0.46

The HFIAP highlights another major difference which is not apparent from the mean HFIAS scores. Table 12 shows the HFIAP breakdown for the four major types of household structure. While male-centred households had the highest percentage of severely food insecure in both cities (49% in Wuhan and 38% in Nanjing) (Table 12), female-centred households actually had the lowest levels of completely food security (2% food secure in Wuhan and 23% in Nanjing).

TABLE 12: Levels of Food Security by Household Structures

HFIAP	Female-centred (%)		Male-centred (%)		Nuclear family (%)		Extended family (%)	
	Wuhan	Nanjing	Wuhan	Nanjing	Wuhan	Nanjing	Wuhan	Nanjing
Food secure	2.1	23.3	6.1	28.7	4.5	30.1	4.5	33.8
Mildly food insecure	16.7	35.6	8.2	18.1	15.7	30.4	17.4	30.5
Moderately food insecure	39.6	17.8	36.7	14.9	45.4	20.2	39.9	18.3
Severely food insecure	41.7	23.3	49.0	38.3	34.4	19.3	38.2	17.4

The registration status of the household might also potentially affects people's access to necessary services during the lockdown, although more research is needed on exactly what services were affected. However, the *hukou* status of a household did have an impact on the likelihood of being food insecure. As Table 13 shows, households with *hukou* and reside in Wuhan and Nanjing had the lowest mean HFIAS scores (9.1 in Wuhan and 4.1 in Nanjing). Migrant households without *hukou* had higher levels of food insecurity (HFIAS of 10.5 in Wuhan and 6.2 in Nanjing).

TABLE 13: Comparison of HFIAS of Different Household Registration Status

	Average HFIAS	
	Wuhan	Nanjing
I have the *hukou* and I live in Wuhan/Nanjing	9.1	4.1
I have the *hukou* and I am visiting Wuhan/Nanjing	11.2	6.8
I do not have the *hukou* and I live in Wuhan/Nanjing	10.5	6.2
I do not have the *hukou* and I am visiting Wuhan/Nanjing	10.1	–

The impact of different types of lockdown measure on food security differed in the two cities. While respondents in Nanjing under complete lockdown had the highest level of food insecurity, the situation differed in Wuhan. Respondents in Wuhan under partial lockdown were actually more food insecure than those under complete lockdown. This might relate to the way people accessed food. In complete lockdown areas, the government devoted more resources to delivering food to households while in partial lockdown areas, people had to rely on limited visits to food stores or to buy food through commercial platforms to access food. However, as noted above, some partial lockdown households also experienced a later total lockdown which complicates the finding. In both cities, the small number of households living in areas with no lockdown measures were significantly more food secure, as indicated by the lowest HFIAS score.

TABLE 14: Comparison of HFIAS Between Households under Different Lockdown Measures

	Average HFIAS	
	Wuhan	Nanjing
Complete lockdown	9.3	5.4
Partial lockdown	9.9	4.8
Neither	7.6	3.9

Household food security also differed by housing conditions. In both cities, respondents living in open non-commercial residential compounds had the highest average HFIAS score, indicating the highest level of food insecurity, followed by those in gated commercial residential compounds. While households in open commercial residential compounds were most food secure in Wuhan, households in homesteads were the most food secure in Nanjing.

TABLE 15: Comparison of HFIAS Between Households Living in Different Housing Conditions

Housing type	HFIAS	
	Wuhan	Nanjing
Open non-commercial residential compound	11.8	5.2
Gated commercial residential compound	9.7	4.7
Employee/student dormitory	9.5	4.4
Homestead	9.4	4.2
Gated non-commercial residential compound	8.7	4.5
Open commercial residential compound	8.0	4.7

The floor the respondents were living on and whether they had elevators also affected household food security during the lockdown. Table 16 shows that in Wuhan, households living on the 7th floor or higher were slightly more food insecure than households living on lower floors but the difference was not significant. In Nanjing, households living on 7th floor or higher with elevator were significantly more food insecure than other households. In Wuhan, households living on 6th floor or lower with elevators were the most food secure. However, it is difficult to explain why Nanjing households on the 7th floor or higher without elevator were the most food secure, although this was only 6% of all households in the city.

TABLE 16: Comparison of HFIAS Between Households on Different Floors

	Wuhan	Nanjing
7th floor or higher, with elevator	9.6	5.1
7th floor or higher, without elevator	9.5	3.8
6th follor or lower, without elevator	9.4	4.6
Other	9.2	4.3
6th floor or lower, with elevator	9.1	4.5

Food Availability

As noted above, the major food security challenge faced by respondents during the lockdown was a decline in access to preferred foods and a diverse range of foods. Impaired access could be the result of reduced availability, price increases, closure of markets, or declining financial resources. Table 15 shows which of the various food groups respondents had greatest difficulty accessing and therefore, by extension, which food groups were in short supply during COVID-19. Overall, the effects of the pandemic on food supply and access were more severe in Wuhan than Nanjing across all of the different food groups with the exception of leafy greens (Table 17). For example, 44% of respondents in Wuhan reported disrupted access to fish, dried fish, shells and seafood compared to 18% in Nanjing. Similarly, 42% in Wuhan reported disrupted access to beef and lamb compared to 16% in Nanjing. In that city, the supply of pork seems to have been the most affected meat product (at 21%), though still considerably less than in Wuhan (36%). Soybean-sourced foods, such as tofu and bean curds, and fruits were also severely affected in Wuhan. The two food groups which were almost equally affected in both cities was the supply of leafy greens and rice and rice products.

TABLE 17: Food Groups Affected by COVID-19

	Wuhan		Nanjing	
	No.	%	No.	%
Fish, dried fish, shells, and seafood	351	44.3	185	18.1
Beef and lamb	332	41.9	164	16.0
Pork	282	35.6	213	20.8
Tofu, bean curds and other food made from soybeans	269	33.9	92	9.0
Fruits	251	31.7	139	13.6
Poultry (chicken, duck, goose, pigeon)	228	28.8	147	14.4
Peanuts, cashews, almonds or any other nuts	220	27.7	43	4.2
Milk, yogurt, cheese or any other food made from milk	202	25.5	83	8.1
Liver, kidney, or any other offal	180	22.7	61	6.0
Rice, noodles, rice noodles, bread, biscuits, or any other food made from rice, flour, sorghum, or millet	170	21.4	184	18.0
Beans and peas	165	20.8	59	5.8
Leafy greens	164	20.7	223	21.8
Baby formula (if you live with an infant/toddler)	142	17.9	69	6.7
Cucumber, zucchini, squash, wax gourd, sponge gourd	114	14.4	82	8.0
Eggplant, tomato, pepper or any other nightshade vegetables	109	13.7	62	6.1
Potato, sweet potato, purple yam, taro, or any other tuber food or food made from tubers	103	13.0	91	8.9
Broccoli and cauliflower	96	12.1	56	5.5
Soy sauce, cooking alcohol, vinegar, salt, other spice/condiments	80	10.1	42	4.1
Other vegetables	76	9.6	73	7.1
Eggs	63	7.9	57	5.6
Cooking oil and butter	50	6.3	30	2.9
Radish, carrot or any other root vegetables	46	5.8	52	5.1
Other	22	2.8	26	2.5
Note: Multiple-response question				

Conclusion

This research brief presents the basic empirical findings from the project's online survey conducted in China in 2020. Given the constraints of conducting research (with no fieldwork allowed), the findings are not necessarily representative of the whole population in both cities. For example, it appears that they might under-represent households of elderly members. However, these are relatively large samples and no equivalent research has yet been conducted in China. The results are therefore indicative rather than definitive but they raise a whole series of interesting questions for further research. Given that the research methodology was identical in both cities, the data also provides the opportunity for comparative analysis. This is an important exercise because not all cities in China were affected by COVID-19 to the same degree, nor was there a uniform response. The Wuhan model of complete lockdown to eliminate coronavirus spread has been widely (though less stringently) copied in many other countries or regions of countries. The Nanjing (and other Chinese cities) policy of partial lockdown has also been widely emulated.

The main objective of this brief is therefore to compare the original epicentre of the pandemic, Wuhan, with the neighbouring city of Nanjing, 500 km away. Two immediate differences stand out. First, the number of COVID-19 cases in Wuhan was far greater than in Nanjing which is testimony to the effectiveness of the Wuhan response in containing uncontrolled spread. Unfortunately, though, by the time the magnitude of the challenge was evident in Wuhan, the virus was already spreading rapidly around the globe. Second, the response of the municipal governments to COVID-19 varied considerably. In Wuhan, the majority of inhabitants and visitors were locked down and confined to their homes for weeks on end. In Nanjing, there was a degree of complete lockdown but it was more common for residents to be under partial lockdown which meant they could leave their homes for essential purposes and with permits in hand.

The key question, therefore, is how COVID-19 containment and mitigation measures impacted on the food security of the residents of the two cities and whether there were any significant differences in their experiences. All of the evidence presented in this paper indicates that the food-related impacts of the pandemic were more severe in Wuhan than Nanjing. As this brief shows, across the board the respondents in Wuhan experienced greater disruption of their food supply and normal consumption patterns as well as higher levels of food insecurity. The availability of most food groups was affected more in Wuhan than Nanjing as well. However, as this brief suggests, the two cities did share one thing in common: that is, the impact on households was far from uniform with the severity varying in similar ways by the gender of the respondents, household type, migration and residence status, housing conditions and the floor they live on. These preliminary findings will be examined in greater depth in subsequent project publications.

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