The Impact of Lockdown on Police Service Calls During the COVID-19 Pandemic in China

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Abstract Police service calls have been studied widely in the Western context, but they are rarely discussed in the Chinese context. For the context of this study, it is important to note that the Chinese authorities implemented the strictest lockdown after the COVID-19 pandemic began. Drawing on the data from a county-level city in Hubei province, this study examines changes in the quantity and nature of 110 service calls before, during, and after the COVID-19 pandemic lockdown. The results indicate that the average weekly call numbers before and after the lockdown were higher than during the lockdown. Meanwhile, different call types produced different patterns, though the weekly call totals decreased during the lockdown. There was a significant decrease in crime, traffic, and dispute calls, but a substantial increase in calls related to domestic violence, public security, and other issues. Changes in the frequency of different call types pose challenges to police departments. These findings will have implications for deploying police forces and allocating resources within the pandemic crisis in particular.

Introduction

According to Wuhan City Health Commission’s (2020) report, pneumonia cases of unknown cause were found since December 2019, and a total of 44 patients with pneumonia of unknown aetiology had been confirmed as of 3 January 2020. Then, COVID-19 swiftly spread to nearly every country and has been impacting every segment of society. It has had a considerable effect on economics, politics, culture, and crime (Stickle and Felson, 2020). To date, basing on recorded crime data, some research has examined the virus’s influence on crime patterns (e.g. Balmori de la Miyar et al., 2021; Felson et al., 2020; Halford et al., 2020; Payne et al., 2020). Others have used service calls data to investigate the effect on the frequency of calls (e.g. Ashby, 2020b; Hodgkinson and Andresen, 2020; Lersch, 2020; Mohler et al., 2020). However, these studies were set in the Western contexts and often discussed only certain types of calls, such as those related to crime (Hodgkinson and Andresen, 2020; Mohler et al., 2020) and mental health issues (Lersch, 2020). Though Ashby (2020b) analyzed specific call types,
such as crime, order maintenance, and traffic collisions, he mainly focussed on changes in the early months of the COVID-19 pandemic. In particular, American societal norms do not allow for implementing strict lockdowns. For example, state governments told people to stay home, and most businesses were shuttered, but even New York Governor Andrew Cuomo’s executive order exempted 59 occupations from these restrictions (Dunst, 2020). Therefore, it becomes harder for scholars to examine the changes, especially during and after COVID-19. In contrast to Western regimes, the Chinese political system has authoritarian features and is powerful enough to essentially control all sectors of the country (Kornai, 1992). The COVID-19 lockdown offers the opportunity to investigate the effect on crime and social order when the measure was implemented in China.

In 1979, Lawrence Cohen and Marcus Felson presented the routine activity theory and argued there would be a high probability of crime and victimization when three conditions were met: motivated offender(s), suitable target(s), and lack of guardianship (Cohen and Felson, 1979; Felson and Cohen, 1980). The theory provides a macro-perspective on crime and disorder because it assumes how changes in social and economic conditions influence the overall crime and victimization rate. For example, Sherman et al. (1989) found that some certain places, such as bars and run-down motels and hotels, attracted motivated offenders in that they had a lot of vulnerable targets and lacked sufficient guardianship. Not only has the outbreak of COVID-19 greatly affected people’s lifestyles and changed their routine activities, but also these transformations can lead to shifts in criminal behaviour. As Hodgkinson and Andresen (2020) pointed out, residences often easily become a potential target of burglary, but people’s guardianship over their residence would make these targets more difficult to victimize when stay-at-home orders are implemented. Therefore, the routine activity theory provides a suitable theoretical framework for understanding the increase or decrease in crime and disorder.

In this study, we used service call data to examine changes in police calls in China. On the one hand, crime statistics are manipulated and do not reflect China’s actual crime situation (Xu, 2018). One the other hand, service call data are an independent measure of citizens’ demands for service and do not reflect police-initiated activity (Decker et al., 2007). Calls for service to police departments generally refer to ‘110’ calls for emergency assistance in mainland China. That is, as 911 is the emergency number for Americans, dialling 110 service call is now widely known among Chinese as a hotline to contact the police in the event of an emergency such as crime, accident, or needing help. The 110 call system has increased the efficiency of crime fighting and improved responsiveness to service public calls (Wong, 2002) since it was implemented in the 1980s. It also played a vital role during the COVID-19 pandemic in China. For example, in early February 2020, police officers received more than 1,000 telephone calls per day at the 110 command centre at the Qinggang County Public Security Bureau (PSB) in Heilongjiang Province (Qinggang County PSB, 2020). Unfortunately, service calls have received little attention in China, and only a few studies have been descriptive in nature (e.g. Cheng et al., 2020; Wei, 2020).

Generally speaking, we collected the raw data from the 110 command centre of a county-level city in Hubei Province. More specific, this empirical study used 110 service call data to explore the patterns in police service calls before, during, and after the COVID-19 pandemic. The exploration focussed on changes in the quantity and nature of such calls. This study will provide guidance for Chinese policing work in the context of sporadic pandemic outbreaks and has policy implications for exceptional events throughout the world.
Previous studies

Theoretical foundation

Routine activity theory is widely believed to provide a valuable perspective of how crime changes. Cohen and Felson (1979) suggested that many traditional criminological theories had difficulty explaining the annual changes in crime rate trends after World War II. The theory views crime as an event, emphasizing its relation to space and time and its ecological process (Miró, 2014), rather than focussing on the offender. Structural changes in routine activity patterns offer more opportunities for crime to take place and, Cohen and Felson (1979) argued, can influence crime rates when three elements converge in space and time. For example, college enrolment, vacation, and new consumer goods provide various opportunities to escape the confines of the household while they increase the risk of predatory victimization (Felson and Cohen, 1980). Messner et al. (2007) suggested that ‘changes in routine activities and increased opportunities for crime are likely to have played a role in the growth in crime’ (p. 514). Conversely, the lack of any one of these variables is sufficient to prevent the successful completion of a predatory crime.

The occurrence of exceptional events presents an excellent opportunity to explore the change of routine activities and examine the increase or decrease of target availability. For example, basing on the routine activity perspective, Decker et al. (2007) explored the effects of planned events on the demand for police services using official 2002 data from the Salt Lake City Police Department. They found no statistically significant increase in demand for public security services during the Olympics. However—and equally important—there was also no decline in such calls (p. 96). In contrast, LeBeau (2002) examined how a natural disaster—Hurricane Hugo—altered routine activities during the period of 22 September to 2 October 1989, in Charlotte, North Carolina, and provided deep insight into citizens’ demands for police service. The results indicated that the nature and volume of the calls put more emphasis on order maintenance and service functions. Specifically, calls for service abruptly increased the day of Hugo’s arrival and remained high for more than a week. LeBeau also found that, during Hugo’s arrival and the following three days of recovery, burglary reports were much higher than normal—meaning, the hurricane increased vulnerable targets. Similarly, due to Hurricane Katrina in August 2005, large numbers of New Orleans residents fled to other cities, including Houston, San Antonio, and Phoenix. Varano et al. (2010) used crime data (including homicide, rape, robbery, aggravated assault, auto theft, and burglary) in the three cities and found mixed results. For example, the post-Katrina intervention effect was significant for only homicide in Phoenix and homicide and robbery in Houston. However, none of the pre- and post-Katrina weekly crime levels was significantly different in San Antonio. Moreover, Prelog (2016) examined the relationship between disaster and crime. The findings show that higher crime rates are associated with larger disaster magnitudes. However, different crime types vary. For example, disaster magnitude is positively associated with an increase in property crime, but disasters do not affect violent crime rates.

COVID-19 and crime and disorder

In the wake of COVID-19, research has been conducted on the pandemic’s impact on levels of crime and disorder. However, results have not been conclusive. Mohler et al. (2020) examined patterns for robbery, burglary, vehicle theft, assault and battery, domestic violence, vandalism, and traffic stops in police calls for service and reported crime in Los Angeles from 2 January 2020 to 18 April 2020 and in Indianapolis from 2 January 2020 to 21 April 2020. They found that social distancing had a statistically significant impact on burglary calls, robbery calls, and reported crimes
in Los Angeles, but both reported aggravated assault was statistically unchanged in Los Angeles and Indianapolis. They also observed in both cities a substantial increase in traffic stops and domestic violence calls. Similarly, using data between 1 January 2020 and 27 April 2020 from Dallas, Texas, Piquero et al. (2020) examined the extent to which the stay-at-home order was associated with an increase in domestic violence. The results showed that there appeared to be an increase in domestic violence in the first 2 weeks after the local order was implemented, but then a decrease thereafter. However, as Payne et al. (2020) pointed out, their studies were limited to a short-term analysis and unable to disentangle seasonal trends and more longer-term crime patterns. Thus, Campedelli et al. (2020) analysed reported crime data from 1 January 2017 and 28 March 2020 in Los Angeles to investigate the impact on crime trends. They used Bayesian structural time-series models and found that overall crime, robbery, shoplifting, theft, and battery had significantly decreased, but no significant effect on vehicle theft, burglary, assault with a deadly weapon, intimate partner assault, and homicide. They argued that social distancing had a more direct influence on instrumental and less serious crimes.

Ashby (2020a, b) successively used recorded crime data from 16 cities and calls-for-service data from 10 cities in the United States in the early months of the 2020 COVID-19 outbreak. To compare the actual frequency of crime, Ashby (2020a) used seasonal auto-regressive integrated moving average models and found no significant changes in the frequency of serious assaults. There was a decrease in vehicle theft in Chicago and Tucson and in residential burglary in Chicago, Los Angeles, and Memphis. Consistently, after extracting crime data from the Detroit Police Department during March 2020, Felson et al. (2020) also found that burglary declined in areas dominated by residential land use. Moreover, using calls-for-service data, Ashby (2020b) found that there was no distinct difference between the forecast and actual frequency of calls between the first US case and early March, when cities and states began to enforce social distancing. However, there were substantial reductions in certain call types, such as traffic collisions, and significant increases in calls about dead bodies in New Orleans and Seattle and domestic incident calls in Los Angeles, New Orleans, and Phoenix.

Most research is based on US cities with open source crime data, although some also were conducted in other countries. One exception is Halford et al.’s (2020) study, in which they used 5 years of daily counts of recorded crime data and explored crime effects for one UK police force area. Results showed that all crime types had declined and was statistically significant. Others produced mixed findings. For example, to examine the shift in criminal behaviour in Vancouver, Canada, Hodgkinson and Andresen (2020) used data from the Vancouver Police Department and analysed changes in the frequency of particular crime types, such as residential and commercial burglary, theft, theft from vehicle, theft of vehicle, mischief, and violent crime. They found a significant decrease in total crime, but an increase in commercial burglary. Theft and theft from vehicle decreased and auto theft was stable. Residential burglary, mischief, and violence had no obvious change during the COVID-19 pandemic.

To examine whether violent crime declined in the context of social distancing regulations, Payne et al. (2020) modelled the series trend in four violent crime types (common assault, serious assault, sexual offences, and breaches of domestic violence orders) over 6 years between February 2014 and 2020 in Queensland, Australia. Results showed that rates of four violent crimes declined to their lowest levels in a number of years as of April 2020, but the rate of recorded serious assault and sexual offence was significantly lower in April. Moreover, the rate of domestic violence order breaches remained unchanged.

Given that Sweden has taken smaller interventions to cope with the virus, Gerell et al. (2020)
indicated that the impacts on crime in Sweden were likely to be weaker than in other countries. They analysed eight crime categories, including outdoors assault, indoors assault, residential burglary, non-residential burglary, personal robberies, pickpocketing, narcotics crimes, and vandalism. They then compared the change in crime before and after the COVID-19 intervention for 2020 in relation to the median for the three previous years. They found that total crime, burglary, and pickpocketing had decreased significantly, but personal robberies and narcotics crimes were unchanged.

Finally, Balmori de la Miyar et al. (2021) estimated the COVID-19 pandemic’s effects on conventional crime (domestic violence, burglary, robbery, vehicle theft, and assault and battery) and organized crime (homicide, kidnapping, and extortion) from January to May of both 2019 and 2020 in Mexico City, Mexico. They used an event study and a series of robustness tests which showed a sharp decrease in domestic violence, burglary, and vehicle theft and a decrease in assault and battery and extortion during some weeks. Meanwhile, there were no effects on crime related to robbery, kidnapping, and homicide. They concluded that conventional crime declined and organized crime maintained similar activity during the pandemic. Moreover, using 911 calls to the Detroit Police Department, Lersch (2020) explored the rate and geographic distribution of mental health issues during the COVID-19 pandemic. The results showed that, compared to the same period for the previous 3 years, the total number of calls for mental health issues was at the lowest level. One reason might be that people were fearful of seeking help for their conditions, whether for chronic physical or mental conditions.

In brief, previous studies in Western contexts provide a deep understanding of the change in crime patterns and demands for police service calls, though some findings are mixed. However, these studies were confined to crimes or the first few months of the pandemic outbreak. Due to China’s different political system and cultural context, the Chinese authorities imposed tight lockdown and then ended the quarantine measures, and people tended to obey the orders. These practices influenced policing work, especially police service calls. Thus, we used service call data to explore changes in the demand for policing before, during, and after the COVID-19 pandemic in one city in Hubei Province, China, and generalized the patterns observed in Western research.

Data and methods

Data

This study took place in a county-level city in Hubei Province, China (registered population of 650,200 in 2018). The study site was served by a 110 command centre that employed five police officers (including a centre director) with budgeted positions and eight auxiliary police officers. One police officer leads two auxiliary police officers. They work for 24 hours a day, then rest for three days. When they receive calls, police officers ask about the basic information. Then, based on the event’s type, they dispatch the specific police station within the jurisdiction.

Most researchers who do policing or criminological studies face difficulties gaining access to police departments in China (e.g. Chang, 2012; Scoggins and O’Brien, 2016; Wang, 2014, 2020; Xu, 2009; Xu and Jiang, 2019; Zhong, 2009). The author used a personal relationship to gain access to public security organs to do fieldwork and collect these data, which contain information related to the date and time of occurrence and types of call for service made from 1 January 2019 to 30 June 2020. After the authors deleted duplicated records, 27,244 calls for services remained. The retrieved calls were aggregated into weekly counts, which is a commonly adopted time interval in the policing literature (e.g. Ashby, 2020b; Decker et al., 2007).

Five types of calls were summarized by the researchers, including crime-related calls, public
security-related calls, traffic-related issues, domestic violence calls, dispute-related calls, and others. Based on the distinction between criminal cases and public security cases in China (Zhong, 2009), two types of calls were chosen. The first included crime-related calls involving criminal cases that may violate Chinese Criminal Law (CCL), including theft, fraud, robbery, assault, burglary, rape, drug-related crimes, and behaviours that endanger public safety (e.g. arson, causing explosions). Calls involving theft and fraud were the most prevalent. The second type included public security calls involving cases that might violate the PRC’s Public Security Administration Punishment Law (PSAPL). In the current study, typical examples of PSAPL cases included those that involved public fights, pornography, gambling, and drugs but were not severe enough to violate the CCL. Second, because traffic is regarded as a substantial part of police work (Bayley, 1996), traffic-related calls were examined. These included traffic accidents, traffic jams, traffic disputes, and traffic violations (e.g. drunk driving, driving without a license). Among all types of traffic-related calls, traffic accidents were the most prevalent (67.06%). Third, during the pandemic, stay-at-home orders caused domestic violence to become more frequent, dangerous, and severe in China. The Rights Protection Association of Women and Children Under the Blue Sky, an NGO in Jianli County, Hubei Province, found that instances of domestic violence totalled 175 cases in February 2020, twice as many as in January (Cao, 2020). Therefore, the authors selected domestic violence as one category. In accordance with Article 2 of the PRC’s Anti-Domestic Violence Law, domestic violence is defined as the inflicting of physical, psychological or other harm by a family member on another by beating, trussing, injury, restraint, forcible limits on personal freedom, recurring verbal abuse, threats, and other means. According to our records, most domestic violence calls are made by wives who are being abused by husbands. Fourth, common disputes are also widespread in police departments (Dai, 2017; Zhang, 2020). Dispute calls usually involved trivial conflicts that violate neither the CCL nor the PSAPL. Such disputes usually involve family relations, economic problems, employer–employee relations, neighbourhood relations, emotional issues, and doctor–patient relations. Finally, other calls cannot be categorized into the above-mentioned five categories. These include lost children, elderly, and mentally ill people; suicides; drownings; becoming trapped in an elevator; and falling from a building.

The city’s actual lockdown period occurred between Friday, 24 January 2020, and Wednesday, 18 March 2020. However, because a typical week starts on Monday and ends on Sunday, in the analysis, we redefined the lockdown period as between Monday, 26 January 2020, and Monday, 16 March 2020.

Analytical method

The current research is aimed at exploring changes in the quantity and nature of service calls during the lockdown. More specifically, we are particularly interested in investigating the change of calls due to the implementation and the cancellation of lockdown. A sequence of approaches was taken to achieve the research goal. First, descriptive statistics were computed to provide an outline of the data. Second, line figures of the weekly calls were plotted against the time to show the change in weekly calls intuitively. To better interpret the time-series change of the weekly calls, local regression (Loess) was applied to smooth the calls’ volatile patterns. Third, one-way ANOVA was applied to quantify the changes in weekly calls before, during, and after the lockdown period. Tukey’s post hoc tests were conducted afterwards to assess the difference in weekly calls between any two time periods.

The results of the one-way ANOVA quantified the lockdown’s effects on the average number of weekly service calls. However, this change might have resulted from the natural effects of seasonality and the time dependency of the time-series
data. To rule out the confounding effects caused by the nature of time-series data, modified interrupted time-series models (ITS) (McDowall and McCleary, 2018) were applied to examine the changes of the weekly calls for different time points. To be more specific, autoregressive integrated moving average (ARIMA) models with two dummy variables indicating whether the time period was before (1 = before lockdown, 0 = otherwise) or after (1 = after lockdown, 0 = otherwise) lockdown were estimated to show the change of the weekly calls when the lockdown policy was implemented and cancelled. The coefficient of the first dummy variable can be interpreted as average difference of the number of calls before and during lockdown, while the second one as the statistics during and after lockdown.

The current approach is distinct from two commonly used methods to model the effect of special events, that is the regular ITS model (Mohler et al., 2020; Piquero et al., 2020) and forecast method (Ashby, 2020a; Halford et al., 2020; Payne et al., 2020; Piquero et al., 2020). The former approach introduced one dummy variable representing the presence of the event in the ARIMA model and interpreted the coefficient of the dummy variable as the effect of the event on the number of police calls. However, one dummy variable only compared the average number of calls when the event took place or not, it could not separate the average number of calls before or after the event. Therefore, we introduced another dummy variable into the ARIMA models. The latter method applied an automatic algorithm to select ARIMA models with minimum prediction error and used the models to forecast the expected number of calls in the absence of any changes related to the coronavirus pandemic. This approach is useful to calculate the long-term effect of a small-period intervention or a sudden event. However, in the current study, we are interested in scrutinizing the effect of a relatively long event, that is a lockdown, which lasts for approximately two months. Thus, the forecast method is not appropriate.

ARIMA models require tests on stationariness, seasonality, and trends before estimating the models. For this study, stationariness was tested using the Augmented Dickey–Fuller (ADF) test (Banerjee et al., 1993; Said and Dickey, 1984). Seasonality and trends were tested using Seasonal-Trend Decomposition Procedure Based on Loess (STL) (Cleveland et al., 1990). Finally, the ARIMA models were estimated using the auto.arima function in the R package forecast (Hyndman and Khandakar, 2008; Hyndman et al., 2020), which automatically chose the optimal number of autoregressive, difference, and moving averages according to AICc, AIC, and BIC values.

The tests described above were conducted for each call type, and various ARIMA models were estimated. ARIMA(2,0,0), ARIMA(1,0,0), ARIMA(1,0,0), ARIMA(0,1,1), ARIMA(0,0,3), and ARIMA(1,0,0) were the most appropriate models for estimating the time-series patterns of overall, domestic violence, traffic-related, crime-related, dispute, security and other types of weekly calls, respectively.

Results

The descriptive analysis of the average numbers of calls per week is presented in Table 1. The results indicate that the most prevalent types of calls were traffic-related calls (30.30%), followed by other calls (27.51%). The percentages of calls related to domestic violence, crimes, disputes, and public security were 15.97%, 14.66%, 13.66%, and 12.27%, respectively. Overall, the average weekly call totals were 347.45, 290.86, and 359.44 during the periods before, during, and after the lockdown, respectively. At first glance, the overall calls decreased during the lockdown period. In particular, the number of traffic-related calls dropped by approximately 90%. In contrast, the number of domestic violence, public security,
and other calls increased. The most noteworthy increase was in domestic violence calls, which increased by nearly four times compared to before the lockdown. However, when the lockdown ended, the average number of calls per week returned to original levels, suggesting the lockdown’s effects on the number of calls might have been temporary.

A more intuitive picture of the changes in weekly calls by type can be found in Fig. 1, in which the black lines indicate the actual weekly calls and the blue lines with grey areas denote the Loess lines with 95% confidence intervals. The shaded rectangular area indicates the intervals of the lockdown period. As the figure indicates, the weekly totals for all kinds of calls fluctuated but were stationary overall before the lockdown, except for a peak in January and February 2019 during the Chinese Lunar New Year. However, during the lockdown, the weekly calls for traffic-related issues, crimes, and disputes decreased dramatically, and the weekly calls for domestic violence, public security issues, and other types increased. Similarly, when the lockdown ended, the weekly calls returned to their original levels. Slight differences include that the rate of change in calls for crime and domestic violence after the lockdown period was generally slower than that for other types of calls.

As Table 1 and Fig. 1 indicate, different types of calls demonstrated different patterns during the lockdown period, but it remains unclear whether the change in the total weekly calls during the lockdown period achieved statistical significance. Table 2 displays the results of one-way ANOVA tests performed to examine whether the average number of weekly calls before, during, and after lockdown differed significantly. Although the overall difference in weekly calls was not statistically significant, the differences were significant for each type of call (all \( p < 0.05 \)). Findings from the Tukey’s post hoc analyses supported the findings from the previous descriptive analyses. For traffic-related issues, crimes, and disputes, the number of weekly calls before and after the lockdown was significantly higher than those during the lockdown (all \( p < 0.001 \)). In contrast, for domestic violence and other calls, the numbers were significantly higher during the lockdown compared to before and after the lockdown (all \( p < 0.001 \)). For public security calls, although the number of weekly calls increased significantly during the lockdown, the difference between the numbers during and after lockdown was not significant.

Table 3 displays the results of the ARIMA models. On average, 105.94 more calls occurred each week before lockdown than occurred during...
lockdown ($p < 0.05$). Also, 108.77 more calls occurred each week after lockdown than occurred during lockdown ($p < 0.05$). Similar patterns emerged for calls about traffic, crimes, and disputes. The numbers of weekly calls before and after lockdown were significantly higher than those during the lockdown. The other three types of calls, however, showed different patterns. Weekly calls for domestic violence, public security issues, and others were lower before and after lockdown compared with the numbers during the lockdown. Noticed that the differences of the average weekly

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**Figure 1** Frequency of weekly 110 calls from January 2019 to June 2020

**Table 2** Average weekly calls before, during, and after lockdown

|                              | Before lockdown Mean(S.D.) | During lockdown Mean(S.D.) | After lockdown Mean(S.D.) | One-way ANOVA |
|------------------------------|-----------------------------|----------------------------|---------------------------|---------------|
|                              | Overall                     | Domestic violence          | Traffic                   | Crimes        | Disputes      | Public security | Other         | F     | Before–During | After–During | Before–After |
|                              | 347.45 (88.57)              | 3.93 (2.46)                | 117.66 (59.68)            | 51.64 (11.65)       | 47.16 (15.43) | 40.41 (11.39)  | 86.64 (20.22)  | 1.71  | 56.59         | 68.58        | 11.99        |
|                              | 290.86 (54.93)              | 14.86 (5.58)               | 11.43 (8.89)              | 26.43 (7.46)        | 26.43 (9.61)  | 54.43 (15.69)  | 157.29 (34.19) | 38.33*** | −10.93***     | −7.92***     | 3.01***     |
|                              | 359.44 (77.16)              | 6.94 (4.14)                | 99.19 (29.27)             | 57.38 (18.29)       | 56.00 (15.20) | 43.62 (13.9)   | 96.31 (22.1)   | 14.48*** | 25.21***     | 30.95***     | 5.73        |
|                              |                             |                            |                           |                  |              |                  |              | 9.46*** | 20.73***     | 29.57***     | 8.83        |

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. 
calls on the three periods estimated by ARIMA models are not the same as the corresponding statistics calculated by descriptive analysis (Table 2). For instance, ARIMA models suggest the differences of the overall calls and disputes between the three periods are much larger than what have been observed by descriptive analysis. It may largely be attributed to the spikes in calls prior to the lockdown period. ARIMA models may consider the increasing trends before lockdown and yield a larger size of effect compared to the statistics yielded by descriptive statistics. However, we do acknowledge that ARIMA models might overestimate the size of the effect, since the time series in the current study is relatively short and we do observe a peak in calls immediately prior to the lockdown associated with the Chinese Lunar New Year.

In summary, the results generally indicate that overall weekly calls decreased during the lockdown, but various subcategories of calls showed opposite patterns. Weekly calls related to traffic, crimes, and disputes decreased significantly during the lockdown, but weekly calls related to domestic violence, public security issues, and other issues increased.

### Discussion and conclusion

Research on the influence of COVID-19 on crime and disorder has received attention from scholars in Western literature (e.g. Ashby, 2020a, b; Balmori de la Miyar et al., 2021; Gerell et al., 2020; Halford et al., 2020; Mohler et al., 2020; Payne et al., 2020; Piquero et al., 2020), but China’s different political and police systems provided a non-Western setting in which to examine calls for service. Particularly, the authorities implemented draconian lockdown and then lifted the mass quarantine over the cities in China. Using data from a 110 command centre in one county-level city in Hubei Province, China, this study analyzed changes in service calls before, during, and after the lockdown associated with the COVID-19 pandemic.

The results indicated that before and after the lockdown, the average overall numbers of weekly calls were higher than during the lockdown, meaning that the lockdown affected the number of calls. When the authorities imposed the lockdown, closed management was implemented in China. Residents were housebound or had limited opportunities to go outside for provisions, and they were...
permitted to enter or exit only with their entry permits. Non-residents were banned from entering (Zhu, 2020). People’s routine activities were interrupted. Time-series analysis also showed that in the Chinese city, overall calls decreased from 24 January through 18 March during the lockdown. This is consistent with Ashby’s (2020b) findings that the overall frequency of calls in the United States decreased from 20 January to 10 May 2020.

However, the results also indicated that different types of calls generated different patterns. Average weekly calls for crimes, traffic, and disputes decreased sharply during the lockdown. First, as for crime-related calls, due to the stay-at-home order, there were less opportunities to commit crimes. Routine activity theory tells us that if three variables converge differently, crime patterns would fluctuate. The data further showed that the average number of weekly calls for theft of electric vehicle theft, burglary, and pickpocketing dropped from 5.07, 8.75, and 3.25 before the lockdown to 0.29, 3.29, and 0.43 during the lockdown, and increased to 2.56, 4.81, and 2.50 when the lockdown was lifted, respectively. The reason for the decrease was that suitable targets were unavailable to motivate offenders. Messner et al. (2007) conducted a criminal victimization survey in Tianjin, China, and suggested that routine activity theory was applicable to urban China for property crimes. Other research also supported these findings (Balmori de la Miyar et al., 2021; Gerell et al., 2020; Halford et al., 2020; Hodgkinson and Andresen, 2020; Wei, 2020). For example, Wei (2020) found that ‘there were 8,713 calls in H City’s S District between January 22 and March 21, 2020. Compared with the same period during the previous year, the number of calls fell by 34.32% in 2020’ (p. 40). Moreover, the pandemic affected the routine operation of the political–legal organs. The number of criminal cases these organs dealt with significantly dropped. The Supreme People’s Procuratorate’s (2020) data showed that the number of suspects whom national procuracy organs approved and decided to arrest was 132,914 from January to March 2020, a 41.8% decrease from the same period in 2019. Second, with regard to traffic-related calls, to reduce the transmission of the pandemic, the authorities imposed a ban on vehicle traffic. For example, the Shiyan City Prevention and Control Command of COVID-19 Pandemic (2020) decreed that other than those permitted by the command, other vehicles were banned from roads. Based on the data, we found that the police responded to about 63.60 weekly traffic collisions before the lockdown and 46.69 after it. However, during the lockdown, calls regarding collisions decreased dramatically to 13.00 per week. The decline was largely due to the ban from the Chinese authorities, which forcibly limited people’s movement and interactions. The reason is different from Western countries, that is the government’s strategy hinged on voluntarily compliance (Fowler and Utych, 2020), though both traffic collisions fell in Baltimore, Cincinnati, Los Angeles, New Orleans, Phoenix, San Diego, San Jose, Seattle, Sonoma County, and St. Petersburg (Ashby, 2020b), and traffic stops decreased substantially in Los Angeles and Indianapolis in the United States (Mohler et al., 2020). Third, regarding dispute calls, because of travel restrictions, outdoor activities markedly fell, and people had fewer opportunities for contact. Consequently, dispute calls tended to decrease. For example, in our database, the number of weekly calls about consumer disputes fell from 2.56 before the lockdown to 1.00 during the lockdown, and at the end of lockdown the number rose to 3.38. Similarly, Cheng et al. (2020) found that, ‘compared to the same period in 2019, the number of dispute calls went down by 33.77% during the lockdown in the Kecheng public security sub-bureau’ (p. 49).

Unlike crime, traffic, and dispute calls, the weekly average number of calls for public security, domestic violence, and other issues greatly increased during the lockdown. First, in terms of public security calls, although the number of weekly calls did not differ significantly during and
after lockdown in the ANOVA model, the difference was significant in the ARIMA models. This indicates that, after removing the temporal trend (time trend), the difference became significant. This is inconsistent with Decker et al.’s (2007) study, in which, after analyzing the change in service calls during the Olympics, they found that the demand for public safety services was not statistically significant. Public security comprises the majority of policing work in China. ‘The ratio of public security offences to criminal offences ranged from 0.9 to 2.2 from 1986 to 2006’ (Zhong, 2009, p. 103). During the lockdown, many people were punished because they violated the travel restrictions or did not wear masks. For example, the average weekly number of calls the police received regarding disruptions the order of social administration rose from 0.33 before the lockdown to 12.43 during the lockdown, and calls about other public security issues rose from 3.53 before the lockdown to 10.00 during it. Second, the findings indicated that the weekly calls about domestic violence increased by 278.12% during the lockdown. Consistently, scholars have found that the number of calls concerning domestic incidents rose after stay-at-home orders began in Dallas, Los Angeles, Indianapolis, New Orleans, and Phoenix (Ashby, 2020b; Mohler et al., 2020; Piquero et al., 2020), but the increase in domestic violence calls in this study seems much higher than those observed in the US studies. The most important reason was that the Chinese authorities took the most aggressive stance to fight the coronavirus. Indeed, these measures, such as lockdown and stay-at-home orders, changed people’s routine activities and created opportunities for increased abuse because offenders and victims stayed together without capable guardianship. Jia et al. (2020) used 11,478,484 units of mobile phone data and found that the quarantine was effective in ceasing people’s movement in China. However, based on recorded crime data from a UK police service, Halford et al. (2020) identified a drop in recorded domestic abuse. They thought that social distancing might have increased the difficulty of reporting domestic abuse because the offenders remained on scene and could not be separated. Finally, compared to before the lockdown, average calls per week about other related issues rose by 81.54% during the lockdown. As shown in Fig. 1, the calls increased notably early on during the lockdown. In particular, the average calls for help rose to 126.11 during the lockdown. However, the data showed that police in the city recorded a weekly average of 40.35 and 53.38 calls to help before and after the lockdown, respectively. The lockdown caused many problems. For example, in Wuhan, many hospitals were converted into facilities for treating only patients with the coronavirus (Qin and Wee, 2020). Many patients with other illnesses could not receive treatment in time. Thus, calls for help regarding illness also increased. Similar to LeBeau’s (2002) findings, service calls increased abruptly on the day of Hurricane Hugo’s arrival.

Generally speaking, exceptional events have significant implications for police departments. The authorities must rely on the department to assist other sectors in maintaining social order and enforcing the law. The outbreak of the pandemic influenced society considerably, altered people’s lives, and changed the nature of routine activities. As analyzed above, the results indicate that different types of calls took on different patterns. These changes, particularly the increase in calls regarding domestic violence and requests for help, required the police department to redeploy police officers and allocate resources to cope with the pandemic.

The current study has several limitations. First, given the difficulty of gaining access to service call data, this study only collected the data from one city and analyzed the five main call categories. Thus, the findings are not generalizable to other cities in China and cannot investigate the changes on the nature and quantity of specific call types. Second, several methodological limitations on the ITS models also require special attention. Usually, the power of ITS depends on the length of series.
and on the balance between the pre- and post-intervention segments (McDowall and McCleary, 2018). Apparently in the current study, the balance of pre- and post-intervention segments is not guaranteed. Also, the algorithm automatically selected the final ARIMA models via comparing several model goodness of fit indexes, which may also run the risk of overfitting. Finally, due to lack of place variables, we were unable to examine the geographical distributions of service calls. Nevertheless, using service call data from China provides valuable information regarding police work and helpful guidance for future research.

Acknowledgements

An earlier version of this paper was presented at the 1st ACCCJ Online Conference, 16 January 2021. The authors would like to thank Ivan Y. Sun, Liqun Cao, Bin Liang, Jihong Zhao, Yaqian Tan, and Po-Chien Chang for discussions and comments on early drafts and the anonymous reviewer for this insightful suggestion. This work was supported by the Macau University of Science and Technology (grant number FRG-19-044-FL).

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