DR. TAISIA HUCKLE (Orcid ID : 0000-0002-0669-0685)

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National trading hour restrictions reduced late-night violence even though the impact of the law change on the ground was minimal

Taisia Huckle, PhD, SHORE & Whariki Research Centre, College of Health, Massey University, New Zealand

Karl Parker, MSc Statistics, SHORE & Whariki Research Centre, College of Health, Massey University, Auckland, New Zealand

Suzanne Mavoa, PhD, Melbourne School of Population and Global Health, University of Melbourne, Melbourne, Australia

Sally Casswell, PhD, SHORE & Whariki Research Centre, College of Health, Massey University, New Zealand

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Correspondence: Dr Taisia Huckle, SHORE & Whariki Research Centre, PO Box 6137, Wellesley Street, Auckland, New Zealand, Tel 0064 9 366 6136, Fax 0064 9 366 5149, email: t.huckle@massey.ac.nz

Abstract

Background: This study aimed to assess the early impact of national alcohol trading hour restrictions on night-time violence in New Zealand. The new national maximum trading hour restrictions prohibited 24-hour trading by reducing hours to between 8am and 4am for on-premises and between 7am and 11pm for take-away outlets.

Methods: A telephone survey of alcohol outlets was undertaken to determine actual trading hours before the law change. Interrupted time-series analysis modelled weekly night-time police calls for service for assault (i.e. between 9pm-6am) and late-night police calls for service for assault (i.e. between 4am-6am) from 2005 to 2015. Day-time police calls for service for assaults were used as the comparison group. Abrupt permanent changes and gradual permanent changes were assessed.

Results: The survey found that only 1% of alcohol shops, 9% of supermarkets and 6% of bars/nightclubs were affected by the hour restrictions because they did not trade as long as their licensed hours permitted in the first place. The time series analysis found no effect of the national trading hour restrictions on night-time police calls for service for assaults. However, a significant gradual permanent decrease of 12.4% was found for late-night assaults between 4am and 6am (i.e. those likely related to the on-premises hour restriction). This equated to a weekly average decrease of 4.3 police calls for service for assaults between 4am and 6am following the law change.

Conclusions: The national trading hour restrictions for on-premises and take-away outlets affected only a small proportion of premises and accordingly the restrictions had no impact on the overall level of night-time violence. Late-night assaults likely related to on-premises, however, did reduce showing the effectiveness of trading hour restrictions even when the impact of the law change on the ground was minimal.

Keywords: Alcohol; trading hour restrictions; on premise; off premise; late night assaults

Introduction

There is limited research assessing effectiveness of trading hour restrictions, particularly in relation to the effects of restrictions to take-away premise trading hours, despite these being a key public health alcohol intervention. This is in part due to recent trends for developed countries to deregulate liquor licensing, and as such the vast majority of research has assessed effects of trading hours when extended (Babor et al., 2010; Campbell et al., 2009). As restricting trading hours are now part of the World Health Organizations best buys for reducing alcohol-related harm (World Health Organization, 2017), it is important to continue to understand effects of trading hour restrictions in different contexts.

Recent studies, and a recent review, report decreases in late night assaults following trading hour restrictions (Wilkinson et al., 2016). In Australia, a study assessing the impact of reductions in on-premises trading hours (initially to 3.00am then 3.30am) on assault in a central business district found a relative reduction of 37% in assaults compared to a control site (Kypri et al., 2011). A follow-up study, showed that the incidence of assault continued to remain lower in the intervention site than the control site (Kypri et al., 2014). Across 18 Norwegian cities, a study found each one hour extension

or restriction of on-premises closing hours was associated with an increase/decrease of about 17% on night-time assaults within the city centres (Rossow and Norström, 2012).

However, other studies have found mixed results when assessing the impact of changes to alcohol trading hours on harms. Following extended hours of trading in Wales in 1988, studies found nothing to suggest a causal impact of the law change on violent criminal offences (Duffy and Pinot De Moira, 1996). Following extended trading hours in England in 2005, findings about impact on harms were mixed (e.g. Durnford et al., 2008; Hough and Hunter, 2008; Newton et al., 2007). However, in both instances of legislation change, it seemed the policy changes had made minimal impact on the ground. For example, the 1988 legislation in Wales resulted in an additional 10-20 minutes of drinking time for on-premises (Pinot de Moira and Duffy, 1995), in 2005 in England, actual closing times were extended on average by 21 minutes. On Saturday nights 56 percent of on-licensed premises continued to close at 11pm and the majority of the rest extended their opening by half an hour or an hour (Hough et al., 2008). These examples highlight the importance of understanding the impact of policy change on the ground when assessing the likely effect of policy change.

There is very limited evidence assessing the effects of restrictions to trading hours for take-away outlets. A study from Geneva found a reduction in hospital admissions for intoxication among young drinkers (by 25-40% depending on the age group) following restriction of alcohol sales in petrol stations and video stores, and 9 pm closing for other off-premises (Wicki and Gmel, 2011). In a state of Germany a policy banning sales at off-premise outlets (e.g., gas stations, kiosks, supermarkets) between 10pm and 5am resulted in around a 7% decrease in alcohol-related hospitalizations among adolescents and young adults (Marcus and Siedler, 2015).

In 2012, New Zealand implemented a new Act governing the sale and supply of alcohol, the Sale and Supply of Alcohol Act. Included under the object of the Act is that the harm caused by the excessive or inappropriate consumption of alcohol should be minimised (New Zealand Parliament, 2012). The full impact of the Act will stretch over a number of years and to date its' main impact has been on alcohol outlet trading hours. The Act eliminated 24 hour trading by introducing national maximum trading hours on December 18th 2013 for on-premises (now 8 am to 4 am) and for take-away outlets (now 7 am to 11 pm). These hours were, however, less strict compared to the original recommendations made by the Law Commission for 9am to 4am for on-premises (with a mandatory one-way door from 2am) and 9am to 10pm for off-premises (New Zealand Law Commission, 2010).

Local authorities (Councils) can establish a Local Alcohol Policy in their area, and can expand licensing criteria. Local Alcohol Policies have been very hard to implement due to a right to appeal in the Act and the effects of LAPs have been muted by alcohol industry appeals (Randerson et al., 2018). There are 67 councils in New Zealand of which three had implemented a Local Alcohol Policy within the time frame of the current study. These Local Alcohol Policies reduced trading hours further

than the national maximum hours - two reduced take-away outlet hours (by 1 hour), all three restricted on-premise hours (by differing levels). However, they were implemented in areas with few alcohol outlets (Ministry of Justice licensing list, 2013).

At a national level, the Act also prevented small grocery/convenience stores from being able to sell alcohol. However, as many of these types of outlets applied for renewed licenses before the Act came in to force and, which commonly last up to 3 years, it is anticipated that this change has had little impact within the period of this study. Risk-based licensing fees were also introduced and there is some anecdotal evidence that this has affected some club licences, i.e. that small bowling clubs for example have not renewed because of the cost (or have joined with other clubs to share the cost) (pers com Bruce 2016). The Act also allows for local communities to object to liquor licences, in reality, however, this has been a very challenging and unsuccessful process for communities which have been expected to submit evidence, appear in court and be cross-examined by alcohol industry and other lawyers.

Given the main policy change in New Zealand has been to remove 24 hour trading, the aim of this study was to assess the early impacts of the new national trading hour restrictions on night-time and late-night police calls for service for assaults in before and after the law change.

Methods

Ethical Approval

Full ethical approval was obtained from the Massey University Human Ethics Committee – application approval number MUHEC: 13/045. The study was not pre-registered nor was a study protocol published.

Data

Survey of outlet actual trading hours

Alcohol outlets may be licensed for more hours than they actually trade. For contextual purposes, just prior to the national maximum trading hours coming into force on Dec 18th 2013, we conducted a national telephone survey of on-premises (bars, nightclubs and restaurants/cafes) and take-away outlets (supermarkets, grocery outlets and alcohol shops) and asked usual opening and closing times for each day of the week for each premise. The number of premises selected to be called was 4621 from the 2013 liquor licensing list (from the Ministry of Justice, NZ). We selected all premises commonly identified from the national database as likely to experience a change in hours: all bars/nightclubs, grocery/supermarkets and alcohol shops and took a random selection of 1,000 restaurants/cafes (given the high number of them). Grocery/supermarkets were asked at what time they started and stopped selling alcohol (as some would stay open longer but not sell alcohol). Premise names and addresses were taken from the 2013 national liquor licensing database and telematched to obtain premise phone numbers. We received ethical approval to call premises without

identifying ourselves as researchers in case this would affect responses. The response rate was 68%. Non-contact/no answer was the main reason we could not obtain hours from premises.

Police calls for service for assaults

Police Calls for Service for assaults were obtained from the New Zealand Police from the Communications and Resource Deployment (CARD) database. This database records all responses/dispatch to 111 calls and vehicle stops, whether or not they lead to arrests. As CARD events include responses to 111 calls initiated by the public these data are less dependent on factors related to policing practice. All 111 calls are answered by the police communications centres. All calls are handled in the same way. The Communications Centre call taker enters information about the call by gathering details from the caller and using a list of offence/incident codes used in the police communication centres. The codes used in this study were minor assault, serious assault and grievous assault. The dates and times of responses are recorded. No demographics were available. Incidents not likely to be in CARD are phone calls or presentations to watch houses where no immediate attendance at the scene is required (Pers Comm Gavin Knight, National Statistics Manager, Police 2012). We assessed for the possibility of duplicates. In a sample of data, we searched for assaults in the same area, same day, same offence type, same time (defined as within 30 minutes of each other). There were some likely duplicates but these were minimal (1%).

Analysis

Survey of actual trading hours

The proportions of types of on-premises and take-away alcohol outlets affected by the national maximum trading hour restrictions according to a) licensed trading hours and b) actual trading hours were calculated. A premise was determined as “affected” if it traded outside of 8am to 4am for an on-premises or 7am to 11pm for take-away outlets on any day of the week.

Time-series analysis

Night-time police calls for service for assault were defined as between 9pm and 6am. This time-period was selected for a) analysis to capture the effects of the new closing times and b) the 6am cut off time was chosen to avoid crossing over with the new morning opening hours (7am for take-away outlets and 8am for on-premises). Late-night police calls for service were determined as between 4am-6am. This time-period was selected because it was directly affected by the new national trading hour restrictions for on-premises and was likely to capture effects of the policy change in city centres where most of the late night trading on-premises were situated. We included all days of the week as some on-premises traded very late throughout the week, the new closing times also affected take-away outlets and weekday police calls for service for assaults may be important to assess in this context.

There was no control site available, as the policy change was national so, for the time-series modelling, we included comparison groups. For the models, the comparison group used was day-time police calls for service for assaults. Day-time police calls for service for assault should not be

affected by changes in the new closing hours but function as a proxy for potential confounders. For example, media attention was heightened during the time of the law change (but for which we have no easy way to control for), there was also the possibility of changing population attitudes in context of restriction etc.

Police calls for service for assault before and after the law change were investigated using an interrupted time series. Police calls for service for assaults from June 2005 to April 2015 were aggregated to a weekly interval. The percentage of night-time police calls for service for assault out of the total number of police calls for service for assault for each week were calculated. The percentage of late-night police calls for service for assault out of the day-time and late-night number of police calls for service for each week were also calculated. ARIMA (AutoRegressive Integrated Moving Average) models were used to explore a change after the introduction of the national trading hour restrictions. Analysis was undertaken in SAS 9.4 using PROC ARIMA and plots were completed using R and the ggplot library (R Core Team, 2017; Wickham, 2009).

Both the night-time and late-night data sets were checked for stationarity with both models being transformed to a stationary series after differencing at 1, however, the night-time model was also differenced at 52 to account for seasonality present (no seasonality adjustment was required for the late-night model). After trying a range of autoregressive (AR) and moving average (MA) models, both of the time series were appropriately modelled using a MA(1) model. The autocorrelations were checked and showed white noise and the normality of the residuals showed no departure from the normality assumption in either model.

A model using a zero order transfer function was used to assess if there was an abrupt permanent effect, where the time series was shifted after the intervention (i.e. change occurred abruptly). A separate model was used to assess if there was a gradual permanent effect where the change due to the intervention was gradual, and the final permanent impact become evident after a lag (i.e. change occurred after some time). This model used a first order transfer function to assess change at onset (ω) as well as a rate value (δ). In this model, the ω represents the direction and size of the gradual permanent change, and the rate parameter δ denotes how quickly after intervention the effect occurred. If a change happens slowly after the intervention the rate will be close to 1, while an estimate close to zero indicates the change happened straight away. A dummy variable included in the models was used to indicate 18 December 2013 and onward (the date the policy reducing trading hours came into effect).

For both models (in particular the late-night assault model), a visual inspection of the time-series revealed a spike in assaults around the time of the 2011 Rugby World Cup that was held in New Zealand. We looked for outliers in the time-series models during this period but did not find any. One outlier was included in the night-time assault model to enable convergence of the estimates.

Results

Survey of actual trading hours vs legally licensed trading hours

Insert Table 1

Table 1 shows there are some considerable differences between the proportions of premises affected based on their legally licensed hours compared to those actually affected as determined by the survey of actual hours. This was the case particularly for supermarkets (57% v 9%), bars/nightclubs (60% v 6%) and restaurants/cafes (41% v 17%). Only 1% of alcohol shops reported they were going to be affected by the new hours.

Of the on-premises surveyed that were affected by the national trading hour restrictions, the average reduction in trading hours was 1.5 hours. For take-away outlets, the average reduction was 1 hour.

Of the 17% of restaurant/cafes actually affected by the national trading hour restrictions, none were affected by the new closing times. Of the 14% of smaller grocery stores affected, only 1% were affected by the new closing times. Restaurants/cafes and smaller grocery outlets were more likely to only be affected by the new opening hours of 8am for on-premises and 7am take-away outlets. While smaller grocery outlets were asked what time they started/stopped selling alcohol, restaurants/cafes were asked when they opened/closed and may/may not have actually been selling alcohol. Findings for restaurants/cafes should be interpreted within this context.

Insert Table 2

Night-time assaults

The results of the time-series modelling are presented in Table 2. For night-time police calls for service, no significant effect of the national trading hour restrictions was found (neither abrupt permanent change ($p = 0.123$) nor gradual permanent change ($p=0.870$)).

Although not tabulated, we also ran this model including weekend data only (Friday 9pm to Sunday 6am), and found no significant effect of the national trading hour restrictions (neither abrupt permanent change ($p = 0.123$) nor gradual permanent change ($p=0.870$)).

Late-night assaults

For the late-night assault model, no significant abrupt permanent change found ($p = 0.365$) but a significant gradual permanent decrease was found ($p < 0.0001$). The decrease in late-night police calls for service for assaults was from 10.6% to 9.3%, equivalent to a decrease of 12.4%. Before the implementation of the national trading hour restrictions there was a weekly average of 34.4 late night assaults (4am to 6am). Following the law change, the time series model found a decrease of 12.4% following the law change, which corresponds with a drop to 30.1 assaults weekly on average.

Insert Figure 1

Discussion

In New Zealand, alcohol outlet trading hours were restricted from 24 hours to 8am-4am for on-premises and 7am-11pm for take-away outlets. To assess the early impacts of the impact of the new closing times, a natural experimental design was used to assess weekly night-time and late-night police calls for service for assaults before and after the law change. A strength of the study was the use of police calls for service for assaults. Police calls for service are largely comprised of responses to emergency calls from the public. As such, changes to enforcement practices at the time of implementation of the new law are less likely to affect these data relative to other police datasets. An additional strength of the study was that almost ten years of data were available to model. The new national trading hour restrictions for on-premises and take-away outlets had no effect on the overall level of night-time violence (between 9pm and 6am). Inspecting Figure 1 visually, shows a drop in calls for service for assaults around the time of 2013, however, the decline starts at the beginning of 2013 not the very end when the policy change occurred. We do not know if premises were changing their hours, or people were changing their behaviour, prior to the implementation of the law change or if the visual decline was unrelated to the law change. Either way, the decline could not be directly attributed to introduction of the new trading hour restrictions.

The findings of no change in the overall level of night-time violence is, however, in keeping with other relevant New Zealand data. The survey of actual trading hours of premises we conducted before the law change, found a considerably lower proportion of take-away outlets and bars/nightclubs were actually affected by the new national maximum hour restrictions because they did not trade as long as their licensed hours permitted in the first place. Further, different national survey data collected in

2011 found relatively few drinkers were likely to be affected by the 4am closing time for on-premises as only 3% of respondents aged 16-65 years reported purchased after 4am before the law change (Gray-Phillip et al., 2018). In relation to take-away outlets only 3% of drinkers reported purchasing after 11pm (Huckle et al., 2019). A different study from Christchurch, New Zealand found that alcohol-related presentations to an Emergency Department mainly occurred among people who sourced alcohol from off-licence outlets and that the proportion of alcohol-related presentations did not change significantly between 2013 and 2017 (after the introduction of the national trading hour restrictions) (Ford et al., 2018). In this context, of minimal overall reduction in the average hours and numbers of premises affected on the ground, we may not expect much change in the overall level of night-time violence.

Studies from other contexts where the impact of changes to trading hours were minimal also found there is little impact on overall levels of harm. In England, when 24 hour trading was introduced actual extensions to closing times were minimal i.e. extended on average only by around 20 minutes (Hough et al., 2008). Studies found mixed results in England as to whether the hour extensions had impacted harm or not (e.g. Durnford et al., 2008; Hough and Hunter, 2008; Newton et al., 2007). Legislation extending trading hours in Wales also had little impact on overall levels of harm (Duffy and Pinot De Moira, 1996; Pinot de Moira and Duffy, 1995) again because the actual impact on the ground was minimal.

Our study did find evidence of a 12.4% reduction in late-night violence between 4am and 6am following the introduction of the national trading hour restrictions. This decrease was likely related to the new on-premise closing time of 4am. The impact of the national trading hour restrictions on late-night violence was not abrupt, but found to be gradual and permanent i.e. change occurred more slowly after the intervention. Inspecting the data there is a period of four months after the trading hour restriction in which the percentage of assaults between 4am and 6am gradually changed. It is possible at these later hours, when patrons are more likely to be intoxicated, they did not immediately adjust to leaving the area when the bars closed. This finding highlights the effectiveness of late-night on-premise trading hour restrictions for reducing violence even in a context where the overall number of bars/nightclubs effected were relatively few nationally. However, the late-night trading on-premises affected by the trading hour restrictions were mainly situated/clustered together in entertainment districts.

There is a relevant international example regarding late-night effects when trading hour changes on the ground are minimal. In England, following the introduction of 24 hour trading and actual closing times were extended on average only by around 20 minutes (Hough et al., 2008). Humphreys et al. (2013) found no evidence that this law change affected the overall volume of violence. The study did find, however, increases to violence in the early morning (3 a.m. to 6 a.m.) (2013). These findings are very similar to the current study, albeit the current study has assessed a restriction not a liberalisation.

Limitations

The public does not report all crimes to police. Incidents not likely to be in Communications and Resource Deployment (CARD) database are phone calls or presentations to watch houses where no immediate attendance at the scene is required (pers Comm Gavin Knight, National Statistics Manager, Police 2012).

We had less data post-policy change relative to pre-policy change. However, analysing the data on a weekly basis increased the power of the time-series design. Other studies are currently under-way in New Zealand analysing more years of data post-restrictions in New Zealand (MacLennan et al., 2016).

In 2011, the rugby world cup was held in New Zealand and which lasted just over six weeks in September through to October. The All Blacks (the New Zealand team) won and considerable celebrations occurred. Police reported there was a spike in assaults around the time of the 2011 Rugby World Cup (Bradford, 2015). Inspecting Figure 1 also shows spikes in police calls for service for night-time and late-night calls for service for assault near the end of 2011. To investigate if this could have impacted on the study findings, the times during the Rugby World Cup (September through October 2011) were considered as outliers in the models. It was found that none of the times during the rugby world cup were considered outliers in either the night-time and late-night time series models.

Three Local Alcohol Policies were implemented in New Zealand within the period of the current study. They were implemented in the following months: August 2014, February 2015 and March 2015 and each restricted trading hours further than the national restrictions. We do not consider these Local Alcohol Policies to have affected results of this study as these areas had few on-premises and take-away outlets (Ministry of Justice liquor licensing list 2013).

Conclusions

The national trading hour restrictions for on-premises and take-away outlets affected only a small proportion of premises and accordingly the restrictions had no impact on the overall level of night-time violence. Late-night assaults likely related to on-premises, however, did reduce showing the effectiveness of trading hour restrictions even when the impact of the law change on the ground was minimal. Restricting trading hours is an effective and inexpensive policy intervention to reduce alcohol-related harm and the findings of this study suggest that further restrictions to trading hours would be effective in reducing late-night violence in New Zealand.

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Figure 1: Trends in police calls for service for assault between 1995 and 2015 in New Zealand

Table 1: Proportion of premises affected by the national maximum trading hours change comparing legally licensed versus actual trading hours

		% of premises affected by new hours restrictions		Average hours reduced ²	
		Legally licensed hours	Actual hours ²	Late hours	Morning hours
<i>Take-away outlets</i>					
Alcohol store	1130	9	1	1	0
Supermarket	410	57	9	1	1
Smaller grocery	578	16	14	1	1

On-premises

Bar/Nightclub	1955	60	6	1.5	1
Restaurant/café	3970	41	17	0	1.5

¹n from the 2013 liquor licensing list (Ministry of Justice), prior to the introduction of the trading hour restrictions

² from the survey of actual trading hours

Table 2: Estimates for the time-series modelling for night-time and late-night police calls for service for assaults

Parameter	Estimate ³	Standard error	t Value	P-value	Lag
Night-time assaults (9pm-6am)					
<i>Abrupt permanent change</i>					
Moving average	0.943	0.017	54.910	<.0001	1.000
Direction and size of effect(ω) ¹	-0.014	0.009	-1.540	0.123	0.000
<i>Gradual permanent change²</i>					
Moving average	0.939	0.017	53.910	<.0001	1.000
Direction and size of effect(ω)	-0.018	0.023	-0.780	0.433	0.000
Rate of change(δ)	-0.252	1.538	-0.160	0.870	1.000
Late-night assaults (4am-6am)					
<i>Abrupt permanent change</i>					
Moving average	0.943	0.016	60.820	<.0001	1.000
Direction and size of effect(ω)	-0.007	0.007	-0.910	0.365	0.000
<i>Gradual permanent change</i>					
Moving average	0.942	0.015	60.940	<.0001	1.000
Direction and size of effect(ω)	-0.001	0.002	-0.660	0.508	0.000
Rate of change(δ)	0.907	0.156	5.820	<.0001	1.000

¹Change at the onset of the trading hours restrictions

² The direction and size of the gradual permanent change is denoted by ω . The rate of change parameter δ denotes how quickly after intervention the effect occurred. If a change happens slowly after the intervention the rate will be close to 1, while an estimate close to zero indicates the change happened straight away.

³Units are the proportion of night-time or late-night Police calls for service for assaults (relative to the comparison group).

Figure 1: Trends in police calls for service for assault between 1995 and 2015 in New Zealand

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Author/s:

Huckle, T;Parker, K;Mavoa, S;Casswell, S

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