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Liquor legislation, last drinks, and lockouts: the Newcastle (Australia) solution

G. R. Hoffman[1,2], K. Palazzi[3], B. K. Oteng Boateng[1], C. Oldmeadow[3]

[1]Department of Oral and Maxillofacial Surgery, John Hunter Hospital, Newcastle, Australia; [2]University of Newcastle Medical School, Newcastle, Australia; [3]Information Technology, Statistical Support Unit, Hunter Medical Research Institute, Newcastle, Australia

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Abstract. The aim of this study was to determine whether the regional implementation of prohibitive liquor legislation, introduced in order to limit the sale of and access to alcohol, can lead to a sustained reduction in the incidence of assault occasioning facial injury, as seen in patients presenting to a level 1 trauma hospital. A retrospective observational cohort study was conducted to document patients who were identified as an acute hospital presentation of assault occasioning facial injury. The period of study was 2003–2015; this ensured a similar period of time before and after the implementation of the legislation in 2008. A statistical analysis was undertaken to assess the rates of change in oral and maxillofacial (OMF) assault admissions pre and post legislation. The study found that pre-legislation numbers of OMF assaults increased at a rate of 14% per annum and then decreased at a rate of 21% per annum post legislation (31% relative rate ratio reduction). Similar trends were seen for all males, males aged 18–35 years, and males where alcohol was recorded at clinical presentation. The introduction of 'last drinks' and 'lock out' legislation has led to a significant and sustained reduction in assaultive alcohol-related facial injury in Newcastle.

Key words: alcohol; facial injury; liquor legislation.

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Licensed premises are popular night-time establishments that are particularly favoured by a young adult clientele. Pubs, bars, and nightclubs act as places for socializing, the provision of entertainment, and the sale and consumption of alcohol.[1,2] Regrettably, it has been recognized that these venues also serve as high-risk settings for alcohol-fuelled violence and injury. It has been well reported that a large number of assaults occur inside or within close proximity to hotels, bars, and nightclubs.[3]

Alcohol-related physical aggression is a pressing public health concern. It can frequently result in either a head injury and/or a facial injury. It is noteworthy, however, that the relationship between alcohol consumption and occasions of violent behaviour is confounded by the fact that the majority of people who consume alcohol do not become either offenders or victims of violent crime, while the consumption of alcohol does not universally act as a predisposition to the perpetration of violent acts.[4,5]

Research has demonstrated that in any given region, a relatively small number of liquor outlets can be responsible for a disproportionally high number of alcohol-related episodes of trauma.[6] Towards the end of the late twentieth century, there began to develop, in many countries around the world, an intense public outcry and government scrutiny in relation to the serving practices of and trading hours kept by alcohol outlets. This concern was typified by formal complaints about levels of violence, damage to person and property,

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and broader elements of antisocial behaviours that were perpetrated by some patrons. Of relevance to the present study were the events that culminated in the application of the 'Newcastle solution' of 2008.

Newcastle is the second largest city in the state of New South Wales, Australia. It is widely acknowledged as Australia's seventh largest city, serving an immediate urban population of approximately 530,000 inhabitants, within a total regional population of 900,000. Notably, several licensed premises located in the central business district (CBD) of Newcastle were identified as having a high incidence of patrons who were involved in interpersonal violence. As a result, effective March 21, 2008, the New South Wales state government Liquor Administrative Board restricted the trading hours and conditions of service of alcohol to patrons of 14 pubs in the Newcastle CBD. In particular, close of business (last drinks) was reduced from 5 a.m. to 3 a.m. (and by subsequent negotiation to 3.30 a.m.) and the admission of new patrons (lockouts) was limited to 1 a.m. (and by subsequent negotiation to 1.30 a.m.).

The purpose of the present study was to determine whether the introduction of liquor legislation imposed to restrict opening hours (last drinks) and in turn control the sale of alcohol, as well as limit the admission of new patrons (lock outs), can lead to a sustained reduction in alcohol-related facial injury.

Materials and methods

Study design and setting

To address the research purpose, a retrospective cohort study was designed and implemented to measure the frequency of persons being assaulted and having a resultant facial injury that required hospital attendance.

The study population was derived from all maxillofacial trauma patients who attended the regional level 1 trauma hospital and who were assessed and/or managed by the Department of Maxillofacial Surgery for a facial injury. The study was conducted over a 13-year period from January 1, 2003 to December 31, 2015.

Participants

To be included in the study, patients had to have (1) presented acutely to the emergency department between the hours of 6 p.m. Friday and 6 a.m. Sunday; (2) been assessed and/or managed for a facial injury (hard or soft tissue) by the oral and maxillofacial surgery (OMFS) service; (3) alleged that they had been assaulted (as recorded in their hospital record). Two subgroup analyses were performed: (1) patients aged between 18 and 35 years; (2) patients who had sustained their injury under the influence of alcohol and/or as a result of attendance at a venue associated with the consumption or sale of alcohol.

Patients were excluded from the study if they had presented with any non-alcohol/non-assault-related cause of facial injury, or had attended the hospital outside the defined study hours.

Variables

The primary predictor variables that were selected for the study comprised a heterogeneous set of factors that were grouped into logical categories: demographic (age and sex), classification (assault), aetiology (alcohol), and year (in particular pre/post legislation). The primary outcome variable was the presentation of a hard and/or soft tissue maxillofacial injury.

Data sources and analysis

The relevant information was retrieved and downloaded from the hospital electronic patient administration system 'i.PM'. This is a State Ministry of Health (New South Wales Health) approved and supported software system.

Patient data entered under 'emergency department presentations' were retrieved for the period 2003–2015. All facial trauma presentations assessed and/or managed by the OMFS discipline and within the study time frame were sought. In addition, presentation comments (alcohol, assault, time, age 18–35 years) were used to further define the patient cohort. Blood alcohol testing was not undertaken at the institution and could therefore not be included in this study. Instead, subjective (self) reporting or objective (clinician) documentation was relied upon.

Statistical methods

For each year, aggregate counts and percentages within the population for the entire time period were recorded.

Segmented regressions were fit to allow different estimates of the slope of the line for the pre- and post-intervention periods; negative binomial and Poisson distributions were assumed (as appropriate for count data). The models included terms for time prior to intervention (in years, zero in 2008 and in the post-intervention period), post intervention time (in years, this variable was zero during the pre-intervention period), and an indicator for the pre/post intervention period (interpreted as the immediate effect of the intervention). The regression coefficient for time since start of follow-up was interpreted as the pre-intervention period slope, and the coefficient for the post-intervention time was interpreted as the change in the slope. When exponentiated, these coefficients were interpreted as incident rate ratios (RR). Robust standard errors were used to account for any slight deviations from the distributional assumptions of dispersion and potential heteroscedasticity.

Within a few of the male sub-populations, negative binomial models did not converge, and so Poisson models were fit without robust standard errors. Due to the low number of admissions within the female sub-population, regression modelling was not possible.

Admission numbers were recorded over time as crude (raw) data for the pre- and post-intervention periods. In addition, both crude rates and estimated presentation counts (with 95% confidence intervals (CI), as calculated for each segmented regression), which took into account changes over time, were recorded graphically.

SAS version 9.4 software (SAS Institute Inc., Cary, NC, USA) was used for all analyses.

Ethics

The study was granted an exemption in writing by the Local Health District and Hospital Ethics Committee (Institutional Review Board). All patients were de-identified and all data treated anonymously in the undertaking of this study.

Results

A total 152 patient attendances for assault occasioning facial injury with acute presentation to the emergency department from Friday 6 p.m. to Sunday 6 a.m. occurred over the 13-year study period. Of these 152 patients, 144 were male and eight were female. With regard to age, the cohort was dominated by males aged 18–35 years ($n = 113$, 74%). The numbers of admissions by year, as well as the percentages within each population, are shown in Table 1.

The rate of change (RR) per 1-year increase was calculated for the pre-intervention period and the post-intervention period and is outlined in Table 2. The rates of change for the pre-intervention versus

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