Cigarette availability and price in low and high socioeconomic areas

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Abstract

Objective: To determine whether tobacco retailer density and cigarette prices differ between low and high socioeconomic status suburbs in South-East Queensland.

Methods: A survey of retail outlets selling cigarettes was conducted in selected suburbs over a two-day period. The suburbs were identified by geographical cluster sampling based on their Index of Relative Socio-economic Advantage and Disadvantage score and size of retail complex within the suburb. All retail outlets within the suburb were visited and the retail prices for the highest ranking Australian brands were recorded at each outlet.

Results: A significant relationship was found between Index of Relative Socioeconomic Advantage and Disadvantage score (in deciles) and the number of tobacco retail outlets (r=0.93, *p*=0.003), with the most disadvantaged suburbs having a greater number of tobacco retailers. Results also demonstrate that cigarettes were sold in a broader range of outlets in suburbs of low SES. The average price of the packs studied was significantly lower in the most disadvantaged suburbs compared to the most advantaged. While cigarettes were still generally cheaper in the most disadvantaged suburbs, the difference was no longer statistically significant when the average price of cigarette packs was compared according to outlet type (supermarket, newsagent, etc).

Conclusions: In South-East Queensland, cigarettes are more widely available in the most disadvantaged suburbs and at lower prices than in the most advantaged suburb

In Australia, tobacco use causes about 15,500 deaths each year.[1] It is the greatest preventable contributor to the country's burden of disease through years of life lost from premature death, ill health and disability.[1] Despite these alarming statistics, a substantial number of Australians continue to smoke, with 15.1% of those aged 14 years and older being daily smokers in 2010.[2] Smoking prevalence is highest among people who are disadvantaged in terms of employment type, education and income level, with the most disadvantaged being more likely to smoke and to smoke more cigarettes per day.[3,4] In addition, a clear social gradient of tobacco-related disease also exists, with the most disadvantaged experiencing poorer health and a shorter life expectancy.[5] This suggests that current interventions have not been sufficient to substantially reduce smoking rates amongst the most socioeconomically disadvantaged, and that more targeted interventions are required.

Despite recent advances in the regulation of tobacco retailing in Queensland, there is still considerable room for improvement. In Queensland, the retail display of cigarette packs and smoking-related products is now banned, however there are still no restrictions on where cigarettes can be sold, and there is no requirement for tobacco retailers to be licensed. With the exception of Victoria, this conflicts with all other state and territory jurisdictions where tobacco retailers require a licence. It is also in stark contrast to a number of other products and services considered potentially harmful to health, safety or social principles including food preparation and sales or the commercial sex industry.[6] In addition, it conflicts with the substantial regulatory requirements that govern the sale of Australian pharmaceutical products, even though these are designed to restore or enhance health.[6] Despite these obvious differences, relatively little attention has been paid to the potential impact that tobacco retailing regulation (such as restrictions on the number of retailers or minimum floor prices for tobacco products) could have on smoking prevalence in Australia, particularly in areas of socioeconomic disadvantage.

Recent international studies have examined issues concerned with tobacco retailer density, attaining contrasting results. A number of North American-based studies examining the relationship between socioeconomic status (SES) and tobacco retailer density have established that lower median household income is inversely associated with increased tobacco retailer density.[7–11] Similarly, a North American study exploring the relationship between youth smoking prevalence and tobacco retailer density determined that increased tobacco retailer density is associated with low SES.[12] Two recent Australian studies in New South Wales found conflicting results. Paul et al.[13] found no significant relationship between SES and density of tobacco outlets at both postcode and census collection district level in the Hunter region. However, a recent study by Kite et al.[14] using tobacco retail licence data for the entire state reported a significant relationship between tobacco outlet density, SES and remoteness, independent of smoking prevalence. These differences could be partly dependent on variation in retail geography between the studies, with Paul et al.'s study[13] containing

both rural areas with very low population densities, and urban areas with high commercialism and relatively low residential populations.

Evidence from studies of other products, including alcohol and fast food, support the view that increased retailer density is associated with increased sales and can lead to adverse health outcomes.[15–17] This evidence corresponds with traditional market theories which argue that the increased availability of consumer goods results in greater consumer awareness, presents more purchasing opportunities and leads to higher sales.[18] Consequently, it can be reasoned that greater tobacco retailer density has the potential to encourage higher consumption and higher smoking prevalence. However, unlike the fast food industry, additional factors, such as nicotine dependence, could influence cigarette purchasing patterns.

A high tobacco retailer density can potentially reduce cigarette prices through price competition. The price of tobacco products is one of the most influential factors affecting smoking behaviour in Australia. Research demonstrates that an increase in the price of cigarettes results in a reduction in both consumption and smoking prevalence,[19–21] and that people of low SES are particularly sensitive to price increases in tobacco products.[20,21] However, despite this evidence, there is limited or no research that examines whether the purchase price of cigarettes differs according to the SES of an area.

The objective of this study was to determine if tobacco retailer density and cigarette prices differ between low-SES and high-SES suburbs in Southeast Queensland.

Methods

Sample

In order to establish differences in price and tobacco retailer density, a survey of retail outlets selling cigarettes was conducted in four South-East Queensland State Suburbs on 30 September and 1 October 2010. In Australia, State Suburbs are locality boundaries gazetted by the geographical place name authority in each Australian state and territory.[22] To compare levels of socioeconomic disadvantage between geographical areas, including State Suburbs, the Australian Bureau of Statistics (ABS) has developed Socio-economic Indexes for Areas (SEIFA). SEIFA is a relative measure of socioeconomic disadvantage. It is a series of four indexes that allow for all geographical areas in Australia to be ranked according to their level of social and economic wellbeing.[23] The Index used throughout this study was the Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) which is a continuum of values depicting advantage (IRSAD decile 10) to disadvantage (IRSAD decile 1). It is derived from various census measures including household income, occupation, internet connection and level of education attained.[23]

To establish which suburbs would form the study sample, the IRSAD (stratified by decile) was obtained for each suburb in the Brisbane and Logan City Council areas. Two suburbs from the lowest and highest IRSAD deciles were selected based on the following characteristics: the suburb contained a moderate-sized shopping centre (<100 retail outlets) and a 1 km radius from the main shopping centre did not include the Brisbane river. This was done to obtain survey areas with similar retail characteristics and study area.

ABS statistics for the sample suburbs demonstrate that a higher percentage of people living in the low-SES suburbs compared to the high-SES suburbs were born overseas (33% versus 24%). The most prominent places of birth in the low-SES suburbs were Vietnam, New Zealand, England, Samoa and the Philippines.[24–27]

The suburb area surveyed was drawn using the largest shopping complex as the central point, and included all retail outlets within a one kilometre radius. The largest shopping complex was chosen as the central point as it is more likely to contain a supermarket, which is where the majority of cigarettes are purchased in Australia.[28] Retail outlets were identified as selling cigarettes if they sold any brand or pack size of manufactured cigarettes or loose tobacco.
Retail outlets were categorised into the following 10 types:

• supermarket
• convenience store
• newsagent
• hotel or club
• Asian grocery store
• specialist tobacconist
• petrol station
• café or takeaway food shop
• liquor shop (including drive-through)
• other.

Prices were obtained for the following four cigarette packs (where available) from each retail outlet:

• Winfield Blue 25s
• Longbeach Original 30s
• Peter Jackson Original 30s
• Horizon Purple 30s.

These cigarette packs represent the four leading cigarette brands in Australia in terms of sales revenue in grocery stores and supermarkets.[29] For consistency, similar pack sizes of 12 mg cigarettes were chosen.

To collect the data, the auditor travelled systematically by foot through each of the survey areas and identified all retail outlets. The auditor then entered each outlet to establish if they sold cigarettes. Where cigarettes were sold, retail prices for each of the four brands were recorded as per the price displayed, or where no price was displayed, as per the price verbally provided by the shop assistant. All data were recorded on a prepared score sheet which included address, type of outlet, retail price of each brand and opening hours.

Analysis

For each area surveyed, the following were calculated:

• number of retail outlets selling cigarettes
• percentage of the total number of retailers that sell cigarettes
• mean and range of prices for each of the four pack types studied
• mean price per retail outlet category for each of the four pack types studied
• difference between recommended retail price during the study period and mean price.

To determine whether cigarette prices differ according to the level of socioeconomic disadvantage of a suburb according to IRSAD (in deciles), the price range, mean and 95% confidence intervals were established for each of the packs surveyed. A two sample t-test was then used to compare the mean price of each pack and IRSAD decile. A 2 factor-ANOVA was also used to measure variability amongst mean price, outlet type (supermarket, newsagent, etc) and IRSAD decile.

Pearson's Correlation Coefficient was used to determine the strength of association between tobacco retailer density and IRSAD decile. Pearson's Correlation Coefficient was also used to determine whether tobacco retailer opening hours were associated with IRSAD decile.

Results

The price of cigarettes

There was a significant difference between the mean price of cigarette packs in high SES and low-SES suburbs, with the average price of the four packs studied being significantly lower in socioeconomically disadvantaged suburbs (Winfield $t=2.61$, $p=0.012$; Longbeach $t=3.11$, $p=0.003$; Peter Jackson $t=2.8$, $p=0.008$; Horizon $t=2.71$, $p=0.01$). Table 1 demonstrates the range and mean price for each of these packs.

Socio-economic status	N	Range ($AUD)	Mean ($AUD)	95%CI	t
Winfield Blue 25s					
High SES (IRSAD decile 10) Low SES (IRSAD decile 1)	20 32	14.75 – 18.60 14.09 – 17.80	16.36 15.60	15.86–16.86 15.25–15.95	2.61
Longbeach Original 30s					
High SES (IRSAD decile 10) Low SES (IRSAD decile 1)	16 27	16.32 – 20.10 14.20 – 18.74	17.72 16.69	17.14–18.30 16.28–17.10	3.11
Peter Jackson Original 30s					
High SES (IRSAD decile 10) Low SES (IRSAD decile 1)	18 27	15.95 – 20.90 14.75 – 19.98	18.17 17.01	17.45–18.89 16.51–17.52	2.8
Horizon Purple 30s					
High SES (IRSAD decile 10) Low SES (IRSAD decile 1)	14 23	13.75 – 19.75 14.45 – 17.80	17.08 15.88	16.13–18.03 15.43–16.33	2.71

Table 1. Mean and range of cigarette pack prices according to SES of store location.

When the mean price of cigarette packs is compared according to outlet type (supermarket, newsagent, etc), pack prices are generally lower in suburbs of low SES; however, the difference is no longer statistically significant. The only exception is packs of Peter Jackson Original 30s sold through newsagents, where the average price was found to be significantly lower in suburbs of low SES (p=0.01). Table 2depicts the analysis of the mean price of cigarettes according to outlet type.

Pack	Outlet type	Mean price in high SES suburbs ($AUD)	Mean price in low SES suburbs ($AUD)	Statistica significar
1.	*Retailer not present in these suburbs*			
2.	**Pack type not available at these outlets*			
3.	***Difference in pack price according to outlet type statistically significant at the 0.05 level*			
Winfield Blue 25s	Supermarket	14.81	14.57	

Pack	Outlet type	Mean price in high SES suburbs ($AUD)	Mean price in low SES suburbs ($AUD)	Statistica significar
	Convenience store	16.43	15.80	
	Newsagent	15.82	15.79	
	Petrol station	17.54	17.06	
	Liquor shop	16.98	17.19	
	Asian grocery store	*	15.59	
	Specialist tobacconist	*	14.56	
	Pub/club	*	**	
	Café/takeaway outlet	*	15.43	
	Clothing store	*	14.45	
Longbeach Original 30s	Supermarket	16.44	16.13	
	Convenience store	17.63	16.43	
	Newsagent	17.31	16.76	
	Petrol station	18.69	18.23	
	Liquor shop	18.59	17.21	
	Asian grocery store	*	16.50	
	Specialist tobacconist	*	16.21	

Pack	Outlet type	Mean price in high SES suburbs ($AUD)	Mean price in low SES suburbs ($AUD)	Statistica significar
Peter Jackson Original 30s	Pub/club	*	**	
	Café/takeaway outlet	*	16.73	
	Clothing store	*	16.00	
	Supermarket	15.98	15.90	
	Convenience store	18.18	17.53	
	Newsagent	17.57	16.56	***
	Petrol station	19.65	18.99	
	Liquor shop	19.24	18.56	
	Asian grocery store	*	17.68	
	Specialist tobacconist	*	16.17	
Horizon Purple 30s	Pub/club	*	**	
	Café/takeaway outlet	*	16.80	
	Clothing store	*	16.10	
	Supermarket	14.25	14.70	
	Convenience store	17.33	16.33	
	Newsagent	16.45	16.35	

Pack	Outlet type	Mean price in high SES suburbs ($AUD)	Mean price in low SES suburbs ($AUD)	Statistica significar
	Petrol station	18.64	17.53	
	Liquor shop	16.69	16.94	
	Asian grocery store	*	**	
	Specialist tobacconist	*	14.74	
	Pub/club	*	**	
	Café/takeaway outlet	*	16.13	
	Clothing store	*	15.05	

Table 2. Mean pack price according to retailer category and socio-economic status of store location.

In Australia, the New South Wales Retail Traders' Association[30] advises small retailers in all states and territories of the recommended retail price for cigarettes. There was a clear difference between these recommended retail prices and the average prices we observed according to SES. The average pack price in high SES areas was higher than the recommended retail price (Winfield Blue 25s +0.21, Longbeach Originals 30s +0.23, Peter Jackson Original 30s +0.58 and Horizon Purple 30s +0.57), while packs in low-SES suburbs were cheaper than the recommended retail price (Winfield Blue 25s −0.57, Longbeach Originals 30s −0.77, Peter Jackson Original 30s −0.57 and Horizon Purple 30s −0.65).

The availability of cigarettes

We found a significant relationship between IRSAD decile and the number of tobacco retail outlets (r=0.93, p=0.003), with a total of 20 tobacco retail outlets identified in high-SES suburbs compared to 36 in low-SES suburbs. When expressed as a percentage of the total number of retail outlets, about 15% of retail outlets in high-SES suburbs sold cigarettes, compared to 17% in low-SES suburbs.

The type of retail outlet also differed according to IRSAD decile. In high-SES suburbs, tobacco retail outlets were predominantly newsagencies and petrol stations. In low-SES suburbs, tobacco retail outlets were mainly Asian grocery stores, followed collectively by supermarkets, newsagencies and

specialist tobacconist stores. It is interesting to note that cigarettes were sold in a broader range of outlets in low-SES suburbs, including pubs and clubs, Asian grocery stores, specialist tobacconists, cafes and takeaway outlets, and a clothing store.

The average number of days per week that tobacco retailers were open was similar between high-SES suburbs (6.85 days per week) and low-SES suburbs (6.92 days per week). However, there was a significant difference (p=0.048) between the daily opening hours of tobacco retailers in high and low-SES suburbs, with outlets in high-SES suburbs open for more hours per day on average (14.24 hours) compared to low-SES suburbs (11.75 hours). Access to cigarettes was available 24 hours a day in both high-SES suburbs and one low SES suburb. All outlets offering 24 hour a day access to cigarettes were either service stations or convenience stores.

Discussion

Our finding of a greater tobacco retailer density in the most socioeconomically disadvantaged suburbs compared to the most advantaged suburbs is consistent with research in North America[7–11] and Australia,[14] but differs from another recent Australian study.[13] That study, based in the NSW Hunter Region, used databases of tobacco retail outlets that are updated on a two to three yearly basis. In contrast, our study used an in-person check of all retail outlets within a one kilometre radius to identify retailers that sell cigarettes. We found that in the most disadvantaged suburbs, a greater proportion and a wider range of retailers sell cigarettes, including Asian grocers and a clothing store. Reliance on databases could miss retailers such as these. Differences in retail geography between the two studies may also partly account for the difference in results. For example, whether a significant retail area (i.e. a shopping centre) is located within a suburb is likely to be a greater determinant of tobacco retailer density than SES. We attempted to account for this by sampling only suburbs that contained a medium-sized shopping centre to ensure comparability.

Our study also found that access to cigarettes in terms of store opening hours is high regardless of the SES of a suburb. All suburbs we surveyed had supermarkets (the main point of cigarette purchase) that were open seven days a week. In addition, three of the four suburbs had tobacco retail outlets that were open 24 hours a day. This demonstrates that in the current market, smokers in South-East Queensland are able to access cigarettes easily, regardless of the day of the week or time of day. This has the potential to influence recent quitters to relapse as they can readily access cigarettes when experiencing a craving.

We found that cigarette pack prices are lower in low-SES suburbs compared to high-SES suburbs. In addition, we determined that the average price of the four packs studied was lower than the recommended retail price in low-SES suburbs. However, when comparing the mean price of cigarette packs according to outlet type, we determined that while pack prices were generally lower in low-SES suburbs, the difference was not statistically significant. Whether smokers in low-SES suburbs benefit from these lower prices depends on their purchasing behaviour. As most smokers

purchase their cigarettes from supermarkets,[28] which had only small price differences between high and low-SES suburbs, it is unlikely that most smokers in low-SES suburbs would purchase cigarettes for much less than smokers in high-SES suburbs, despite having access to a wider variety of outlets that supply cheap cigarettes.

However, it is possible that certain sub-populations in low-SES suburbs benefit from these lower prices. Our study results suggest that other area demographics (such as ethnicity) have the potential to influence the number and type of retail outlets selling cigarettes. This was evident in the low-SES suburbs where the large Vietnamese population has resulted in a greater number of Asian grocery stores and as a result, has potentially influenced the greater number of tobacco retailers in these suburbs. The relationship between tobacco retailer density and demographics other than SES is relatively unexplored in Australia and these results suggest that future research is warranted.

The finding that low-SES suburbs have greater tobacco retailer density and overall lower prices is consistent with traditional market theories which suggest that greater competition results in lower prices. It is also likely to produce greater consumer awareness, present more frequent opportunities for purchase and consequently lead to higher sales.[18] Given what is known about the purchasing patterns of smokers, it is probable that an increase in tobacco retailer density would result in an increase in the number of spontaneous cigarette purchases, normalise smoking for children, and influence recent quitters to relapse. To date, only one published study has examined the impact of tobacco retailer density on smoking cessation success. This study observed an association between quit success and proximity of the quitter's home to a tobacco retailer, but not with retailer density.[31] Further research on the influence of retailer density around homes and workplaces on relapse is needed.

Our results suggest a number of tobacco control strategies. First, compulsory licensing for tobacco retailers should be a priority to enable effective and efficient monitoring of tobacco sales. As no licensing system exists in Queensland, the only way to accurately identify all tobacco retailers was to conduct personal visits. This is impractical for ongoing monitoring of tobacco sales. Our finding that cigarettes were sold from a wide variety of outlets, including a clothing store, suggests relying on traditional categories of tobacco retailers may miss some outlets. In Australia, there are currently no zoning restrictions or ordinances that limit the number, concentration or placement of tobacco retailers. Reducing the density of tobacco retailers through limiting the number of tobacco retail licences issued per suburb may reduce cigarette discounting in addition to reducing the convenience of purchasing cigarettes.

Comparison of average pack prices in high-SES and low-SES suburbs stratified by type of retailer suggests that the biggest impact on cigarette prices is likely to be achieved by removing cigarette sales from supermarkets and/or by introducing a legislated minimum floor price for tobacco

products. As demonstrated in this study, cigarette prices are heavily discounted in supermarkets, so removing cigarettes from their shelves would therefore decrease price competition, resulting in an overall increase in price.

A number of limitations of this study need to be considered when interpreting the results. The chosen sample areas may not have captured all tobacco retail outlets within the selected suburbs. However, it is anticipated that using the supermarket as the central point would have allowed the survey to capture the majority of retail outlets, and restricting the area to a 1 km radius ensured a similar geographic area was assessed in each suburb. The suburbs selected do not necessarily reflect all suburbs in Queensland. For example, due to demographic and environmental differences, it is questionable whether results from this study would be repeated in regional and remote areas or Indigenous communities. Despite these limitations, our study provides a clear picture of the relationship between tobacco retailer density, SES and cigarette prices in Australia.

Increases in the price of tobacco products have proven to be the most effective means of decreasing smoking prevalence.[19,20] Tobacco companies recognise this, and have been introducing a number of sub-value brands to the market in response to the most recent increase in tobacco excise. Our study only monitored four major brands and pack sizes of cigarettes. Future research should examine the impact of sub-value brands and heavily discounted imported cigarettes on cigarette purchasing in low SES areas, especially in light of the recent Australian legislation requiring plain packaging on tobacco products.

Finally, while this study examined cigarette price and availability, it by no means reflects where smokers buy their cigarettes or smoking prevalence. For example, buying habits may also be influenced by the location of where a smoker works or socialises, and there are additional sources through which smokers can procure cigarettes that have not been captured in this survey, i.e. internet purchases and contraband cigarettes. Future Australian studies would benefit from exploring the relationships between cigarette price and availability, SES, purchasing behaviour and smoking prevalence. Our results suggest that interventions to restrict the number of retail outlets could be usefully employed by governments as further disincentives to tobacco use.

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