BMJ Open

Perceptions and impact of plain packaging of tobacco products in low and middle income countries, middle to upper income countries and low-income settings in high-income countries: a systematic review of the literature

Nicole Hughes,[1] Monika Arora,[2] Nathan Grills[1]

CrossMark

[1]Nossal Institute for Global Health, The University of Melbourne, Melbourne, Victoria, Australia
[2]Health Promotion Division, Public Health Foundation of India, New Delhi, India

Correspondence to
Nicole Hughes;
nicolehughes4@gmail.com

ABSTRACT

Objective: To review the current literature around the potential impact, effectiveness and perceptions of plain packaging in low income settings.

Method: A systematic review of the literature.

Data sources: 9 databases (PubMed, Global Health, Social Policy and Practice, Applied Social Sciences Index and Abstracts (ASSIA), CINAHL, PsycINFO, British Library for Development Studies (BLDS), Global Health Library and Scopus) were searched. The terms used for searching combined terms for smoking and tobacco use with terms for plain packaging.

Study selection: Studies investigating the impact of plain packaging on the determinants of tobacco use, such as smoking behaviour, appeal, prominence, effectiveness of health warnings, response to plain packs, attitudes towards quitting or likelihood of smoking in low-income settings, were identified. Studies must have been published in English and be original research of any level of rigour.

Data extraction: Two independent reviewers assessed studies for inclusion and extracted data.

Data synthesis: The results were synthesised qualitatively, with themes grouped under four key headings: appeal and attractiveness; salience of health warnings and perceptions of harm; enjoyment and perceived taste ratings; and perceptions of the impact on tobacco usage behaviour.

Results: This review has identified four articles that met the inclusion criteria. Studies identified that tobacco products in plain packaging had less appeal than in branded packaging in low-income settings.

Conclusions: This review indicates that plain packaging appears to be successful in reducing appeal of smoking and packets, and supports the call for plain packaging to be widely implemented in conjunction with other tobacco control policies. However, there are considerable gaps in the amount of research conducted outside high-income countries.

Strengths and limitations of this study

- This study provides supportive evidence of the potential impact of plain tobacco packaging in low-income settings to reduce packaging appeal.
- A limitation of this review is the scarcity of research in low-income settings, which limits the ability to draw conclusions for low and middle income countries (LMIC's) more generally.
- Further research on the impact, perceptions and effectiveness of plain packaging in LMICs and low-income settings is required.

avoidable mortality around the world.[1] From as early as 1956, the negative health effects of tobacco use were known,[2] but today it remains a highly utilised substance. There are considerable differences in tobacco use and prevalence patterns across the world. In a number of high-income countries (HIC), there has been a significant decline in tobacco use (such as in Australia where smoking prevalence has halved from 26.1% in 1991 to 13.3% in 2013[3]); however, in many low to middle income countries (LMIC), such as in India where 26% of adults use smokeless tobacco, and 14% of adults smoke tobacco,[4] this is not the case, with high tobacco use prevalence rates persisting. In a LMIC such as India, a large gender disparity exists in tobacco use, where 24% of males smoke tobacco, compared to only 2.9% of women. Recent global estimates place the mortality burden from tobacco use at over 5 million annually,[5] with nearly two-thirds of these deaths occurring in developing countries.[6] Further to this, by 2030, 70% of the burden of death and disease from tobacco products will be in LMICs.[1 7 8]

The WHO's Framework Convention on Tobacco Control (FCTC) was the first treaty

INTRODUCTION

Tobacco use is one of the leading preventable causes of death, and the largest cause of

negotiated under the patronage of the WHO[9] and represents a global vigour towards a reduction in tobacco consumption. The aims of the FCTC are "to protect present and future generations from the devastating health, social, environmental and economic consequences of tobacco consumption and exposure to tobacco smoke".[9] The FTCT recommends numerous strategies to combat tobacco consumption, two of which demand controls on tobacco advertising promotion and sponsorship, and packaging and labelling. Article 11 recommends the introduction of plain packaging, which involves the removal of all branding and advertising from the pack, such that packs are relatively indistinguishable from one another, other than the brand name in mandated text, size and style.[10]

In the past decade, there has been an increased focus on plain packaging among tobacco control researchers in HIC. This was a notion initially published in 1992,[11] where the concept of removing the brand was hypothesised to reduce the ability of the pack to be used as an advertising mechanism. There is now considerable evidence that tobacco companies are increasingly using the pack as a way of advertising and targeting consumers,[12] for example, in subgroups such as women[13 14] and youth.[15] The pack has become a strategic instrument of promotion, in which tobacco companies are focusing their marketing and communication strategies on consumers.[14] The proposal of the plain pack includes colourful graphic health warnings but otherwise no colours, brand imagery or corporate logos, with brand name printed in a mandated size, font and location.[16] Plain packaging of tobacco products hopes to reduce and remove the ability of tobacco companies to utilise the pack for advertisements.[17]

From the introduction of health warning labels on tobacco packaging in Canada in 1992, there has been significant progression in reducing the advertising capacity of the pack, such that plain packaging was legislated and enforced in Australia in 2012[18]; has been legislated in Ireland[19] and will be enforced from 2016; and is currently before the New Zealand parliament.[20] The evidence for the use of plain packaging in HIC has exponentially grown in the past 10 years, and a recent comprehensive systematic review demonstrated that plain packaging reduces the attractiveness of packaging, the appeal of smoking and that it will make the legally required health warnings to be more salient.[12] Such determinants (or associations) of tobacco use are typically the aim of plain packaging policies and the research to determine its impact. The direct effect of plain packaging on tobacco use prevalence is difficult to disaggregate and has not been the stated aim of plain packaging polices.[21] These findings, as listed above, were generally consistent regardless of sample and location, with no change in the effect of plain packaging found between different socioeconomic status (SES), or between different ethnicities.[12 22] However, the majority of the evidence to support plain packaging as a tobacco control

mechanism or policy comes from HIC (eg, Australia,[23–27] New Zealand,[28 29] Canada,[30 31] the UK,[23 32 33] Norway,[34 35] Belgium,[36] France[37 38] and Italy[39 40]). The potential effect of plain packaging is less well understood in LMIC. LMICs encounter a different and diverse set of challenges[41] as they aim to combat high rates of smoking and the consequences of this—high mortality and morbidity.

The primary objective of this systematic review was to locate and review all the published literature relating to the perceptions, potential impact and/or effectiveness of plain packaging on tobacco use determinants in LMICs. The secondary objective, if there was a lack of literature in LMIC, was to rerun the review and include middle to upper income countries (MUIC) and purposefully researched low-income settings in HIC. The rationale to include MUIC and purposefully researched low-income settings in HIC was that there are similarities between these settings, such as higher prevalence of disadvantage, poverty, illiteracy and marginalisation; price elasticity; vulnerability to marketing and image; difficulty in accessing tobacco control interventions and generally higher smoking rates compared to high-income settings.[42 43] To the best of our knowledge, there are no studies that have reviewed the literature focusing on LMIC, MUIC or low-income settings in HIC. Recommendations from Stead et al[12] suggest that further understanding of the effectiveness of plain packaging in LMICs would be informative and helpful. Therefore, the objective of this systematic review was to investigate, through the collation of all original research, the potential impact of plain packaging of tobacco products on the determinants of tobacco use in LMIC, MUIC and low-income settings in HIC, such as appeal of the packaging or product; the salience and effectiveness of health warnings; and tobacco use behaviour.

METHODS

A search of the literature was undertaken across nine databases, including PubMed, Global Health, Social Policy and Practice, Applied Social Sciences Index and Abstracts (ASSIA), CINAHL, PsycINFO, British Library for Development Studies (BLDS), Global Health Library and Scopus, using the search terms as defined in table 1. Reference lists of the literature were scanned to identify further studies. A search for grey research literature was also conducted including searching web-based platforms such as Google scholar and governmental webpages with combinations of search terms as per table 1. Contact was made with leading tobacco control experts to enquire if they were aware of any research that had been conducted in LMIC, MUIC and low-income settings in HIC.

A preliminary search revealed only one article researching plain packaging in LMIC, and therefore it was determined that the final search strategy would be inclusive of evidence from studies conducted in MUIC and low-income settings in HIC. LMIC and MUIC were

Table 1 Search terms used

Tobacco search terms	Plain packaging	Pack/container
cigar*	pack design	Pack
hand-roll*	packet design	packet
roll-your-own	package design	package
smok*	product	packs
tobacco	packaging	packaging
kretek	product labelling	packets
bidis	descriptor	packages
beedis	descriptors	pouch
snuff	brand*	pouches
chew*	trade mark	tin
gutk*	trade marks	tins
zarda	trade marking	container
pan mas*	graphic*	containers
paan	design*	carton
betel	dissuasive	cartons
beedi	generic	canister
bidi	homogenous	canisters
rollie*	plain	
smoking	plainer	
tobacco use	plainest	
cessation	standard	
tobacco industry	standardised	
	standardized	
	unbranded	
	no-frills	
	neutral	
	shape*	

defined by World Bank's per capita gross national income metric[44] (see online supplementary appendix 1 for details), and low-income settings in HIC were

Box 1 Inclusion and exclusion criteria

Inclusion criteria
► Published in English
► Research was completed in either low and middle income countries or middle to upper income countries defined as per the World Bank's per capita gross national income metric[44] OR the research purposefully investigated low-income setting within high-income countries (HIC)
► Research investigating the perceptions, impacts and/or effectiveness of plain packaging compared to branded packaging for all types of tobacco products
► Original research of any level of rigour and of any style, including quantitative and qualitative studies

Exclusion criteria
► Any commentaries, editorials or opinion pieces
► Articles published in languages other than English
► Research conducted in HIC (where it has not been conducting or focused on low-income or socioeconomically disadvantaged settings)
► Research conducted in HIC where the subanalysis of SES in a study primarily focused on high-income or mainstream settings

included if the study purposefully investigated a particular low-income setting (ie, indigenous, homelessness). Studies were excluded if they were conducted in an HIC and merely included a subanalysis by income status because these studies did not represent a specific population setting or population grouping. Similarities between these settings—including a higher prevalence of disadvantage, poverty, illiteracy and marginalisation—justify these inclusions.
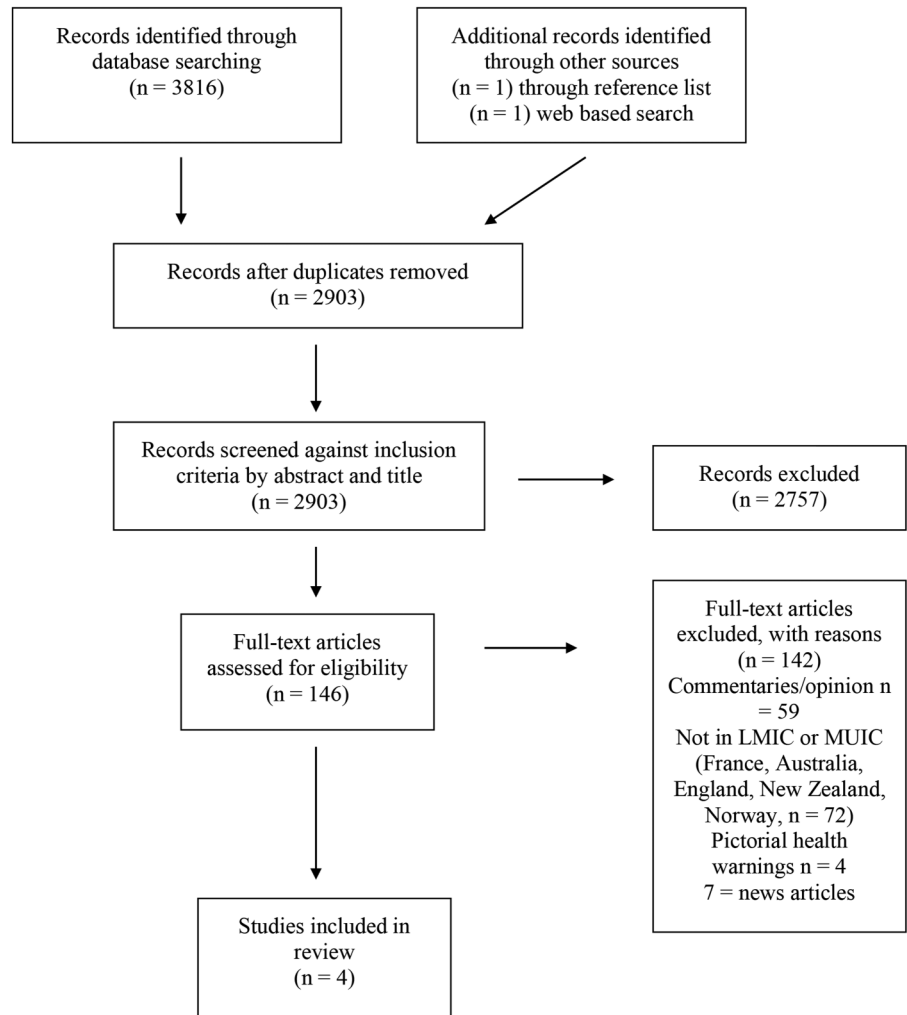
The search strategy was deliberately broad, and search terms did not include a list of LMICs due to the challenges of searching, such as lack of country details in titles and abstracts, publishing countries versus countries where the research was conducted and limitations in some databases for length of search terms. Plain packaging is a relatively new phenomenon in tobacco control, so it was decided not to set date restrictions. The chosen strategy resulted in 3816 articles, which after removal of duplicates ended up with 2903 articles. Two independent reviewers screened the titles and abstracts by the inclusion and exclusion criteria (see box 1), and full texts obtained as per figure 1. Four articles met the inclusion criteria for discussion in this review. Final search was conducted in December 2015. Please see online supplementary appendix 2 for an example of the search strategy, and refer to the completed PRISMA statement.

Once articles were selected, the analysis and collection of data was undertaken by two authors. The authors extracted data from all studies including information on the study purpose and design, the sample population, data collection methods and analysis and overall findings. They then undertook a thematic synthesis of the collated results. Themes were prespecified a priori categories from previous research,[12] but were adapted on the basis of the information reported in the included studies. Data were thematically analysed on the impact of plain packaging of tobacco products by appeal and attractiveness, salience of health warnings and perceptions of harm, enjoyment and perceived taste ratings and perceptions of tobacco usage behaviour. Studies were of similar quality, and therefore no studies were weighted for analysis. Bias and study quality assessment were based on the QATSDD.[45]

RESULTS

Four articles met the inclusion criteria to be included in this review. All four studies looked at the actual or potential impact and perceptions of plain packaging on the determinants of tobacco use such as appeal, prominence and effectiveness of health warnings, response to plain packaging, attitudes towards quitting and likelihood of smoking in their chosen populations. No studies included in the review were able to investigate causality or demonstrate effectiveness of plain packaging on tobacco use prevalence. Table 2 provides a summary of the characteristics of these studies and table 3 provides

Figure 1   Process of article selection.

Records identified through database searching (n = 3816)

Additional records identified through other sources (n = 1) through reference list (n = 1) web based search

Records after duplicates removed (n = 2903)

Records screened against inclusion criteria by abstract and title (n = 2903)

Records excluded (n = 2757)

Full-text articles assessed for eligibility (n = 146)

Full-text articles excluded, with reasons (n = 142) Commentaries/opinion n = 59 Not in LMIC or MUIC (France, Australia, England, New Zealand, Norway, n = 72) Pictorial health warnings n = 4 7 = news articles

Studies included in review (n = 4)

the key outcomes. One of the studies selected was a qualitative study,[46] one an experimental pack rating survey,[47] one an online survey,[48] and one used mixed quantitative and qualitative measures.[41] Two of the selected studies investigated specifically socioeconomically disadvantaged smokers (low-income setting) in Australia, one study reviewed young Brazilian women (MUIC setting) and one reviewed a sample of the Indian population (LMIC setting). Two studies used sample packs,[41 46] but the other two used computer images.[47 48] All studies were designed to detect the potential impact of proposed plain packaging compared to current branded packaging, and only Guillaumier et al[46] were able to detect the actual impact as some focus groups were conducted after the introduction of plain packaging in Australia.

Arora et al's[41] study was the only study to review their results comparing the impact and perceptions of plain packaging between income groups. They showed significant consistency in results across low, middle and upper socioeconomic status throughout their results, the only significant difference being that the high SES group compared with lower SES reported that tobacco packs distracted from pictorial warnings.

Appeal and attractiveness

Both White et al[48] and Arora et al[41] showed that appeal is greater in branded packs compared to plain packs in the Brazilian and Indian settings. White et al[48] showed that removing brand colour and descriptors reduced appeal, with the effect being greatest when packages had no brand imagery or descriptors. White et al[48] also showed that non-smokers more strongly favoured branded packs. Arora et al's[41] focus groups generally agreed that colourful packaging lured people across age and all socioeconomic divides and 76% of survey respondents reported that tobacco packs were attractive. They also reported that the appeal and attractiveness of the product was a very important component of the smoking experience for Indian smokers and that packs were perceived as a status symbol. Guillaumier et al[39] showed that plain cigarette packs were rated as significantly less appealing than branded packs.

Salience of health warnings and perceptions of harm

Arora et al[41] showed in a survey in New Delhi that 91.6% of participants thought that plain packaging would make pictorial warnings effective, and their focus groups agreed that warnings would have increased impact when

Table 2 Summary of study characteristics

Study	Study type	Sample size	Type of tobacco packaging	Population	Data collection and analysis
White et al[48]	Computer-based survey	N=640	Three groupings of cigarette packs for comparison ▸ Standard branded cigarette packs ▸ The same packs without brand imagery or ▸ Same packs without imagery or descriptions (eg, flavours)	Young women (16–26 years) in Brazil Sample recruited from an online commercial market research company panel Tobacco users and non-users MIC	4 key brand attributes (brand appeal, perceived taste, health risk, smoothness and desirability were rated using a 5-point Likert scale (eg, 1='A lot more appealing' to 5='A lot less appealing'). Pack selection task (offer of pack as a gift at completion) was used as a behavioural measure to test brand appeal. Logistic regression models were used to examine the effect for single packages on the four brand attributes, and the extent which participants selected a pack (branded/plain)
Arora et al[41]	Mixed research ▸ Focus group discussions ▸ Survey	N=124 (focus group) N=346 (survey)	Focus group: Dummy plain tobacco packaging for cigarette, bidis and chewing tobacco packs Survey: Photos of dummy plain packs for cigarette, bidis and chewing tobacco packs	Tobacco users and non-users in New Delhi, India Sample recruited through purposive sampling methods from resident welfare associations and local communities of New Delhi Sample included low and high SES LMIC	Thematic analysis of the key themes from focus group discussions, which were grouped under ▸ Attractiveness of packs ▸ Appeal of packs ▸ Increased potency of health warnings ▸ Promotional value Option poll/perceptions about effectiveness of plain packaging proportions Results of survey were presented as percentages of overall responses.
Guillaumier et al[39]	Computer-based survey	N=354	Plain cigarette packs vs branded cigarette packs (two well-known brands)	Socioeconomically disadvantaged smokers in Australia (including 18% Aboriginal and/or Torres Strait Islanders) Purposeful sampling from social and community service organisations	Responses were on a scale of 1–7 for brand appeal (including taste ratings) The Kruskal-Wallis test was used to assess differences in the four pack conditions, and pairwise comparisons were conducted using the Wilxoxon rank sum test for scores between branded and non-branded packs. Purchase intention results were analysed by OR analyses to assess effect of packaging type (branded vs plain)
Guillaumier et al[46]	Qualitative focus groups	N=51	Model plain cigarette packs	Socioeconomically disadvantaged smokers in Australia (including 26% Aboriginal and/or Torres Strait Islanders) Purposeful sampling from social and community service organisations	Thematic analysis of key themes—graphic imagery and health concerns, cessation information and effect of pictorial warnings.

LMIC, low and middle income countries; SES, socioeconomic status.

Open Access

used in conjunction with plain packaging. White et al[48] showed that 42.6% of responders still reported brands differing in their health risks, with this being particularly obvious in the younger age groups. Guillaumier et al[39] showed that socioeconomically disadvantaged Australians still believe health messages are exaggerated, but did not detect a change in this perception with plain packaging. Guillaumier et al[46] did not consider salience of health warnings.

Enjoyment and perceived taste ratings

Guillaumier et al[46 47] and White et al[48] looked at taste ratings and showed similarities across perceived taste ratings, where smokers were asked how plain packaged cigarettes might taste, how enjoyable and how satisfying in taste: all of which decreased with plain packaging. Guillaumier et al[39] showed that images of trial plain packages were less appealing on taste attributes than branded packaging for one type of cigarette, but showed no difference between a high cost different brand (this brand was not regularly smoked in the sample). White et al[48] showed that the highest taste ratings were for branded packs, and further that the taste rating reduced more for the packs without descriptors than the plain packs with descriptors.

Guillaumier et al's[46] study was the only study that had the ability to review after the implementation of plain packs in Australia, although it was only in three of the six focus groups. An interesting finding was that smokers using cigarettes in plain packaging reported decreased product quality, with quality and taste decreasing, although at the same time they reported that the plain packaging was not likely to impact their established smoking behaviour.

Perceptions of the impact on tobacco usage behaviour

Purchase intentions were reduced with plain packaging and this was consistent within the studies that assessed for intentions. White et al[48] offered selection of a pack of cigarettes at the completion of the study and found that significantly more chose branded packs over plain packs. Arora et al's[41] focus groups suggest that plain packaging may decrease the uptake of tobacco use, prevent initiation and experimentation but may have less effect on current users, although the questionnaire suggested that 83.2% of responders thought plain packaging could motivate users to quit. Similarly, Guillaumier et al[46] found that plain packaging seemingly reduced initiation of smoking tobacco use, but would have a lesser effect on people already smoking. Guillaumier et al[39] also showed that plain packaged cigarettes had reduced purchase intention in socioeconomically disadvantaged populations in Australia.

Study quality

On the basis of the NHMRC Evidence hierarchy, all four studies were level IV, demonstrating low study quality.[49] Considering the similarity of study quality across the studies that met inclusion/exclusion criteria, no studies were excluded on the basis of study quality. Therefore, all studies have limited generalisablity due to the study designs utilised and sampling approaches. All studies (excluding three of the focus groups in Guillaumier et al[46]) are investigating people's perceptions and beliefs when they are shown images or samples of proposed plain packaging. This is potentially different from behaviour in real-life settings, and is a limitation of all four studies included. Study quality was assessed by discussion, based on the QATSDD's[45] 16 criteria and a short summary of each study has been included below.

White et al[48] used an online panel selection, which involved some self-selection, and also limited the sample to being computer literate, again presenting a potential selection bias of the sample. White et al[48] utilised an admirable study design, utilising three distinct groups of exposure to cigarette packs, and provided clear and justified statistical methods, therefore maximising the quality of results, given the study design.

Arora et al[41] used a purposive sample focusing on only two geographically limited regions, and did not provide adequate information on how sampling occurred, potentially resulting in some selection bias. Arora et al[41] clearly provided relevant details and utilised an appropriate approach given the aims of their research, but provided limited discussion around potential confounders for their results.

Guillaumier et al[39] used a convenience sample from a local health service, which provided access to a hard-to-reach population. This research limited its survey to only two brands of cigarette (Winfield and Benson & Hedges); a wider range of brands may have provided further insights. The authors provided justification for their choice of study design, clear methods and provided transparent information about their results.

Guillaumier et al[46] used a small convenience sample from local health services, which allowed the authors insights into a hard-to-reach population group. This study uniquely conducted focus groups both before and after the implementation of plain packaging in Australia, yet provided little subanalysis considering this occurred. Given that the study population was hard to reach, little discussion was provided around potential response bias from the participants or how this was managed while conducting the focus groups.

DISCUSSION

This literature review found minimal research from low to middle income (LMI) settings (ie, including LMIC, MUIC and low-income settings in HIC) investigating the potential impact or perceptions of plain packaging on the determinants of tobacco use. However, the results from the four studies identified—which met the inclusion criteria—demonstrate that plain packaging may be a potentially effective intervention in LMI settings and that it can reach otherwise difficult to reach populations.

Table 3 Summary findings

Study	Summary of findings
White et al[48]	Branded packs are significantly (p<0.001) more appealing than plain packs, and plain packs with descriptors (mean scores: branded pack=6, plain=4.3, plain-no descriptor=3.4) Branded packs had a higher taste rating than plain packs (mean scores: branded pack=4.9, plain=3.9, plain no-descriptor=2.3) Branded packs rated higher for smoothness compared to plain packs (mean scores: branded pack 4.1, plain=3.1, plain no-descriptor=1.6) Plain packs with descriptors rated higher than plain packs with no descriptors in regard to appeal (mean scores 4.3:3.4), taste (3.9:2.1) and smoothness ratings (3.1:1.6) Minimal difference in health risk between packs (mean scores: branded pack=1.5, plain=1.1, plain no-descriptor=1.2)
Arora et al[41]	Focus group discussion ▸ General agreement that coloured packs 'lure' people from all ages and socioeconomic backgrounds, eg, 'First time when I saw it (the cigarette pack), I thought the pack contained some candies, it looked beautiful and attractive' and 'If I am walking with an expensive cigarette packet, it will create certain status around me' ▸ Plain packs reduce the appeal of the tobacco products, especially among youth and children ▸ Health warnings will be more prominent, eg, 'in your face' Survey ▸ 83.2% reported that the colours, designs, gloss and large fonts of brand distract from the health warnings ▸ 81.8% of tobacco users reported that plain packaging reduces appeal, and 83.2% of non-users report that plain packaging would reduce appeal ▸ 91.6% participants reported that plain packaging would make pictorial warnings more effective ▸ 69% survey participants strongly supported the plain packaging proposal ▸ High SES participants reported that plain packaging reduced the attractiveness of tobacco products more than did low SES (tobacco users 83.3%:81% and non-users 92.9%:79.6%)
Guillaumier et al[39]	Plain packaging was significantly less appealing on taste attributes than branded packaging in the Winfield brand (p=0.004), but no differences were detected in taste ratings in the B&H condition. Plain packaging was associated with significantly reduced smoker ratings of 'positive pack characteristics' (p<0.001), 'positive smoker characteristics' (p=0.003) and 'positive taste characteristics' (p=0.033) in the Winfield brand name condition only. There was no difference in the negative smoker characteristic ratings across the four pack conditions (p=0.427) In comparison to plain packaging, branded packaging was associated with higher odds of smokers' purchase intentions (OR=2.18, (95% CI 1.34 to 3.54); p=0.002).
Guillaumier et al[46]	Health Warning Labels (HWL) that pictured children elicited emotive response, but desensitisation also occurred with HWL, eg, "hate the baby one…that one disturbs me, but I don't care about the rest of them" HWL were noticeable on the plain packs and increased thoughts about quitting. Participants reported active avoidance of HWL Participants (adults) reported that plain packaging was "aimed at young people", and suggested it would be effective for this population and that for first-time smokers plain packs might have more of an impact. Since the implementation of plain packaging, participants reported that the quality and taste of cigarettes had decreased. Health warnings on new plain packaging were noticed initially, but the multiple focus groups reported the idea of being desensitised

Disadvantaged groups are often difficult to reach with tobacco control interventions, and Guillaumier et al[46] have successfully provided insights into these challenging populations. The studies were largely consistent with the evidence from HIC[12 27]; for example, the four studies included in this review all suggested that plain packaging will reduce pack appeal. Further research on LMI settings would be required to determine if the magnitude of acceptability and beliefs about the effectiveness of plain packaging would be more or less than in HICs.

Evidence as to the effectiveness of plain packaging in HIC appears to be relatively consistent across different research designs, population subgroups (male/female, age and ethnicity) and within both smokers and non-smokers.[12 22 50 51] However, in the LMI settings included in these four studies, small differences were observed between subgroups. White et al[48] showed that non-smokers more strongly favoured branded packs, potentially demonstrating heightened sensitivity to the appeal of brands. Arora et al[41] found differences between the low and higher SES groups whereby those in the higher

SES were more attracted by the branding. Guillaumier et al[39] showed that the low SES population had reduced appeal of brands that were little known (in this case, expensive packs that were not smoked by the sample compared to commonly smoked brands). One possible reason might be that hard-to-reach populations are less impacted by plain packaging in regard to brand attractiveness. However, another likely reason would be that the higher cost of the little known brand also decreased their perceived attractiveness. The negative effect on perceived taste and quality in plain packaging is persuasive across both HIC and LMI settings.

An interesting finding from Arora et al[41] was that India had a high proportion (70%) of participants who supported the introduction of plain packaging. This is similar to information coming out of HIC, such as in the UK, where 62% support plain packaging[52] and up to 80% support it if plain packaging made packs less appealing to children and youth[53], and Australia, where 49.9% of smokers support plain packaging.[54] This suggests that in general, there is community support for introducing plain packaging across both HIC and LMI settings alike.

It has been shown that brand identity and appeal are motivating factors in youth initiating tobacco use.[55 56] Promisingly, this review found that plain packaging reduces the appeal and attractiveness of packs in LMI settings, similar to the effect shown in HIC. White et al,[48] using a younger population as a sample, demonstrated that plain packaging made packs less attractive. This provides incentive for further studies investigating the effect of plain packaging on younger people's initiation into smoking in LMIC and MUIC.

Tobacco control experts recommend incremental changes in tobacco control policy.[57] In many LMICs and MUIC, research and policy energy has been directed towards other simple and effective tobacco control interventions, such as increasing taxes[58] or pictorial health warnings such as in Asia[59] and Nigeria.[60] However, for LMIC, it may take many years, and much supporting research of various kinds, such as in Australia, to introduce plain packaging. Given the dearth of papers from LMICs, and the time it takes to generate high-level research, research needs to be started now. Although the argument for plain packaging has been present in countries such as Mexico since 2010,[61] there is a substantial lack of focus on research in non-HIC.

There are, and will be, considerable political challenges in moving forward with tobacco control policies in LMICs. The dossier of evidence in the Australian experience of plain packaging was crucial in shepherding plain packaging through parliament and defending legal challenges. Such evidence is essential in LMICs. For example, the Modi Government of India recently argued that research among HIC does not necessarily translate into effectiveness in an LMIC.[62] Although these comments received considerable criticism, if LMIC such as India are to emulate HIC and introduce a potentially effective tobacco control intervention, more research must be conducted in these areas. Given the legal challenges that resource-rich countries such as Australia are facing after implementation of plain packaging,[63] and given that they will most likely be faced by LMICs, lower resourced countries will need contextual evidence to defend any such legislation. The tobacco industry has consistently acted in a spurious manner, such as its appetite for litigation even in cases where legal success is unlikely,[64] and therefore further specific research in LMIC is vital.

Limitations

In general, plain packaging research is often limited, as it does not aim to measure the direct effectiveness of plain packaging on tobacco use prevalence.[12] Rather, as shown by the studies in this review, research on plain packaging generally measures the impact on a set of proxies or determinants and the assumption, based on other evidence, is that these may contribute in concert with other interventions to lowering tobacco use prevalence.[65 66]

A potential limitation of this work is the scarcity of research in LMI settings, which limits the ability to draw conclusions for LMIC's more generally. Clearly, further research on the impact and effectiveness of plain packaging in LMICs is required.

There is significant heterogeneity in settings that include papers from LMI settings within high-income countries, as well as papers completed in MUIC and LMIC. However, there are also similar relevant characteristics across these LMI settings such as price elasticity, vulnerability to marketing and image, difficulty in accessing tobacco control interventions, and generally higher smoking rates compared to high-income settings.[42 43] Additionally, although the significant difference in the setting (and the method, sample selection and measures) somewhat limits generalisability, reviewing data from such diverse settings actually enabled useful comparisons and contrasts to be made. Furthermore, the consistency of results between the four articles, along with reviews of research in high-income countries, suggests that the findings may be consistent across countries and across socioeconomic spectra.

Limitations of the methods used in the four articles included use of computer images compared to actual sample packs, which may change the perception of packs and may elicit different results. All studies reviewed the appeal and attractiveness of packs but used different rating measures.

A further limitation of the review was the inclusion of only English language articles, given that LMIC may publish in other languages. However, the search strategy did not limit itself to language and the only articles excluded on the basis of language were articles published in French and Italian from HIC.

Conclusion

This review provides some early evidence that tobacco products in plain packaging have less appeal, increase

the salience of health warnings and may reduce the initiation of smoking in LMICs. However, very little research has been conducted in LMI settings. Given the political and legal challenges that resource-rich countries such as Australia have, and continue to face, during and after implementation of plain packaging, lower resourced countries need to have evidence to support their move forward in tobacco control. Therefore, further research into the potential impact and effectiveness of plain packaging in LMI settings is vital to build the case for plain packaging as an effective tobacco control initiative.

REFERENCES

1. World Health Organization. *WHO report on the global tobacco epidemic, 2008: The MPOWER package*. Geneva: WHO, 2008.
2. Doll R, Hill AB. Lung Cancer and Other Causes of Death in Relation to Smoking: a Second Report on the Mortality of British Doctors. *BMJ* 1956;10:1071–81.
3. Australian Government Department of Health. National Drug Strategy Household Survey detailed report 2013 [10 Aug 2015]. http://www.health.gov.au/internet/main/publishing.nsf/content/tobacco-kff
4. World Health Organization. *WHO Report on the Global Tobacco Epidemic, country profile India*. 2015.
5. Eriksen M, Mackay J, Ross H. *The tobacco atlas*. 4th edn. Atlanta, GA: American Cancer Society, 2012.
6. American Cancer Society World Lung Foundation. The Tobacco Atlas, Smoking's death toll 2015. http://www.tobaccoatlas.org/topic/smokings-death-toll/
7. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med* 2006;3:2011–30.
8. Stewart BW, Kleihues P. *World cancer report*. IARC Press, 2003.
9. World Health Organization. *WHO framework convention on tobacco control*. Geneva, 2003.
10. World Health Organization. Elaboration of guidelines for implementation of Article 11 of the Convention. *Third Session of the Conference of the Parties to the WHO Framework Convention on Tobacco Control*; Durban, South Africa, 17–22 November 2008. http://www.who.int/fctc/guidelines/article_11.pdf
11. Beede P, Lawson R. The effect of plain packages on the perception of cigarette health warnings. *Public Health* 1992;106:315–22.
12. Stead M, Moodie C, Angus K, *et al*. Is consumer response to plain/standardised tobacco packaging consistent with framework convention on tobacco control guidelines? A systematic review of quantitative studies. *PLoS ONE* 2013;8:e75919.
13. Carpenter CM, Wayne GF, Connolly GN. Designing cigarettes for women: new findings from the tobacco industry documents. *Addiction* 2005;100:837–51.
14. Wakefield M, Morley C, Horan JK, *et al*. The cigarette pack as image: new evidence from tobacco industry documents. *Tob Control* 2002;11(Suppl 1):I73–80.
15. Braun S, Mejia R, Ling PM, *et al*. Tobacco industry targeting youth in Argentina. *Tob Control* 2008;17:111–17.
16. Cunningham R, Kyle K. The case for plain packaging. 1995:80.
17. Hoek J, Gendall P, Gifford H, *et al*. Tobacco branding, plain packaging, pictorial warnings, and symbolic consumption. *Qual Health Res* 2012;22:630–9.
18. Tobacco Plain Packaging Act 2011, Act No. 148 of 2011 (2011).
19. Public Health (Standardised Packaging of Tobacco) Act 2015. Ireland2014.
20. Smoke-free Environments (Tobacco Plain Packaging) Amendment Bill, (2013).
21. Tobacco Plain Packaging Act 2011, An Act to discourage the use of tobacco products, and for related puposes, Australian Government ComLaw, (2011).
22. Moodie C, Stead M, Bauld L, *et al*. Plain tobacco packaging: a systematic review. Plain tobacco packaging: a systematic review. 2012;7:116.
23. Brose LS, Chong CB, Aspinall E, *et al*. Effects of standardised cigarette packaging on craving, motivation to stop and perceptions of cigarettes and packs. *Psychol Health* 2014;29:849–60.
24. Dunlop SM, Dobbins T, Young JM, *et al*. Impact of Australia's introduction of tobacco plain packs on adult smokers' pack-related perceptions and responses: results from a continuous tracking survey. *BMJ Open* 2014;4:e005836.
25. Germain D, Wakefield MA, Durkin SJ. Adolescents' perceptions of cigarette brand image: does plain packaging make a difference? *J Adolesc Health* 2010;46:385–92.
26. Wakefield M, Coomber K, Zacher M, *et al*. Australian adult smokers' responses to plain packaging with larger graphic health warnings 1 year after implementation: results from a national cross-sectional tracking survey. *Tob Control* 2015;24(Suppl 2):ii17–25.
27. Wakefield MA, Germain D, Durkin SJ. How does increasingly plainer cigarette packaging influence adult smokers' perceptions about brand image? An experimental study. *Tob Control* 2008;17:416–21.
28. Hoek J, Wong C, Gendall P, *et al*. Effects of dissuasive packaging on young adult smokers. *Tob Control* 2011;20:183–8.
29. McCool J, Webb L, Cameron LD, *et al*. Graphic warning labels on plain cigarette packs: will they make a difference to adolescents? *Soc Sci Med* 2012;74:1269–73.
30. Al-Hamdani M. The effect of cigarette plain packaging on individuals' health warning recall. *Healthc Policy* 2013;8:68–77.
31. Koval JJ, Aubut JA, Pederson LL, *et al*. The potential effectiveness of warning labels on cigarette packages: the perceptions of young adult Canadians. *Can J Public Health* 2005;96:353–6.
32. Shankleman M, Sykes C, Mandeville KL, *et al*. Standardised (plain) cigarette packaging increases attention to both text-based and graphical health warnings: experimental evidence. *Public Health* 2015;129:37–42.
33. Maynard OM, Leonards U, Attwood AS, *et al*. Effects of first exposure to plain cigarette packaging on smoking behaviour and attitudes: a randomised controlled study. *BMC Public Health* 2015;15:240.
34. Scheffels J, Lund I. The impact of cigarette branding and plain packaging on perceptions of product appeal and risk among young adults in Norway: a between-subjects experimental survey. *BMJ Open* 2013;3:e003732.
35. Scheffels J, Saebo G. Perceptions of plain and branded cigarette packaging among Norwegian youth and adults: a focus group study. *Nicotine Tob Res* 2013;15:450–6.
36. Van Hal G, Van Roosbroeck S, Vriesacker B, *et al*. Flemish adolescents' perceptions of cigarette plain packaging: a qualitative study with focus group discussions. *BMJ Open* 2012;2:pii: e001424.
37. Gallopel-Morvan K, Moodie C, Eker F, *et al*. Perceptions of plain packaging among young adult roll-your-own smokers in France: a naturalistic approach. *Tob Control* 2015;24:e39–44.
38. Gallopel-Morvan K, Moodie C, Hammond D, *et al*. Consumer perceptions of cigarette pack design in France: a comparison of regular, limited edition and plain packaging. *Tob Control* 2012;21:502–6.
39. Mannocci A, Colamesta V, Mipatrini D, *et al*. [How would plain packaging and pictorial warning impact on smoking reduction, cessation and initiation?]. *Epidemiol Prev* 2013;37:400–5.
40. Mannocci A, Colamesta V, Mipatrini D, *et al*. From directive to practice: are pictorial warnings and plain packaging effective to reduce the tobacco addiction? *Public Health* 2015;129:1563–70.
41. Arora M, Tewari A, Grills N, *et al*. Exploring perception of Indians about plain packaging of tobacco products: a mixed method research. *Front Public Health* 2013;1:35.

42. Australian National Preventive Health Agency. Promoting a Healthy Australia. 2013.

43. U.S. Department of Health and Human Services. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General.* Atlanta, GA, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2012. http://www.cdc.gov/tobacco

44. The World Bank Group. Country and Lending Groups Data 2015. http://data.worldbank.org/about/country-and-lending-groups—Low_income (accessed Jan 2016)

45. Sirriyeh R, Lawton R, Gardner P, *et al.* Reviewing studies with diverse designs: the development and evaluation of a new tool. *J Eval Clin Pract* 2012;18:746–52.

46. Guillaumier A, Bonevski B, Paul C. Tobacco health warning messages on plain cigarette packs and in television campaigns: a qualitative study with Australian socioeconomically disadvantaged smokers. *Health Educ Res* 2015;30:57–66.

47. Guillaumier A, Bonevski B, Paul C, *et al.* Socioeconomically disadvantaged smokers' ratings of plain and branded cigarette packaging: an experimental study. *BMJ Open* 2014;4:e004078.

48. White CM, Hammond D, Thrasher JF, *et al.* The potential impact of plain packaging of cigarette products among Brazilian young women: an experimental study. *BMC Public Health* 2012;12:737.

49. National Health and Medical Research Council. *How to review the evidence: systematic identification and review of the scientific literature.* Canberra, 2000.

50. Smith CN, Kraemer JD, Johnson AC, *et al.* Plain packaging of cigarettes: do we have sufficient evidence? *Risk Manag Healthc Policy* 2015;8:21–30.

51. Hammond D. *Standardized packaging of tobacco products: evidence review.* Waterloo, ON, Canada: University of Waterloo, 2014.

52. Doward J, Legge J. Public backs plans to remove branding from cigarette packets. *The Observer* 15 April 2012.

53. Action on Smoking and Health. Public support for putting tobacco products in plain packaging 2011. http://www.ash.org.uk/files/documents/ASH_765.pdf

54. Swift E, Borland R, Cummings KM, *et al.* Australian smokers' support for plain or standardised packs before and after implementation: findings from the ITC Four Country Survey. *Tob Control* 2015;24:616–21.

55. Wayne GF, Connolly GN. How cigarette design can affect youth initiation into smoking: Camel cigarettes 1983–93. *Tob Control* 2002;11(Suppl 1):I32–9.

56. Gendall P, Hoek J, Thomson G, *et al.* Young adults' interpretations of tobacco brands: implications for tobacco control. *Nicotine Tob Res* 2011;13:911–18.

57. Chapman S. *Public health advocacy and tobacco control: making smoking history.* Oxford, Malden, MA: Blackwell Pub., 2007.

58. Jiménez-Ruiz JA, de Miera BS, Reynales-Shigematsu LM, *et al.* The impact of taxation on tobacco consumption in Mexico. *Tob Control* 2008;17:105–10.

59. Yong HH, Fong GT, Driezne P, *et al.* Adult smokers' reactions to pictorial health warning labels on cigarette packs in Thailand and moderating effects of type of cigarette smoked: findings from the international tobacco control Southeast Asia survey. *Nicotine Tob Res* 2013;15:1339–47.

60. Amandeep C, Rao NC, Nidhi G, *et al.* Communicating tobacco health risks: how effective are the warning labels on tobacco products? *Niger Med J* 2014;55:411–16.

61. Hammond D. "Plain packaging" regulations for tobacco products: the impact of standardizing the color and design of cigarette packs. *Salud Publica Mex* 2010;52(Suppl 2):S226–32.

62. Correspondent H. Tobacco warnings on hold, BJP MP wants research on cancer link. *Hindustan Times* 2015.

63. Plain packaging: the lessons so far. *Managing Intellectual Property* 2014;(241):140–1.

64. Crosbie E, Glantz SA. Tobacco industry argues domestic trademark laws and international treaties preclude cigarette health warning labels, despite consistent legal advice that the argument is invalid. *Tob Control* 2014;23:e7. doi:10.1136/tobaccocontrol-2012-050569

65. Pechey R, Spiegelhalter D, Marteau TM. Impact of plain packaging of tobacco products on smoking in adults and children: an elicitation of international experts' estimates. *BMC Public Health* 2013;13:1–7.

66. Chapman S, Freeman B. *Removing the emperor's clothes: Australia and tobacco plain packaging.* Australia: Sydney University Press, 2014.