

Rapid literature review on the impact of health messaging and product information on packaging of alcohol and other unhealthy commodities

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Executive summary

- Alcohol labelling provides a high-reach opportunity to provide important health information and guidance to consumers at the point of sale and consumption, and helps them to make decisions about what products to purchase and how much to consume.
- Current alcohol labels in the UK do not fully meet the former voluntary agreement between the Government and the alcohol industry to include information on units, the lower-risk drinking guidelines and the Chief Medical Officer's advice on drinking during pregnancy.
- To ensure that labels can quickly and effectively achieve their intended purpose, it is important that their placement and content are underpinned by up-to-date robust and objective research.
- This report presents findings from a rapid review that brought together evidence on communicating health messaging and product information on the packaging of alcohol, with a secondary focus on tobacco and foods high in fat, sugar and/or salt.
- The rapid review provides mixed support for the impact of health messaging information on consumer knowledge and comprehension. It found that consumers' ability to spontaneously recall existing warning messages varies across studies and across countries. Lessons could be learned from research in the tobacco field that shows that knowledge of smoking-related health risks increases after exposure to health warnings.
- Although the review found mixed evidence on the impact of product information on consumer knowledge and comprehension, it showed that specific label content may increase comprehension. For example, people's ability to interpret standard drink/unit information may be improved if such information is presented alongside low-risk drinking guidelines. The review found limited evidence for the positive impact of nutrition information on consumers' knowledge and comprehension in relation to alcohol, with one recent study suggesting that energy labels increase the accuracy of energy content estimates in alcohol products. Lessons may be drawn from research on foods high in fat, sugar and/or salt that show nutritional information can increase consumers' content understanding. The rapid review did not identify studies looking at the impact of ingredients lists on consumer-related outcomes in relation to alcohol.
- Previous research, included in this review, provides preliminary support for the impact of health messaging on consumer decision-making and behaviour. The inclusion of health warnings on alcohol product labels can lead to increased intention to reduce drinking in experimental studies. Research in real-world settings shows promising results that if labels are well-designed they can lead to reduced alcohol consumption.
- Evidence on the impact of product information on consumer decision-making and behaviour is inconclusive, with studies suggesting that the provision of alcohol content and calorie information may not influence consumer behaviour. Lessons could be learned from the research in the field of foods high in fat, sugar and/or salt, which provides support for the importance of including nutrition information on product labels.
- The review shows that large, colourful labels on the front of alcohol products increase label visibility. Similar findings emerge from the field of foods high in fat, sugar and/or salt. There is also support for the use of plain packaging of alcohol products as a way to increase visibility of health messaging. The effectiveness of plain packaging is well-established in the tobacco field.

- Evidence in the current review provides support for the effectiveness of health warnings that link alcohol to a specific disease (e.g. cancer) in increasing people’s awareness of alcohol as a risk factor for the disease. Cancer warnings may be particularly effective in prompting people to reduce alcohol consumption. It also supports the use of explicit, negatively framed statements to communicate health risk information.
- The rapid review provides support for the impact of pictorial warnings on reducing alcohol consumption. Pictorial warnings have also been shown to be effective in increasing smoking cessation.
- Evidence in this review shows that the use of colour-coded schemes, such as traffic light systems, on alcohol labels may be effective in helping people to estimate alcohol serving limits. Drawing from research on foods high in fat, sugar and/or salt, the most effective way to help consumers make healthier choices may be to communicate standard drink and calorie information per serving, in addition to a graphical representation of what percentage of the weekly recommended amount a serving size represents.
- The review does not provide support for the use of descriptors indicating low alcohol content as a way to reduce alcohol consumption. Similarly, in the fields of tobacco and foods high in fat, sugar and/or salt, research shows that certain descriptors may mislead consumers to believe products are healthy or less harmful (e.g. use of “light” on cigarette packs).
- The findings of this review suggest that for alcohol labels to be effective in influencing consumers’ behaviour, they need to use a combination of health messaging and product information, and consider optimal label design to increase visibility.
- The above findings have implications for alcohol labelling in the UK and these are discussed in more detail in the current rapid review.

1. Introduction

Excessive alcohol consumption results in around 3 million deaths worldwide every year (WHO, 2018). In 2010 the World Health Organization (2010) introduced a global strategy to reduce the harmful use of alcohol and one of the recommended target areas of the strategy includes alcohol labelling. Alcohol labelling enables people to access health information and advice at the points of sale and consumption, and make informed decisions about the products they purchase and consume (Eurocare, 2014).

There are initiatives across the world that have introduced better labelling for alcohol drinks. In Europe, the European Alcohol Policy Alliance (Eurocare, 2014) provides recommendations for better labelling that includes ingredients, allergens, nutritional information, alcoholic strength and health warnings. Alcohol labelling in the UK has been based on voluntary agreements between the government and the alcohol industry, the most recent of which was the 2011 Public Health Responsibility Deal labelling pledge. Over 100 alcohol companies committed to introduce alcohol labels that include information on units, the lower-risk drinking guidelines and the Chief Medical Officer’s advice on drinking during pregnancy (Department of Health, 2012). This voluntary agreement meant that the alcohol industry self-regulated the implementation of the above recommendations. However, a review of labels found that in England 77.6% of alcohol labels contained the three required elements and the logo size was relatively small (Petticrew et al., 2015). In 2017, the Alcohol Health Alliance (AHA) reviewed 315 alcohol products across 27 UK locations and found that only 1 label out of 315 informed consumers of the Chief Medical Officer’s recommended low-risk weekly guideline (14 units, with several alcohol-free days). A subsequent AHA review of 320 alcohol products across 12 UK locations showed that 7.5% of labels carried the recommended low-

risk drinking guidelines and most labels did not display a health warning (AHA, 2018). The most recent AHA review of 424 containers in 18 locations found that 29% of labels contained up-to-date Chief Medical Officer's guidelines (AHA, 2020). Despite this gradual increase, progress in relation to alcohol labelling remains unsatisfactory. Deficiencies in practice also appear to be reflected in consumer reactions, with awareness of product information, health messaging, and health warnings on alcohol packaging being limited among both adults and adolescents in the UK (Critchlow et al., 2019; RSPH, 2018)

In response, as part of their Alcohol Prevention Framework (2018), the Scottish Government have committed to potential action on mandating alcohol labelling if industry progress continues to be unsatisfactory. With product packaging part of the 'marketing mix' (Hastings & Angus, 2009), this is a key opportunity to advocate for changes to ensure health messaging and product information are effectively communicated to consumers via alcohol packaging or labelling.

It is essential that policy is informed by the most relevant, robust and up-to-date research. This rapid review brings together evidence on communicating health messaging and product information on the packaging of alcohol, with a secondary focus on other unhealthy commodities (i.e. tobacco and foods high in fat, sugar and/or salt). Product information includes alcohol content (e.g. %ABV, standard drinks/units¹), nutrition information and ingredients listing. Health messaging refers to health warnings and low-risk drinking guidelines. The rapid review aimed to focus on evidence on the following factors: consumer knowledge and comprehension (including attention, responsiveness, recall), consumer decision-making and behaviour, presentation of product information and health messaging including content (e.g. novelty, framing of messages, credibility), visibility and noticeability, placement/positioning and format (e.g. text, table, graph, pictograms). The rapid review addressed the following research questions:

1. What is the impact of the provision of health messaging and product information on consumer knowledge and comprehension?
2. What is the impact of the provision of health messaging and product information on consumer decision-making and behaviour?
3. What is the impact of how this information is provided (e.g. content, credibility, visibility, noticeability, placement, positioning and format) on consumer knowledge, comprehension, decision-making and behaviour?

2. Methods

A rapid review of the literature was conducted with the aim to explore the impact of health messaging and product information on the packaging of alcohol and other unhealthy commodities (i.e. tobacco, foods high in fat, sugar and/or salt). A rapid review is a type of knowledge synthesis where the steps of a systematic review are streamlined (Khangura et al., 2012). Rapid reviews are suitable when health decision makers need timely access to evidence-based information (Tricco et al., 2015). The current review followed methods suggested by Dobbins (2017) and previous rapid reviews providing information for evidence-informed decision making in health policy and practice (Abrami et al., 2010; Bambra et al., 2010). The current review aimed to scope the literature rather than evaluate its effects, therefore quality assessment was not conducted.

¹ The term "standard drink" is used in some countries (e.g. USA, Australia) to refer to the amount of pure alcohol in one drink. The term "unit" is used in the UK to refer to the amount of pure alcohol in one drink. The amount of alcohol representing a standard drink or a unit varies between countries.

The primary review aim was to bring together existing research evidence from primary studies on health messaging and product information on the packaging of alcohol. Secondary aims included similar information about tobacco and foods high in fat, sugar and/or salt. As these were secondary outcomes, the review did not include primary studies in these fields but identified and extracted key information from existing reviews and reports that summarise available evidence in order to highlight examples of best practice for health messaging and product information.

2.1 Search strategy

The strategy for searching the literature is outlined below. Alcohol Focus Scotland had previously collated relevant literature and this was used as a starting point:

- 1) Retrieval of relevant literature held within Alcohol Focus Scotland’s existing literature database and screening the records against the inclusion criteria for the review.
- 2) Identification of key terms used in the above literature to inform key search terms.
- 3) Database searches using the search terms, identified in step 2. The chosen databases were Web of Science Core Collection and Medline, as per recommendations on the best combination of databases (Bramer et al., 2017).
- 4) Searches of grey literature on key websites: WHO, Alcohol Focus Scotland, Scottish Health Action on Alcohol Problems, Alcohol Change, Department of Health, Public Health England, National Institute for Health and Care Excellence (NICE).
- 5) Key informants working in the fields of alcohol, nutrition and tobacco were asked to provide feedback on the identified records and to identify any publications not captured by the search.
- 6) Hand searching the reference lists of previous reviews on alcohol labelling, identified by the search and recommended by key experts.

2.2 Search terms

Databases were searched from inception until February 2020 but experts were invited to recommend additional articles until the end of April 2020. An initial search identified a large number of studies (>100 000) so limiters were applied where the search terms had to be included in the study titles or abstracts. Although only studies in English were included, language filters were not applied. The search terms are displayed below.

Box 1 Search terms for alcohol

Alcohol* AND Label* OR Information OR Health messag* OR Warning OR Guideline*

Box 2 Search terms for tobacco

“Smok*” OR “tobacco” AND Label* OR Information OR Health messag* OR Warning OR Guideline*

AND
Review

Box 3 Search terms for food

Food* OR fat OR sugar OR salt²
AND
Label* OR Information OR Health messag* OR Warning OR Guideline*
AND
Review

2.3 Selection criteria

Studies were included in the review if they were written in English and if they focused on health messaging and product information on the packaging of alcohol, tobacco and foods high in sugar, fat and/or salt, and the impact of these on consumers. Only primary studies in the field of alcohol were included. Only reviews in the fields of tobacco and food were included.

2.4 Data extraction, management and analysis

2.4.1 Alcohol

The literature collated by Alcohol Focus Scotland contained 119 records. The combined search methods for identifying alcohol literature yielded 1581 articles. The titles and abstracts were screened and irrelevant articles excluded. The full text of 107 publications was screened. The full-text of articles identified by the database searches was screened independently by two authors. This resulted in the inclusion of 73 publications (fig. 1). Text relevant to the review aims was extracted and organised in Excel. An evidence table is included as supplementary material (Supplementary material 1). The text was then summarised narratively and presented under each research question.

2.4.2 Food

The database searches identified 398 articles and literature collated by Alcohol Focus Scotland contained 7 articles. Due to the small number of titles, abstracts and full text were screened in parallel and this led to the inclusion of 18 reviews. Information about the type of review, reviews aims, number of included studies and key findings was extracted in Excel. An evidence table is included as supplementary material (Supplementary material 2). Information was narratively summarised and presented in the current report.

2.4.3 Tobacco

The search methods identified 118 articles and literature collated by Alcohol Focus Scotland contained 4 articles. Due to the small number of titles, abstracts and full text were screened simultaneously and this led to the inclusion of 14 reviews. Information about the type of review, reviews aims, number of included studies and key findings was extracted in Excel. An evidence table

² The authors acknowledge the search strategy could have been wider to include words such as “calorie” and “energy” but for the purposes of the rapid review, the term “food” was considered to encompass the above.

is included as supplementary material (Supplementary material 3). Information was narratively summarised and presented in the current report.

2.5 Limitations

A number of limitations of the current rapid review should be acknowledged. A rapid review methodology was employed and rapid reviews are considered more susceptible to bias, compared to systematic reviews, as the sources of information are limited and quality assessment of included articles is not performed. Rapid reviews also provide descriptive summaries of data, rather than in-depth interpretations. However, this is a limitation of many literature reviews. The review was also limited to English language publications.

2.6 Description of publications included in this review

2.6.1 Alcohol

The review included 73 publications, focusing on the impact of health messaging and product information on consumer comprehension, knowledge, decision-making and behaviour in relation to alcohol. The publications included 63 academic articles, published in peer-reviewed journals, and 10 reports.

Most of the research was published after 2011 (n=54). Nine of the publications were between 2001 and 2010, and ten between 1990 and 2000.

The majority of studies in the publications were conducted in the UK (n=22), followed by Australia (n=18), USA (n=11) and Canada (n=9). Five studies were conducted in multiple countries, four in New Zealand and the remaining studies were conducted in Italy, France, Luxembourg and Thailand.

The studies were primarily quantitative (n=65), most of which adopted an experimental design (n=46) and the remainder a cross-sectional design (n=18), apart from one Randomised Controlled Trial (RCT). Ten studies were qualitative and four adopted a mixed-methods design³.

The number of participants varied from 26 to 126 in the qualitative studies, from 25 to 32, 517 in the quantitative and 25 to 1523 in the mixed-methods studies.

2.6.2 Food

Nineteen reviews, focusing on the impact of health messaging and product information on consumer perceptions, comprehension, knowledge, decision making and behaviour in relation to foods high in fat, sugar and salt, were included in this rapid review. All of these were conducted since 2007 with most of them in the last 5 years (n=14).

Nine of the included reviews were defined as systematic, three as narrative and one as scoping review. The type of review was not specified in five publications and one publication was a position statement based on previous literature.

The number of included studies in the reviews varied from 9 to 69, with four publications not stating the number of included studies.

2.6.3 Tobacco

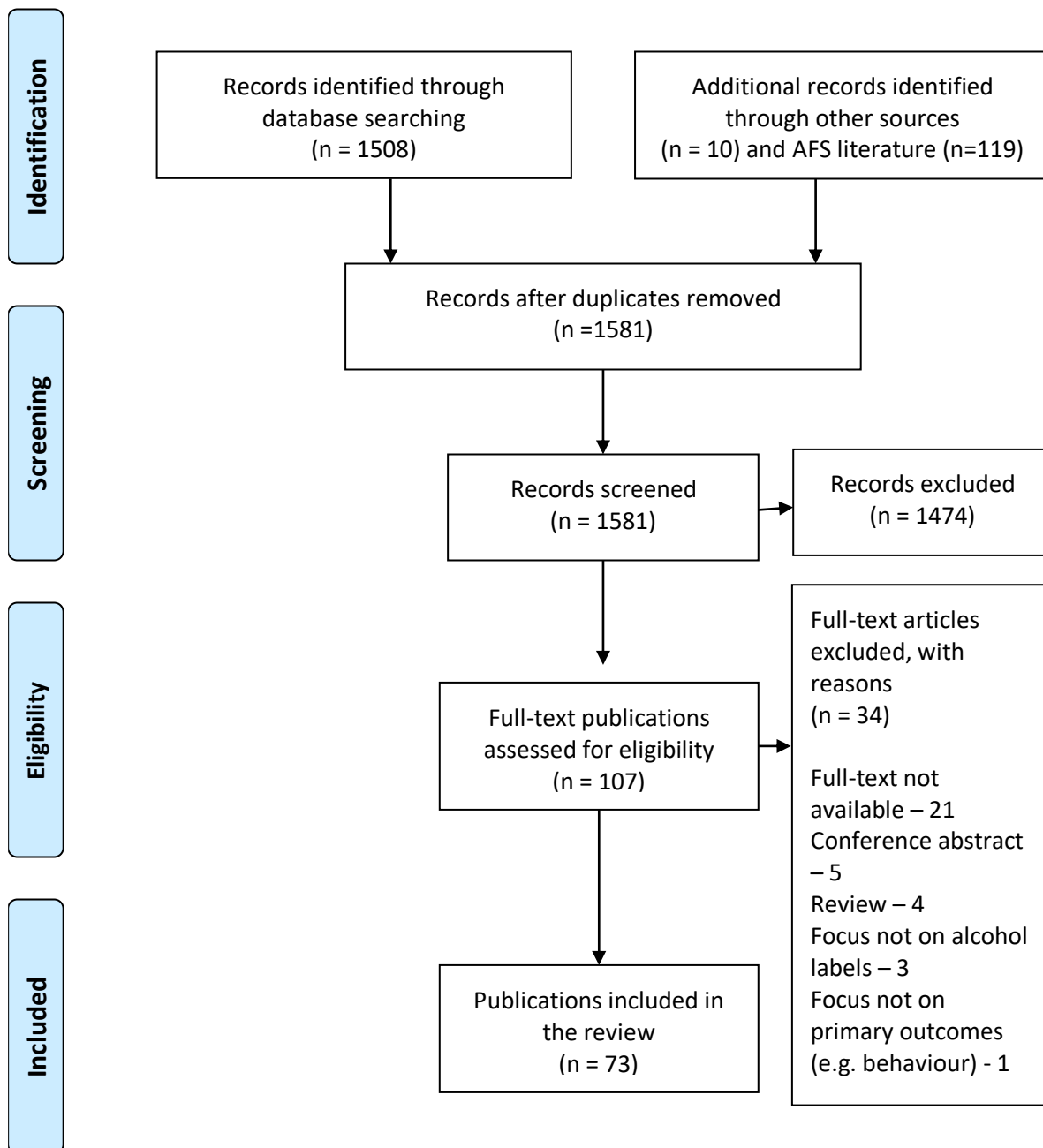
Fourteen reviews, focusing on the impact of health messaging and product information on consumer knowledge and behaviour in relation to tobacco, were included in this rapid review. All of these

³ Number of studies is higher than number of publications as some publications described more than one study

were conducted since 2011. Eight were described as systematic reviews and one as a meta-analytic review. The type of review was not specified in four publications and one was a briefing paper.

The number of included studies in the reviews varied from 14 to 94, with two publications not stating the number of included studies.

Figure 1 PRISMA diagram for the alcohol search



3. Findings

3.1 What is the impact of the provision of health messaging and product information on consumer knowledge and comprehension?

3.1.1 Health messaging

Overall, previous research provides mixed evidence on consumers' awareness and ability to recall health messaging information on existing alcohol products in the given country. Some studies found that people are aware of existing health warnings on alcohol labels (MacKinnon et al., 1992; Webster-Harrison et al., 2002; Jones & Gregory, 2009; Coomber et al., 2016) and have good knowledge of the potential harms of alcohol that are included on government labels in the relevant country (e.g. drunk driving, drinking during pregnancy) (Garretson & Burton, 1998; Jones & Gregory, 2010). MacKinnon et al. (2001) observed an exposure effect where people's awareness and recall of existing government health warnings increase after exposure to such warnings on alcohol labels. Similarly, several recent studies found that before an alcohol labelling intervention was implemented, people had low baseline knowledge of alcohol-related cancer risk and low risk drinking guidelines (Vallance et al., 2020). After intervention implementation, recall of cancer-related warnings, national drinking guidelines and daily drinking limits increased to a greater extent in the intervention sites where alcohol labels were implemented, compared to the comparison sites (Hobin et al., 2020; Schoueri-Mychasiw et al., 2020). Additionally, the study found that people aware of the cancer label message were more likely to be aware of the national drinking guidelines message (Schoueri-Mychasiw et al., 2020).

Other research suggests that people may not be aware of existing health messaging information on alcohol labels. One study in Australia found that only 16% of participants recalled existing warning labels on alcohol products (Coomber et al., 2015). Similarly, in the UK only a third of participants in one study recalled seeing product-related information, health messaging or warnings on alcohol packaging in the past month (Critchlow et al., 2019) and 8% had knowledge of recommended drinking limits (Rosenberg et al., 2017). Around a quarter of women aged 18 to 44 years in a study in New Zealand reported seeing messages or symbols on alcohol products about drinking while pregnant in the past year (Health Promotion Agency, 2017). Stevely et al. (2018) suggest that although exposure to new drinking guidelines increases in the year after their implementation, the increase is not sustained over time.

Although the provision of health messaging information on labels may improve people's recall and knowledge of such information, there is also indication that consumers may not pay attention and even avoid health warnings (CRIOC, 2011; Kersbergen & Field, 2017; Roderique-Davies et al., 2018). For example, young people in one study (Coomber et al., 2017) said they would avoid warnings by transferring alcohol into a different container. In another study, participants showed high avoidance (i.e. whether they would try to avoid the message) of cancer-related messages (Maynard et al., 2018b).

The potential of health warnings to positively impact people's knowledge and comprehension of risk is well-established in the field of tobacco. Noar et al.'s (2016) systematic review found that strengthening cigarette pack health warnings (e.g. improvements to text warnings, introduction of pictorial warnings, improvements to pictorial warnings) was associated with increased knowledge about smoking risks and increased knowledge of, and calls to, quit helplines.

The search did not identify any reviews exploring the impact of health messaging on consumer knowledge and comprehension in relation to foods high in fat, sugar and/or salt. Two reviews suggest that labels could include a clear link between specific nutrients and the most prevalent health problems in the particular country (Hawley et al., 2012) or provide guidance about amount of components (e.g. sugar, salt) considered harmful to health if consumed over a certain threshold.

3.1.2 Product information

Alcohol content

Previous research found that consumers are supportive of and would like information on standard drinks/units to be included on alcohol labels (Stockwell et al., 1991b; Webster-Harrison et al., 2002; Thomson et al., 2012; Roderique-Davies et al., 2018). One recent study in Canada found that before a labelling intervention was implemented, people had low baseline knowledge of standard drinks/units information (Vallance et al., 2020). However, there is limited research looking at the impact of alcohol content information on people's knowledge and comprehension. Four studies included in this review (Stockwell et al., 1991a; Stockwell et al., 1991b; Osioy et al., 2015; Walker et al., 2019b) found that labels containing standard drink/unit information lead to more accurate estimates of alcohol content, compared to labels containing %ABV information. Vallance et al. (2018) explored participants' views on proposed alcohol labels and found that interpreting standard drink information is often challenging and confusing. The authors suggest that alcohol labels should include both standard drink information and low-risk drinking guidelines. This is supported by an experimental study, which found that the combination of standard drink information and low-risk drinking guidelines leads to the most accurate estimates of alcohol in a standard drink and how many standard drinks someone can consume before reaching the low-risk drinking guidelines (Hobin et al., 2018). Similarly, Blackwell et al. (2018) found that a combination of units per serving and weekly guidelines lead to most accurate estimation of serving limits.

Nutrition information

Respondents in two studies said they would find it useful to receive nutrition information on alcohol labels, especially calories per glass (CRIOC, 2011; Annunziata et al., 2016) but there is limited evidence exploring the impact of nutrition information on people's knowledge and comprehension. Participants in one study (Walker et al., 2019a) said that they found terms, such as kilojoules, calories and % daily intake, confusing (unless the person was already health conscious). However, in a subsequent randomised controlled trial, Walker et al. (2019b) found that energy labels increased the accuracy of energy content estimates and participants' confidence in their ability to estimate the energy content of alcoholic beverages.

Research in the field of food high in fat, sugar and/or salt can provide potential insight into this. Reviews show that consumers can recall key information presented to them in an experimental situation (Grunert & Wills, 2007) and nutritional labels can have a positive impact on nutritional content understanding (Feteira-Santos et al., 2020). Nutrition claims relating to fat, sugar or energy content can also shape the knowledge of consumers with respect to perceived healthfulness of products, as well as expected and experienced tastiness of food products – making food products with nutrition claims seeming generally healthier and less tasty (Oostenbach et al., 2019). However, reviews also found that consumers do not always examine nutrition facts labels in detail and often show low comprehension of such information (Mandle et al., 2015; Dumoitier et al., 2019).

There is limited research on the impact of product information on consumer knowledge and comprehension in the field of tobacco. Chung-Hall et al. (2016) suggest that tar, nicotine and carbon

monoxide emission numbers can be misleading smokers to believe that some tobacco products are less harmful than others. The authors suggest that such information is replaced with information about the health effects of these constituents and emissions.

3.1.3 Other information

Consumers in two studies suggested that alcohol labels could include links to websites with additional information (CRIOC, 2011) and harm-reduction messages (e.g. eating before drinking) (Roderique-Davies et al., 2018). The studies did not explore if the provision of such information would have an impact on knowledge and comprehension.

3.2 What is the impact of the provision of health messaging and product information on consumer decision-making and behaviour?

3.2.1 Health messaging

Health warnings

As risk perception (i.e. individual perceived susceptibility to threat) is a known predictor of behaviour, some studies looked at the impact of health warnings on people's risk perception. Clarke et al. (2020) suggest that cancer-related health warning labels may increase disease risk perception while MacKinnon et al. (1992) did not find positive change in beliefs about the health risks of alcohol consumption after the introduction of government health warning labels on alcoholic beverages. Risk perception in relation to alcohol-related harm may be particularly low in young people with two qualitative studies with young people in Australia suggesting that participants did not feel susceptible to health warnings on existing government labels (Jones & Gregory, 2010; Coomber et al., 2018).

Research on the impact of health warnings on consumer decision-making and behaviour shows mixed results. On one hand, research suggests that exposure to alcohol health warnings increases people's intention to reduce alcohol consumption, especially when statements highlight the risk of cancer and diabetes (Pettigrew et al., 2016; Jonegenelis et al., 2018). Similarly, Clarke et al. (2020) found that exposure to cancer-related alcohol health warnings may provoke negative emotions and reduce alcohol drink selection in an online experiment. Jarvis & Pettigrew (2013) reported that health warnings had a positive impact on dissuading young consumers from purchasing alcohol. On the other hand, participants in several studies believed that the current label warnings in the given country are not effective in reducing alcohol consumption (Coomber et al., 2017; Dossou et al., 2017; Coomber et al., 2018; Pechey et al., 2020). In an experimental study, DeCarlo et al. (1997) found that only 7% of participants reported changing alcohol consumption after reading an alcohol warning label. Longitudinal studies show similar results. MacKinnon et al. (2000; 2001) found no effect on alcohol use after exposure to government alcohol warning labels in the USA.

The potential impact of health warnings on consumer behaviour has been highlighted in the literature on foods high fat, sugar and/or salt. Clarke et al.'s (2019) review provides support for the addition of warning labels that communicate adverse health-related consequences of consumption to the packaging of food products (e.g. tooth decay, diabetes, obesity). The review concluded that health warnings can be effective in reducing speed of consumption and encouraging healthy product selection and purchasing intentions.

The strongest support for the impact of health warnings on behaviour comes from the tobacco field. The effectiveness of tobacco health warnings has been studied extensively and health warnings on tobacco packaging are widely implemented across the world (Chung-Hall et al., 2016). Noar et al.

(2016) found that strengthening cigarette pack warnings (e.g. improvements to text warnings, introduction of pictorial warnings, improvements to pictorial warnings) is associated with increased calls to quit lines, reduction in cigarette consumption, increased quit attempts, increased short-term smoking cessation and reduced smoking prevalence.

Pregnancy warnings

Previous research that has focused on the impact of existing government labels in different countries has focused on labels that include pregnancy warnings. However, the impact of pregnancy warnings alone on decision-making and behaviour is under-researched. In one qualitative study, over 80% of participants believed that a pregnancy warning is likely to prevent women from drinking alcohol while pregnant (FARE, 2011). Similarly, Rout & Hannan (2016) found that a colourful pictogram of a pregnant woman drinking with a line across the image was perceived to be most effective in prompting women not to drink while pregnant, compared to other pregnancy warnings.

Other health messaging information

There are some suggestions that drunk driving warning labels may deter driving after drinking and encourage people to deter others from driving after drinking (Greenfield et al., 1999; Tam et al., 2010). One study looked at the impact of recommended drinking guidelines on consumers' intentions to reduce drinking and found that only 7% of respondents reported intention to reduce their alcohol consumption following the release of the new alcohol guidelines (Rosenberg et al., 2017). Stevely et al. (2018) also explored the impact of drinking guidelines and found that after guidelines were introduced, the proportion of people who reported tracking units increased. However, this increase did not persist over subsequent months

3.2.2 Product information

Alcohol content

There is limited research exploring whether provision of alcohol content information impacts on people's decision-making and behaviour. Research included in the rapid review shows that %ABV information may not be sufficient to impact consumers' decision-making and behaviour. In one study, participants said they use %ABV to guide their behaviour (Roderique-Davies et al., 2018) while in another, it was reported as the least important attribute of a label (Annunziata et al., 2019). The impact of standard drink/unit information on consumer decision-making and behaviour also remains under-explored. In an experimental study, Maynard et al. (2018a) found no difference between participants, who received unit information and those who did not, on beer consumed or intention to consume the alcoholic beverage in the future. In another study by Maynard et al. (2018b), a third of participants said they would take no action based on unit information.

Finally, some research suggests that alcohol content labelling may increase alcohol consumption. People report using label information on standard drinks/units and alcohol percentage to help them purchase stronger drinks in an effort to become intoxicated (Jones & Gregory, 2009; Jones & Gregory, 2010; Maynard et al., 2018a).

Nutrition information

Evidence on the impact of nutrition information suggests such information does not influence consumers' decision-making and behaviour. In two studies, Maynard et al. (2018a, 2018b) did not find any evidence for impact of providing calories information on intention to consume the alcoholic beverage in the future or the amount of beer consumed. Similarly, participants in another study (Walker et al., 2019a) said labels containing product information (e.g. nutrition information, calories)

would have little to no impact on their likely purchase or consumption of alcoholic beverages. Some participants in both of these studies said that energy content and calorie information would be relevant to people on a restricted diet (Maynard et al., 2018a; Walker et al., 2019a) with a small proportion of participants saying they may eat less food based on calorie information on alcohol labels (Maynard et al., 2018b). A recent randomised controlled trial (Walker et al., 2019b) compared the impact of three different energy labels and a 'no label' control condition, on consumers' likely alcohol purchase behaviour. The study found that none of the tested energy labels reduced the reported likelihood of purchase and consumption of alcoholic beverages. One study found that serving fact information on labels may increase alcohol consumption intention levels for wine and spirits (Bui et al., 2008).

Research from the field of foods high in fat, sugar and/or salt provides support for the importance of including nutrition information on product labels. Existing reviews show that different nutritional food labels are associated with decreased buying intentions for less healthy products and more healthy diet choices, such as decreased consumption of nutrient-poor foods (Grunert & Wills, 2017; Brown et al., 2018; Crockett et al., 2018; Anastasiou et al., 2019; Oostenbach et al., 2019; Feteira-Santos et al., 2020). However, Shangguan et al. (2019) found that although food labelling may lead to increased consumption of vegetables and reduced consumption of total energy and total fat, it does not alter intake of other dietary targets such as sodium, protein, carbohydrates, fruits and whole grains. In addition, Oostenbach et al. (2019) warn that underestimation of energy content can lead to energy overconsumption. Although these reviews provide support for the impact of nutrition information on decision-making and behaviour, it is unclear whether the effectiveness of such information can be transferred to the alcohol field.

3.2.3 Other information

A combination of product information and health messaging

A recent real-world study in Canada tested the effects of alcohol warning labels on population alcohol consumption. The labels were large and colourful, and included a health message linking alcohol to cancer, Canada's low risk drinking guidelines and standard drink information. The study found reduction of per capita alcohol sales in sites where alcohol warning labels were introduced, suggesting reduced population alcohol consumption (Zhao et al., 2020). However, the label included product information and health messaging so it is not possible to determine what specific aspects of the label had an impact on alcohol consumption.

Exercise-equivalent information

A systematic review by Brown et al. (2018) did not find conclusive evidence for the effectiveness of food labels in decreasing consumption for nutrient-poor foods apart from labels that contained exercise-equivalent information. The potential of including exercise-equivalent information on alcohol labels remains to be explored.

3.3 What is the impact of what and how information is provided on consumer knowledge, comprehension, decision-making and behaviour?

3.3.1 Format of health messaging and product information

Size, colour and placement

Larger labels are often preferred by consumers (Hall & partners, 2018; Vallance et al., 2018). Large size may increase visibility and noticeability (Dossou et al., 2017; Coomber et al., 2018), especially when the label is large and colourful (Jones & Gregory, 2010; Hall & Partners, 2018). Larger labels are also attended to longer in eye-tracking studies (Kersbergen & Field, 2017; Sillero-Rejon et al., 2019), especially when the size is combined with colour (Pham et al., 2018). Extra large warning labels may also decrease product perceptions (e.g. product looks attractive) for spirits and wine (Al-hamdani & Smith, 2016). Similar to colour and size, the location of the warning message on the label can affect its visibility. Warnings on the back label are less noticeable (Coomber et al., 2017; Dossou et al., 2017; Coomber et al., 2018; Roderique-Davies et al., 2018; Annunziata et al., 2019). Participants in Vallance et al.'s (2018) study preferred larger and bolder labels on the front of the bottle. In addition, the context of the warning (i.e. surrounded by other elements) can reduce its visibility (Dossou et al., 2017).

Literature reviews in the field of foods high in fat, sugar and/or salt also support the inclusion of health messaging and product information on the front labels of products (Dumoitier et al., 2019). Grunert & Wills (2007) suggest that labels should be prominent in size and displayed on the top-right of the package. Lessons about the utility of colour in influencing consumer outcomes may also be learned from the tobacco field. Stead et al. (2013) found that darker coloured plain (or standardised) tobacco packs are generally perceived as containing stronger tasting and more harmful cigarettes, than fully branded packs. Lighter coloured plain packs, on the other hand, were believed to suggest weaker and less harmful cigarettes (Stead et al., 2013). Chung-Hall et al. (2016) reached a similar conclusion saying that lighter shades, such as silver and white, are perceived as less harmful than colours such as red. Darker colours may also reduce the attractiveness and other positive attributes of cigarette packaging (Drovandi et al., 2019). Chung-Hall et al. (2016) suggested that health warnings need to be big and on the front of the packet so they are more visible.

Packaging

Research suggests that effective health warning communication can be further increased if plain packaging is used. Plain packaging has been found to increase warning recognition and decrease product-based (e.g. product looks attractive) and consumer-based (e.g. product is associated with someone who is trendy) ratings for alcohol (Al-hamdani & Smith, 2016). Al-hamdani & Smith (2015, 2016) conclude that bigger labels with combined text and image warnings on plain packaging are the most effective way to increase warning recognition and affect product- and consumer-based perceptions.

Lessons about the utility of plain packaging can be drawn from the tobacco field. Evidence suggests that plain cigarette packs are rated as unattractive, have negative connotations and reduce the appeal of tobacco and smoking (Moodie et al., 2012; Moodie et al., 2013; Stead et al., 2013). This is supported by McNeill et al. (2017) who conclude that plain packaging has the potential to decrease the uptake of smoking in non-users and reduce use in current tobacco users. Plain packaging can further increase the salience and effectiveness of health warnings in terms of appeal, recall, attention, believability, seriousness and perceived effectiveness (Moodie et al., 2012; Stead et al., 2013; Al-hamdani, 2014; Chung-Hall et al., 2016; Noar et al., 2016). When used in combination, plain packaging may not only increase the visibility of graphic health warnings but also lead to perceptions

of the cigarettes having an increased tar content and more serious health risks, and increased thoughts of quitting amongst smokers (Drovandi et al., 2019).

3.3.2 Content of health messages

General vs specific messages

There is support for health warnings to clearly state the link between alcohol and a specific illness. Jongenelis et al. (2018) found that change in the extent to which participants believed alcohol to be a risk factor for a specific chronic disease was largest when they were exposed to the statement highlighting the alcohol-related harm associated with that specific disease. Cancer-specific warnings in particular appear to have the greatest impact on raising awareness and prompting conversations (Miller et al., 2016) and increasing motivation and desire to drink less (Maynard et al., 2018b; Pechey et al., 2020). Only one study suggested that general cancer statements may be more believable, convincing and personally relevant than specific cancer statements (Pettigrew et al., 2014).

Long vs short term effects

Research, primarily in younger consumers, suggests that labels should highlight the short-term effects of alcohol consumption (Jones & Gregory, 2010; Annunziata et al., 2016; Annunziata et al., 2019). In one study (Roderique-Davies et al., 2018), some participants said labels should focus on short-term alcohol-related risks such as accidents and violence, but more participants wanted the focus to be on long-term effects on pregnancy, liver function, addiction and mental illness.

Believability

Believability of alcohol warnings is important as messages not perceived as believable may be less likely to promote desired change in behaviour (i.e. reduced alcohol consumption). Studies that explored people's perceptions of health warning labels found mixed results. Research shows cancer-specific warnings are more believable and convincing, compared to other warnings (Pettigrew et al., 2016; Blackwell et al., 2018; Maynard et al., 2018b). However, a different study found that only half of the participants believed that the cancer-related health messages were true (Thomson et al., 2012). Similarly, Maynard et al. (2018b) found that more participants said cancer, mental health and fertility messages provided new information but a smaller majority believed these messages are true, compared to liver disease, driving accidents and harm to an unborn child information where there was less perception information was new but statements were perceived to be true by a bigger majority. Andrews et al. (1990) also found that warnings about birth defects and drinking impairment were more believable than other warnings. In relation to novelty of messages, Coomber et al. (2017) found that after a certain period of time, people become habituated to alcohol warnings, at which point warning may no longer serve their purpose.

3.3.3 Framing of health messaging and product information

Tone of health warning messages

There is mixed evidence on what tone health warning messages should adopt and how they should be framed. There is indication that a health warning message should adopt a serious tone (Thomson et al., 2012). A multi-country study (CRIOC, 2011) found that younger people prefer humorous messages but the authors cautioned against the use of humorous tone as it can lead to increased consumption of alcohol.

Krischler, M. & Glock, S. (2015) explored whether an alcohol warning should be formulated as a statement or a question. They found that the statement warning label had no influence on participants. The question warning label increased individual negative alcohol-related outcome

expectancies (i.e. expectation of negative consequences of drinking) but not positive or general expectancies or intention to drink.

Research suggests that negatively framed health warnings (e.g. alcohol increases your risk of cancer; drunk driving kills) may be associated with motivation to drink less (Blackwell et al., 2018; Maynard et al., 2018b), especially in at-risk groups (i.e. those who drink more) (Jarvis & Pettigrew, 2013). It may also lead to more accurate reasoning in situations, pertinent to decisions to drink (Zahra et al., 2015). Zahra et al. (2015) further suggest that when trying to provide clear, understandable warnings about the consequences of drinking, accuracy can be improved by making the content negative and by presenting it as an "if...then" statement (e.g. if you drink beer, then you will pass out).

Other studies provide support for positively-framed messages (e.g. alcohol makes you feel alone; make sure you are okay to drive) (Glock et al., 2013; Pettigrew et al., 2014). Pettigrew et al. (2014) suggest that statements with a positive message are considered to be more believable, more convincing and more personally relevant than statements that use fear appeal and numerical evidence. Glock et al. (2013) compared positive-framed messages with health-related warnings (e.g. alcohol damages your brain) and found that participants in the positively-related labels group tended to report slightly lower drinking intentions but not lower drinking behaviour.

Collymore and McDermott (2015) suggest the use of messages framed to indicate loss. They found that a health disgust-loss frame (i.e. photo and text saying: "drinking a lot more than two small glasses of wine a day can produce pus spots on your face") was most effective at evoking feelings of disgrace and worry about own alcohol consumption, and triggering intentions to reduce alcohol consumption and drink moderately. This was followed by health fear-loss framed messages (i.e. photo and text saying: "drinking a lot more than two small glasses of red wine per day can be bad for the health of your heart) and social fear-loss framed messages (i.e. photo and text saying: "drinking immoderately in social situations means that you are more likely to make bad interpersonal choices and behave in an undignified manner). The least effective frame for reducing intention to drink was the health gain frame (i.e. photo and text saying: "drinking up to two small glasses of red wine per day can be good for the health of your heart). This finding is important as it is different than findings in the field tobacco, which show that positive or gain-framed messages are significantly more likely than negative or loss-framed messages to encourage smoking cessation (Gallagher & Updegraff, 2011).

Explicit statements

Research supports the use of explicit statements to communicate health warnings. Laughery et al. (1993) suggest that when severity is great, only explicit information conveys severity adequately (e.g. if you drink alcohol, it begins to reach your brain within two minutes after drinking it; if you drink while you are pregnant, your child may be born with Foetal Alcohol Syndrome and need institutionalisation). Similarly, Pettigrew et al. (2014) suggest that statements featuring "increases risk" wording may be more believable than the wording "can cause" among females. This is supported by Hall and partners (2018) and Coomber et al. (2018) who found that consumers sometimes view health warnings as suggestions and recommendations, rather than statements persuading against alcohol misuse. The role of persuasive language in relation to alcohol has not been explored. However, a systematic review by Brown et al. (2018) says that persuasive language is not associated with decreased consumption of energy-dense and nutrient-poor foods or increased consumption of nutrient-dense foods.

Other research provides support for the use of the words “health warning” on alcohol labels (FARE, 2011; Thomson et al., 2012). The use of “government health warning”, however, may be criticised as indicating “nanny” state (Thomson et al., 2012). Creyer et al. (2002) suggest that a label explicitly stating alcohol is a drug may increase perception of a number of risks among college-aged consumers and does not have an effect on the perceived benefits associated with drinking. This is further supported by MacKinnon (1992) who found that participants chose beer cans with blank labels and avoided those with “poison”, “toxic” or “causes cancer” labels.

Graphic images

There is mixed evidence whether graphic and shocking images should be used to communicate health warning information on alcohol labels. Negative pictorials (e.g. person in a crime scene), health-related shocking (e.g. liver with cirrhosis) and accident-related (e.g. wounded girl) pictures have been found to provoke the most reactions (CRIOC, 2011; Authayarat et al., 2018). Sillero-Rejon et al. (2018) found that highly-severe warnings (e.g. a graphic picture of a severely damaged liver and a warning that alcohol causes liver cirrhosis) are perceived as more effective and promote higher motivation to reduce drinking, compared to moderately severe warnings. Similarly, DeCarlo et al. (1997) found that messages with most intensity may be perceived to be most effective (e.g. more Americans have died on highways as a result of drunk driving than all the wars combined). However, although graphic images elicit more engagement (Coomber et al., 2017), they may not be the most effective since they can be perceived as too confronting (Coomber et al., 2017) and might trigger defensive responses (Brown & Locker, 2009). Graphic images may also lead to opposition from “quality” products such as wine (CRIOC, 2011).

Graphic warnings have received strong support in the tobacco field. Graphic pictorial health warnings have been shown to evoke strong emotional responses (e.g. fear) and to be perceived as more real (compared to illustrations) (Hammond, 2011; Chung-Hall et al., 2016; Drovandi et al., 2019). Evidence also suggests that the effectiveness of graphic images could be increased if they are combined with narratives or personal testimonials of the effects of smoking and benefits of quitting (Hammond, 2011).

Descriptors

Research exploring consumers’ preferences for different descriptors of alcohol content (e.g. low, non-alcoholic) can also provide insight into the extent to which labels may be effective. A consultation by the Department of Health and Social Care (2018) did not find evidence to support introducing new descriptors for alcohol above 1.2% ABV. The majority of participants were in favour of keeping the existing descriptor of low alcohol and to be defined as 1.2% ABV or less through guidance. Half of the respondents were in favour of keeping the “dealcoholised” descriptor. The “non-alcoholic” descriptor was deemed to cause confusion as it is used for drinks that contain less than 0.5% alcohol. However, the effect of such descriptors on behaviour needs to be considered. In one study, Vasiljevic et al. (2018a) found that the total amount of alcohol consumption increased as the label denoted lower alcohol strength. In another study, Vasiljevic et al. (2018b) found the descriptors of lower %ABV yielded a higher proportion of correct answers or overestimates for units but more underestimates of the number of small glasses needed to match the alcohol in a small glass of regular strength alcohol.

The use of descriptors (e.g. low fat, light) has been more extensively explored in the field of foods high in fat, sugar and/or salt. Previous reviews found that such descriptors may increase understanding of the content of the product (Schlemitt et al., 2017) and make products less

appealing (Skaczkowski et al., 2016; Schlemm et al., 2017). However, Brown et al. (2018) suggest a potential negative effect of food labels on food consumption saying that when one aspect of a product is advertised as healthy, consumers may increase intake of the product believing it does not lead to weight gain.

Research in the field of tobacco also suggests that brand descriptors (e.g. “light”, “mild”, “regular”) should be used with caution as these can mislead consumers to believe that some tobacco products are less harmful than others (Chung-Hall et al., 2016). Shemlit et al. (2017) found that some smokers may select cigarette packs with “light” or “mild” descriptors, if they want to quit smoking or reduce the risk of smoking to their health.

Form of presentation

The review did not find clear evidence on the most effective way to present health messaging and product information on alcohol labels. Studies suggest the people prefer health warning information to be presented using imagery (e.g. symbols, logos, images). Imagery may make warnings more memorable (Coomber et al., 2018) and more effective in decreasing alcohol selection, compared to text alone or no label (Clarke et al., 2020). Rout & Hannan (2016) found that a colourful pictogram was perceived to be the most effective way to convey a message and prompt women not to drink while pregnant. Logos, depicting the negative effects of alcohol on the brain may be particularly important in driving consumers’ choices (Annunziata et al., 2019). Wigg & Stafford (2016) found that the risks of consuming alcohol were perceived to be higher in the pictorial, compared to control condition, but there was no difference between pictorial and text.

Similar impact of pictorial warnings on behaviour is found in the tobacco field. There is empirical evidence that pictorial warning labels lead to strong affective and cognitive reactions, change knowledge and attitudes, and increase intentions not to use tobacco products (Chung-Hall et al., 2016; Ratih & Susanna, 2018; Francis et al., 2019). However, it is worth noting that one previous review did not find clear evidence on the effectiveness of pictorial warnings on smoking behaviour (Monárrez-Espino et al., 2014).

Studies in the alcohol field also explored whether an image should be combined with text. Some research suggests that a combination between a pictogram and a chart or text is the most effective way to present health information (Rout & Hannan, 2016; Hall & partners, 2018; Vallance et al., 2018) and it decreases positive product perceptions (e.g. product looks attractive) (Al-hamdani & Smith, 2015). Other studies suggest that a combination of image and text is not more effective in reducing alcohol consumption, compared to text only (Stafford & Salmon, 2017). In terms of text, some research suggests that information in the form of statistics may be considered more relevant to participants (CRIOC, 2011; Coomber et al., 2017). According to Armitage and Arden (2016), the inclusion of a self-affirmation statement (e.g. “if I feel threatened or anxious, then I will think about the things that are important to me”) in addition to the standard warning on the alcohol label can lead to reduced alcohol consumption.

Alternative ways to present health messaging and product information by using colour-coded schemes have also been explored. Blackwell et al. (2018) found that accuracy of estimated weekly serving limits of alcohol was best in novel labels (i.e. the Food Label Equivalent⁴ and the Pie Chart

⁴ The Food Label Equivalent label specifies the number of units per serving and what percentage of the guideline weekly amount these units represent.

label⁵) and worst and slowest in the standard industry label (i.e. the Responsibility Deal condition)⁶. However, the type of unit label did not have an impact on participants' perceived ability to reduce consumption, choice of drink or impact on health. Chen & Yang (2015) found that risk messages in table and graphic format were more effective in increasing risk perception than those in text format, but there was no significant difference between graph and table format. According to Bui et al. (2008) Serving Facts panels⁷ can lead to underestimation of calories, carbohydrates and fat in alcoholic beverages. The use of traffic light systems to communicate product information is often preferred by consumers (Maynard et al., 2018b; Roderique-Davies et al., 2018). Sillero-Rejon et al. (2019) suggest that traffic light labels can increase visual attention.

Lessons in relation to the use of color-coded schemes can be drawn from the overwhelming empirical support for such schemes in guiding consumer behaviour in relation to foods high in fat, sugar and/or salt (Hawley et al., 2012; White & Signal, 2012; Cecchini & Warin, 2015; Dumoitier et al., 2019). However, there is limited research to suggest what type of color-coded schemes is most effective. Temple (2020) did not find conclusive evidence that nutrient specific labels (multiple traffic lights, guideline daily amounts, and warning labels) outperform summary labels (Nutri-Score⁸ and those with stars or a tick).

Serving size information

The rapid review did not find research exploring whether communicating product information on alcohol labels in relation to serving size can affect consumer knowledge, comprehension, decision-making or behaviour. However, as shown earlier, accuracy of estimated weekly serving limits of alcohol was best where labels provided units per serving as a proportion of the weekly guidelines, and worst where labels provided total units per container only (Blackwell et al., 2018). This may be particularly problematic for alcohol products that contain more than one serving.

The importance of serving size information has been extensively researched in the field of foods high in fat, sugar and/or salt. Despite some evidence that serving size information can both increase and decrease consumption of a specific product (Dumotier et al., 2019), there is consistent evidence that information per serving is more useful than other information, such as nutrients for 100g (Mandle et al., 2015). According to Hawley et al. (2012) labels should convey calories per serving in addition to daily calorie requirements. Additionally, when foods are sold as a single entity or can be consumed in one sitting, they should include calorie information per package (Grunert & Wills, 2007; BEUC the European Consumer Organisation, 2015). Van der Horst et al. (2019) highlight a potential caveat with serving size information saying that consumers tend to interpret serving size as a recommendation and perceive larger sizes as more realistic, leading to wrong estimates of nutritional content per serving. Tarabella & Voinea (2013) conclude that labels should guide consumers on how to integrate foodstuff in their overall diet by suggesting the appropriate amount and consumption frequency of foodstuff. These findings have implications for alcohol labels as communication of product information (e.g. units per serving, calories per serving) may help consumers to make decisions in relation to alcohol consumption.

⁵ The Pie Chart Label specifies the number of units per serving and how many of these drinks represent the guideline weekly amount, by presenting them using a pie chart.

⁶ The Responsibility Deal condition specifies the total number of units in the container.

⁷ The Serving Facts panel contains a statement that includes levels of calories, carbohydrates, fat, and alcohol Content, on the product container.

⁸ The Nutri-Score is a type of nutrition label that converts the nutritional value of a specific product into a code consisting of 5 letters. The product is given a colour-coded letter indicating its nutritional value.

4. Summary

This rapid review explored the impact of health messaging and product information on consumer knowledge, comprehension, decision-making and behaviour in the field of alcohol, with secondary focus on tobacco and foods high in fat, sugar and/or salt. The review includes 73 publications in the field of alcohol, 19 reviews in the area of foods high in fat, sugar and/or salt, and 14 reviews in the field of tobacco. The majority of publications are from the last 10 years, highlighting the increasing interest in the role of health messaging and product information in shaping consumers' knowledge and guiding their behaviour.

What is the impact of the provision of health messaging and product information on consumer knowledge and comprehension?

The current review provides mixed support for the impact of *health messaging* information on consumer knowledge and comprehension. It found that consumers' ability to spontaneously recall existing warning messages varies across studies and across countries. However, a recent real-world intervention in Canada showed that recall of cancer-related warnings, national drinking guidelines and daily drinking limits increased to a greater extent in the intervention sites where warning labels were introduced, compared to the comparison sites (Hobin et al., 2020; Schoueri-Mychasiw et al., 2020). This suggests that carefully designed labels have the potential to increase people's knowledge of alcohol-related harm. Similar findings have been observed in the tobacco field with a previous review showing that knowledge of smoking-related health risks increases after exposure to health warnings (Noar et al., 2016). Evidence on the impact of health messaging on knowledge and comprehension in relation to foods high in fat, sugar and/or salt is inconclusive.

In relation to *product information*, the review found that although consumers may find it difficult to interpret standard drink/unit information (Vallance et al., 2018), such information leads to more accurate estimates of alcohol content when compared to %ABV information. In addition, when standard drink/unit information is presented alongside low-risk drinking guidelines, people make more accurate estimates of how much alcohol is in the alcohol product and how much they can drink before reaching the low-risk guidelines (Hobin et al., 2018). The review found limited evidence for the positive impact of nutritional information on consumers' knowledge and comprehension in relation to alcohol. A recent randomised controlled trial (Walker et al., 2019b) suggests that energy labels increase the accuracy of consumers' estimates of energy content in alcohol products. Lessons could be learned from previous reviews on labelling of foods high in fat, sugar and/or salt. These show that nutritional information increases consumers' content understanding (e.g. Feteira-Santos et al., 2020). However, research also shows that people do not examine nutrition labels in detail, so it is important for labels to be designed in a way that allows consumers to understand product information and make decisions in environments where decisions about product choices (e.g. supermarkets) are made quickly. Participants in one study expressed preference for labels that enable quick and easy comparison between different alcohol beverages (Walker et al., 2019a). This rapid review did not identify studies looking at the impact of ingredients lists on consumer-related outcomes. Martin-Moreno et al. (2013) suggest that ingredients lists of alcohol products are important because alcohol includes ingredients (e.g. wheat, barley, grapes, histamine, sulphites) that may cause allergic reactions.

What is the impact of the provision of health messaging and product information on consumer decision-making and behaviour?

The rapid review provides mixed support for the impact of *health messaging* on consumer decision-making and behaviour. Behaviour is often influenced by an individual's risk perception of how susceptible they are to a specific illness (Leventhal et al., 1997). Evidence included in this review shows that risk perception of alcohol-related harm may be particularly low in young people (Jones & Gregory, 2010; Coomber et al., 2018). This is supported by previous reviews (Scholes-Balog et al., 2012; Hassan & Shiu, 2018), which found that beyond the adult population, alcohol warnings have little efficacy in affecting risk perceptions and alcohol consumption in adolescents.

The current review shows that the inclusion of health warnings on alcohol product labels can lead to increased intention to reduce drinking in experimental settings. However, research shows mixed results on whether this impact extends to actual changes in behaviour. Evidence, included in the review, shows that many people believe current labels in the given country are not effective in prompting them to reduce drinking. One study in the USA (MacKinnon et al., 2001) found no effect on alcohol use after exposure to government labels containing alcohol health warnings. However, a recent intervention in Canada (Zhao et al., 2020) showed that when alcohol labels are carefully designed, they can lead to reduced population alcohol consumption. Hobin et al. (2020) provide further insight into the potential impact of well-designed labels. In a real-world study, they found that health messaging (i.e. cancer warning) may be particularly effective in increasing intention to reduce drinking, compared to product information (i.e. national drinking guidelines, standard drink information) (Hobin et al., 2020). This is in line with a recent systematic review, which found that health warnings have significant potential to reduce selection of alcohol products (Clarke et al., 2020). Lessons on effective health warnings can be learned from the tobacco field where there is clear evidence that health messaging leads to reduced smoking prevalence.

The review includes limited research on the impact of pregnancy warnings on women's decision-making and behaviour. However, a previous study found that pregnant women in Australia use alcohol labels as a source of information (Parackal et al., 2010). Hankin et al. (1993, 1996, cited in Wilkinson et al., 2009) found that light drinkers and first time mothers were more likely to moderate their drinking after exposure to pregnancy warning labels. The review found limited evidence on the effectiveness of drunk driving warnings to deter people from driving after drinking.

This rapid review found mixed evidence on the impact of *product information* on consumer decision-making and behaviour. There is not enough evidence to suggest that the provision of alcohol content information (i.e. standard drinks/units and %ABV) impacts people's behaviour in relation to reducing alcohol consumption. In some cases, it may even be used to guide decisions about purchasing stronger drinks in an effort to reach intoxication faster (e.g. Jones & Gregory, 2010; Maynard et al., 2018a).

There is also limited evidence exploring the impact of nutrition information on intention to consume alcohol products. Maynard et al. (2018a, 2018b) found that the provision of calorie information does not influence intentions to drink the alcoholic beverage. A recent randomised-controlled trial also showed that energy content labels on alcohol beverages had no influence on reducing the reported likely purchase or consumption of alcoholic products, and some types of labels even led to increased likelihood of purchase (Walker et al., 2019b). Lessons could be learned from the research in the field

of foods high in fat, sugar and/or salt, which provides support for the importance of including nutrition information on product labels.

What is the impact of what and how information is provided on consumer knowledge, comprehension, decision-making and behaviour?

The rapid review provided evidence that alcohol labels have the potential to be effective in increasing consumer knowledge and reducing alcohol consumption. However, several steps need to be taken to optimise label design. First, for any label to be effective, people need to notice it so format and layout factors need to be considered to increase label visibility. Second, the content of labels needs to be carefully designed to communicate information in a clear way. Third, the form of presentation and framing of messages need to be considered so information is communicated in the most effective way.

Format of warning labels

Of primary importance in understanding the effectiveness of warning labels is the question of whether people notice labels. The current review shows that large, colourful labels on the front of alcohol products are more visible and are attended to longer in eye-tracking studies (e.g. Jones & Gregory, 2010; Pham et al., 2018). Similar findings emerge from the field of foods high in fat, sugar and/or salt (Grunert & Wills, 2007; Dumoitier et al., 2019). The use of specific colours has been suggested in the tobacco field with darker colours shown to reduce product attractiveness (Stead et al., 2013).

The review found support for the use of plain packaging of alcohol products (e.g. Al-hamdani & Smith, 2016). This is in line with previous reviews that have recommended the provision of health warnings on plain packaging or contrasting background (Al-Hamdani, 2014; Kaczmarck, 2017). The utility of plain packaging to influence consumer behaviour in relation to reduced uptake of smoking and increased smoking cessation is well-established (e.g. Stead et al., 2012; McNeil et al., 2017).

Content of alcohol warning labels

Once a label is noticed, its content becomes of paramount importance. This rapid review provides support for the effectiveness of health warnings that link alcohol to a specific disease (e.g. cancer), in increasing people's awareness of alcohol as a risk factor for the disease (e.g. Pechey et al., 2020). Cancer warnings may be particularly effective in influencing people's behaviour. A recent real-world study in Canada found that cancer warnings may be effective in influencing cognitive processing and intention to reduce drinking (Hobin et al., 2020). These results support a previous review, which found that health warnings on alcohol products are more effective when they link alcohol with specific harms (Jones & Gordon, 2013). Evidence also suggests that health warnings should focus on the short-term effects of alcohol consumption, which may be particularly relevant to younger consumers (Annunziata et al., 2019). Finally, research suggests that if health warnings present new information, consumers may not believe the information to be true (e.g. Maynard et al., 2018b). This raises questions about what and how to present information without compromising its believability.

Framing of information on alcohol warning labels

In order for health messaging and product information to be communicated effectively to consumers, the framing of messages and form of presentation need to be considered. Evidence in the current review supports the use of explicit statements to communicate health risk

information, especially statements that contain the phrase “health warning” (Thomson et al., 2012). The review found that negatively framed messages may be particularly effective in increasing motivation to drink less (e.g. Blackwell et al., 2018), especially in consumers who drink at harmful levels (Jarvis & Pettigrew, 2013). This contradicts research in the tobacco field where gain-framed messages are more likely to encourage smoking cessation (Gallagher & Updegraff, 2011). Similarly, the effectiveness of graphic health warnings to communicate tobacco harm is well-known (Chung-Hall et al., 2016), but evidence is less conclusive in relation to communicating alcohol-related harm. One explanation for this could be that unlike smoking, alcohol is often associated with positive health (e.g. moderate wine consumption, Vecchio et al., 2017) and social (e.g. social bonding, Emslie et al., 2013) benefits. For example, a study included in the current review (Brown & Locker, 2009) showed that distressing images might lead to defensive responses and lower perceived risk in people vulnerable to alcohol-related problems.

The review does not provide support for the use of descriptors indicating low alcohol content. The considerable uncertainty around the use of descriptors denoting low alcohol and equivalent for tobacco and food has been highlighted before (Shemilt et al., 2017). The use of descriptors needs to be considered carefully as certain descriptors may mislead consumers to believe products are healthy or less harmful (e.g. use of “light” on cigarette packs) (Shemilt et al., 2017).

The rapid review provides support for the impact of pictorial warnings on reducing alcohol consumption (e.g. Clarke et al., 2020). Pictorial warnings have also been shown to be effective in encouraging smoking cessation (Chung-Hall et al., 2016).

Evidence, included in the review, shows that colour-coded schemes, such as traffic light systems, may be effective in helping people to estimate alcohol serving limits (Blackwell et al., 2018). However, serving facts panels may lead to underestimating of nutritional content in alcoholic beverages (Bui et al., 2008). The effectiveness of colour-coded schemes in communicating health messaging and product information on alcohol labels should be further explored as these have received strong empirical support in relation to foods high in fat, sugar and/or salt (e.g. Dumoitier et al., 2019). Similarly, information on serving size (understood as a standard drink) may be relevant to alcohol labels, especially for alcohol products that contain more than one serving size. Information on serving size and servings per container is largely absent on alcohol labels in most countries (Martin-Moreno et al., 2013). Drawing from research on foods high in fat, sugar and/or salt, the most effective way to help consumers make healthier choices may be to communicate standard drink/unit and calorie information per serving, in addition to a graphical representation of what percentage of the weekly recommended amount a serving size represents. One study in the current review (Blackwell et al., 2018) showed that when such methods are adopted, participants find it easier to estimate weekly serving limits of alcohol. However, if standard drink/unit information is to be included on alcohol labels, it needs to be country-specific as standard drink sizes vary across countries. For example, in the UK a standard drink/unit is defined as 8 grams of ethanol while in other European countries it can be as high as 16 grams (Czech Republic) and 20 grams (Austria) (Mongan & Long, 2015). In addition, the boundary of what constitutes harmful drinking would need to be clarified. According to Rehm et al. (2008) harmful drinking is multi-faceted as different patterns and levels of drinking can make different contributions to lifetime mortality risk.

5. Gaps in research

The rapid review has identified a number of research gaps. Addressing these will allow for better understanding of the potential impact of health messaging and product information on consumer comprehension, knowledge, decision-making and behaviour in relation to alcohol:

- There is a need for more longitudinal studies that explore the effect of alcohol labels on behavioural outcomes (e.g. alcohol consumption, purchasing behaviour) to determine whether results from experimental studies can be generalised to real world settings.
- Previous studies use various warning labels so the design of an optimal label is hard to determine. Research should focus on developing optimal labels that are informed by existing research, best practice in relation to label design and input from consumers.
- More qualitative research is needed to explore how people perceive health messaging and product information on alcohol labels, and whether strategies, successfully used in tobacco and foods high in fat, sugar and/or salt, can be applied to alcohol.

6. Implications for policy and research

The findings from the rapid review have implications for policy and research. Based on existing evidence, the review shows that alcohol warning labels have the potential to increase consumer knowledge and comprehension of health messaging and product information, and prompt consumers to make healthier decisions in relation to alcohol consumption. The findings suggest that for alcohol labels to be effective, they can adopt elements from both food (e.g. nutrition information) and tobacco (e.g. health warnings, plain packaging) labelling. The combination of both health messaging and product information is particularly important because the review shows that product information alone can facilitate unsafe drinking behaviour. However, there is a need to develop the ideal combination of health messaging and product information for labels to achieve desired outcomes. In a series of meta-analysis, Argo and Main (2004) suggest that for any warning label to be effective, it needs to influence all information-processing dimensions, which include attention, reading and comprehension, recall and behavioural compliance. The design of optimal alcohol warning labels can be guided by established principles and guidelines on warning design and placement, existing evaluation methods to measure warning effectiveness (Wogalter et al., 2002; Salvendy, 2012) and empirical findings in the fields of alcohol, tobacco and foods high in fat, sugar and/or salt. Based on the review findings, with particular focus on the UK context, this review highlights potential aspects of labelling that need to be considered when designing optimal alcohol labels:

- Consumers in the UK do not always pay attention to alcohol labels (Kersbergen & Field, 2017; Roderique-Davies et al., 2018). To increase attention, research shows that labels should be large and colourful, and positioned on a prominent place on the front label of the alcohol product. Colour-coded schemes, such as the traffic light system, have been shown to be particularly effective in increasing attention among UK consumers (Sillero-Rejon et al., 2018; Maynard et al., 2018b). Plain packaging or clear background may also enhance the visibility of health warnings.
- Health warnings that communicate specific risks in an explicit way may be particularly effective in reducing alcohol consumption. Research in the UK shows that health warnings linking alcohol with specific cancers, drink driving and harm to the unborn baby lead to increased motivation to drink less and decreased drink selection (Maynard et al., 2018b; Clarke et al., 2020; Pechey et al., 2020).
- Consumers in the UK find it difficult to estimate weekly drinking limits on the basis of the current labels, which provide information on units per container (Blackwell et al., 2018). The use of labels that specify the number of units per serving in relation to the CMOS' low-risk drinking guidelines, can help people estimate weekly drinking limits more accurately (Blackwell et al., 2018).

- Negatively framed messages and messages that indicate loss may be more effective in increasing intention to drink less, compared to positively framed or gain-framed messages (Zahra et al., 2015; Collymore et al., 2016).
- Research in the UK also supports the use of highly emotive pictorial warnings, with the potential caveat that these may not be effective among people who drink at harmful levels (Brown & Locker, 2009; Wigg & Stafford, 2016; Sillero-Rejon et al., 2018).
- The use of descriptors to indicate low alcohol consumption may need to be evaluated as descriptors indicating low alcohol content may be associated with increased consumption of the alcohol product (Vasiljevic et al., 2018a, 2018b).

The current review suggests that potential moderators of the effectiveness of warning labels include: visibility enhancing characteristics and location (e.g. colour, size), familiarity (e.g. good knowledge of warnings on existing labels) and consumer characteristics (e.g. age, levels of alcohol consumption). Optimal labels need to attract consumer attention as consumers who actively seek label information may process the information differently than those who notice the label as they are about to purchase or consume the product (Argo & Main, 2004). These findings are in line with WHO (2017) recommendations on alcohol labelling, which highlight the importance of enhancing the visibility of alcohol labels. Familiarity with labels is also important. Coomber et al. (2017) found that consumers sometimes mention “wear out” effects where warnings on alcohol labels become background information. Similarly, exposure to health messaging information may decrease over time (Stevley et al., 2018). The tobacco literature also suggests that the impact of health warnings may decrease over time as people get used to seeing the messages (Hammond, 2011). This highlights the importance of rotating warning labels and presenting different information at specific intervals of time. This is accepted practice in relation to health warning on cigarette packs in many countries (Canadian Cancer Society, 2016). Finally, the review suggests that specific groups of people may be more likely to respond to health messaging information differently. For example, young people may be more likely to engage with warnings that highlight the short-term risks of excessive alcohol consumption. Similarly, negatively-framed messages and emotive messages may be particularly effective for harmful drinkers.

The effectiveness of alcohol labelling can be further reinforced when it is part of a wider comprehensive strategy to reduce alcohol-related harm. The extensive research in tobacco shows that each measure reinforces the effectiveness of other measures (e.g. warning labels and plain packaging, smoke-free legislation, advertising bans) (Martin-Moreno et al., 2013). Scotland is in an excellent position to introduce labelling guidelines that would be complemented by current laws, such as restricted hours for the sale of alcohol, rules on discounts of alcohol products and minimum unit pricing.

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