Rapid literature review on the impact of health messaging and product information on alcohol labelling

Elena D. Dimova & Danielle Mitchell

View supplementary material

Published online: 01 Jun 2021.

Submit your article to this journal

Article views: 148

View related articles

View Crossmark data

Taylor & Francis
Taylor & Francis Group

REVIEW

🔓 OPEN ACCESS   Check for updates

Rapid literature review on the impact of health messaging and product information on alcohol labelling

Elena D. Dimova[a] and Danielle Mitchell[b]

[a]School of Health and Life Sciences, Glasgow Caledonian University, Glasgow, UK; [b]Institute for Social Marketing and Health, Faculty of Health Sciences and Sport, University of Stirling, Stirling, UK

ABSTRACT

Background and aim: Alcohol labelling enables people to make informed decisions about the products they purchase and consume. This rapid review explores the impact of health messaging and product information on consumer attention, comprehension, recall, judgment and behavioural compliance in relation to alcohol use.

Methods: The rapid review adopted a multi-faceted search strategy to identify primary studies on health messaging and/or product information on alcohol packaging, and the impact of these on consumer-related outcomes.

Results: The review provides support for large, colourful labels on the front of alcohol products and the use of plain packaging to increase the visibility of health messaging. It also supports the use of explicit, negatively-framed statements that link alcohol to specific diseases. Colour-coded schemes and pictorial warnings may further optimize the effectiveness of alcohol labels. We did not find sufficient evidence to support the effectiveness of product information alone in influencing consumer attention, comprehension, recall, judgment and behavioural compliance.

Conclusion: Well-designed alcohol labels can positively influence consumers' attention, comprehension, recall, judgment and behavioural compliance. The findings have implications for alcohol labelling research and policy.

Introduction

Excessive alcohol consumption causes around three 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 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, 2016).

There are requirements and guidelines across the world that have introduced better labelling for alcoholic drinks. For example, alcohol labelling requirements in Canada include alcohol by volume on the principal display panel, guidelines on the use of alcohol descriptors (e.g. 'low alcohol', 'light') and product information, specific to the types of alcohol (e.g. age for whisky, country of origin for wine) (The Government of Canada, 2020). In Australia, it is mandatory for labels on alcoholic drinks to indicate alcohol strength, the number of standard drinks in the container and a specific pregnancy warning (McCauley, 2020; Thomas, 2012). In Europe, the European Alcohol Policy Alliance (Eurocare, 2016)

recommends labelling that includes ingredients, allergens, nutritional information, alcoholic strength and health warnings.

Although the above requirements and recommendations share similar characteristics, there is heterogeneity across countries on what information should be included on alcohol labels. Most alcohol labels contain information on alcohol content, but other aspects of product information (e.g. nutritional information, ingredients listings, standard drinks/units) are often omitted. Similarly, health warning requirements for alcohol labels are often limited to the effect of alcohol on pregnancy, despite other well-known alcohol-related risks to health (e.g. cancer, liver cirrhosis) (WHO, 2018).

There is strong evidence in the tobacco field, showing health warnings increase people's knowledge of smoking-related health risks, and prompt intentions to quit smoking (Chung-Hall et al., 2016; Noar et al., 2016). Similarly, research in nutrition shows that product information on labels (e.g. nutritional information) is associated with healthier diet choices and decreased intentions to buy less healthy products (Anastasiou et al., 2019; Brown et al., 2018; Crockett et al., 2018; Grunert & Wills, 2017; Oostenbach et al., 2019).

Previous reviews of alcohol labelling have focused on the role of alcohol warning labels in influencing consumer attitudes and behaviour (Clarke et al., 2020; Hassan & Shiu, 2018; Martin-Moreno et al., 2013; Stockwell, 2006). However, they have not considered other aspects of health messaging (i.e. low-risk drinking guidelines) and have a narrow focus, such as, comparing the effectiveness of image and text versus text only labels (Clarke et al., 2020) or exploring the advantages and disadvantages of specific label elements (Martin-Moreno et al., 2013). The potential effectiveness of product information (e.g. alcohol content, nutrition information, ingredients listings) remains unclear.

This rapid review brings together evidence on health messaging and product information on alcohol labelling. In order to explore the impact of alcohol labels in a consistent way, the review focuses on the five dimensions of warning label effectiveness, proposed by Argo and Main (2004). These include attention (noticeability, awareness, attention, and recognition of the warning), reading and comprehension (readability, understanding and comprehension of the warning message), recall, judgments (consumers' risk perceptions, believability, and attitudes towards complying with the message) and behavioural compliance (motivation that leads to behaviour change). Our rapid review is novel in several ways. First, it summarises research on both health messaging and product information on alcohol labels. Second, it examines their impact on several outcomes by following a clear framework. Third, it summarises the evidence on presentation of product information and health messaging including content (e.g. framing of messages), placement/positioning and format (e.g. text, 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 attention, recall and comprehension?
2. What is the impact of the provision of health messaging and product information on consumer judgment and behavioural compliance?
3. What is the impact of how this information is provided (e.g. content, credibility, visibility, placement, positioning and format) on consumer attention, recall, comprehension, judgment and behavioural compliance?

Methods

This rapid review explores the impact of health messaging and product information on alcohol labelling. A rapid review is a type of knowledge synthesis where the steps of a systematic review are streamlined (Khangura et al., 2012). The current review followed methods suggested by Dobbins (2017) and previous rapid reviews in health policy and practice (Abrami et al., 2010; Bambra et al., 2010). The review aimed to scope the literature rather than evaluate its effects, therefore quality assessment was not conducted.

Search strategy

We used a multi-faceted search strategy that included screening existing literature held by the project funder (i.e. Alcohol Focus Scotland), searching databases and websites, asking key informants for recommendations and screening the reference lists of existing reviews on alcohol labelling. The search process is described below:

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 terms for the database searches. These included: alcohol* AND label* OR information OR health messag* OR warning OR guideline*.
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 reports 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 field of alcohol 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.

Search process

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.

All results, identified by the searches, were collated and duplicates removed. The titles and abstracts of the articles were independently screened by the two authors. We marked each article as 'include', 'exclude' or 'unclear' on the basis of the selection criteria. After this, the full text of all articles, marked as 'include' or 'unclear', was obtained and screened independently. Discrepancies were resolved through discussion.

Selection criteria

Primary studies were included in the review if they were written in English and if they focused on health messaging and/or product information on the packaging of alcohol, and the impact of these on consumers' attention, recall, comprehension, judgment and/or behavioural compliance. In order to ensure the inclusion of articles that have undergone a rigorous peer-review process while minimising the risk of publication bias (Hopewell et al., 2007), the review included articles,

published in peer-reviewed journals and final study reports, published on key websites. Other forms of grey literature (e.g. theses, dissertations, conference abstracts, newspaper articles) were excluded as these may not provide sufficient information or may be less scientifically rigorous.

Data extraction, management and analysis

A data extraction tool, based on the review aims, was developed in order to create a summary of the results. Data from included studies were extracted in Microsoft Excel by the first author. All extracted information was double checked by the second author. We extracted data on study information (i.e. author, year, title), aims, design, health warning or product information, and key findings. Extracted information is presented in Supplementary Material 1.

The information from included studies was brought together in a narrative summary, structured around the review aims and the five warning label dimensions, proposed by Argo and Main (2004). Although Argo and Main (2004) include the measure of noticeability under the 'attention' dimension, we discuss noticeability in relation to research question three (i.e. impact of how this information is provided), as the format of information (e.g. large colourful labels) can influence noticeability. In addition, we included

behaviour change outcomes (e.g. purchasing of alcohol, selection of alcohol in experimental settings, reduced alcohol consumption) under the 'behavioural compliance' dimension. Information under research question three was organised on the basis of extracted data in relation to the visual impact of a label (e.g. colour, placement, content). We created a list of study outcomes and grouped these on the basis of similarity.

Findings

Selection of sources of evidence

We identified 1581 articles and screened the full text of 107 publications. Seventy-one publications met the inclusion criteria. The search process is presented in the PRISMA flowchart below (Figure 1).

Description of studies

The review includes 71 publications, focusing on the impact of health messaging and product information on consumer attention, recall, comprehension, judgment, and behavioural compliance in relation to alcohol. The publications include 61 academic articles, published in peer-reviewed journals, and 10 reports.
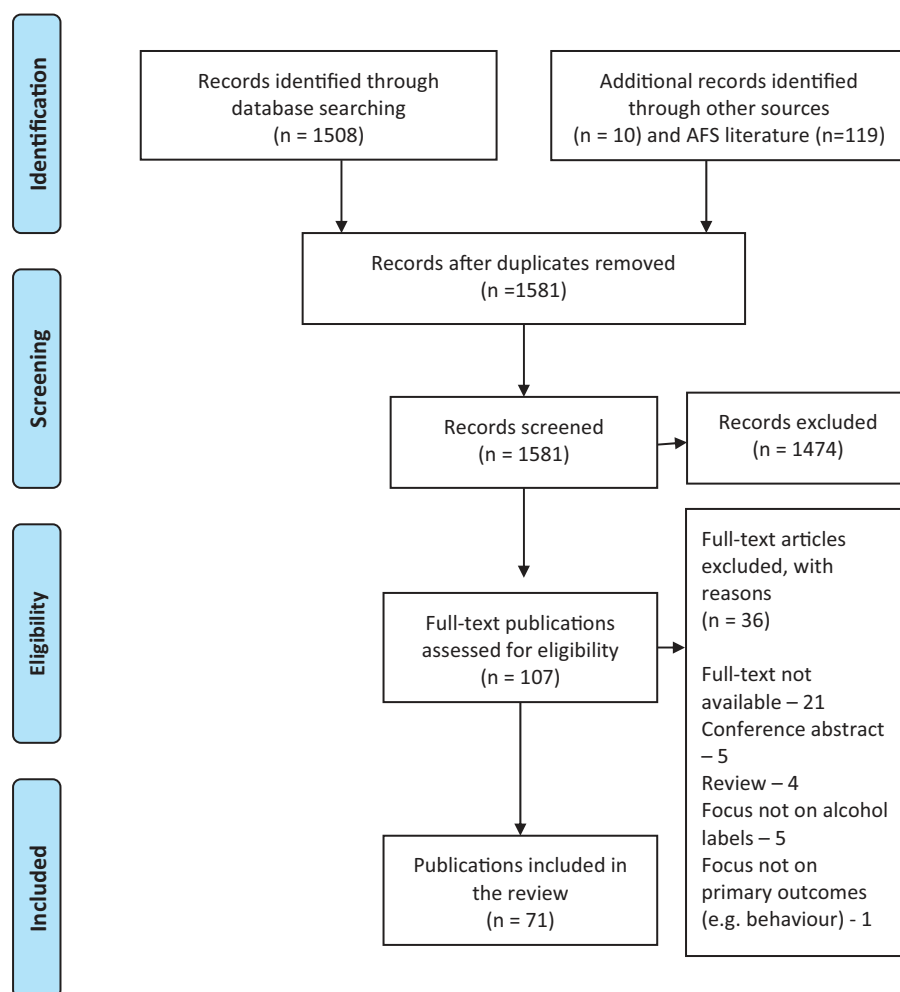

Figure 1. PRISMA diagram.

Most of the research was published after 2011 ($n = 52$). Nine of the publications were between 2001 and 2010, and ten between 1990 and 2000.

The majority of studies were conducted in the UK ($n = 20$), 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 ($n = 63$), most of which adopted an experimental design ($n = 46$) and the remainder a cross-sectional design ($n = 16$), apart from one Randomised Controlled Trial (RCT). Ten studies were qualitative and four adopted a mixed-methods design[1].

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

Study outcomes were heterogeneous but most commonly these included awareness, recall, attention, product perceptions, intentions, selection, purchasing, reduced alcohol consumption.

Synthesis of results

Impact of health messaging and product information on consumer attention, recall and comprehension

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 (Coomber et al., 2017; Jones & Gregory, 2009; MacKinnon et al., 1993; Webster-Harrison et al., 2002) and have good awareness of the potential harms of alcohol that are included on existing government labels (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 increased after exposure to such warnings on alcohol labels. Similarly, several recent studies found greater recall of cancer-related warnings, national drinking guidelines and daily drinking limits in sites where an alcohol labelling intervention was implemented, compared to control sites (Hobin et al., 2020; Schoueri-Mychasiw et al., 2020; Vallance 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., 2020). Around a quarter of women aged 18–44 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).

Although the provision of health messaging information on labels may improve people's recall and awareness of such information, there is also indication that consumers may not pay attention to and even avoid health warnings (CRIOC, 2011; Kersbergen & Field, 2017; Maynard, Blackwell, et al., 2018; 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.

Product information
Alcohol content. Previous research found that consumers are supportive of, and would like information on, standard drinks/units on alcohol labels (Roderique-Davies et al., 2018; Stockwell et al., 1991a; Thomson et al., 2012; Webster-Harrison et al., 2002). However, there is limited research looking at the impact of alcohol content information on people's attention, recall and comprehension. Four studies included in this review (Osiowy et al., 2015; Stockwell et al., 1991a, 1991b; Walker et al., 2019b) found that labels containing standard drink/unit information lead to more accurate estimates of alcohol content, compared to labels containing percent alcohol by volume (%ABV) information. However, interpreting standard drink information can be perceived as challenging and confusing (Vallance et al., 2018). The combination of standard drink information and low-risk drinking guidelines may lead to 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 (Annunziata et al., 2016; CRIOC, 2011) but there is limited evidence exploring the impact of nutrition information on people's attention, recall 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.

Impact of health messaging and product information on consumer judgment and behavioural compliance

Health messaging
Health warnings. Evidence on the impact of health warnings on people's risk perceptions in relation to alcohol-related harm is inconclusive. Clarke et al. (2020) suggest that cancer-related health warning labels may increase disease risk perception while MacKinnon et al. (1993) 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 (Coomber et al., 2018; Jones & Gregory, 2010).

Research on the impact of health warnings on consumer behavioural compliance also shows mixed results. On one hand, research suggests that exposure to alcohol health warnings increases people's intention to reduce alcohol consumption and decreases alcohol drink selection in experimental settings, especially when statements highlight the risk of cancer and diabetes (Jonegenelis et al., 2018; Clarke et al., 2020; Pettigrew et al., 2016). Jarvis and 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, 2018; Dossou et al., 2017; Pechey et al., 2020). Longitudinal studies by MacKinnon et al. (2000, 2001) found no effect on alcohol use after exposure to government alcohol warning labels in the USA. In an experimental study, DeCarlo et al. (1997) found that only 7% of participants reported changing alcohol consumption after reading an alcohol warning label.

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, among other warnings. However, the impact of pregnancy warnings alone on judgment and behavioural compliance 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 and 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 & Greenfield, 2010).

Believability

Believability of alcohol warnings is important as messages not perceived as believable may be less likely to promote reduced alcohol consumption. Research shows cancer-specific warnings are more believable and convincing, compared to other warnings (Blackwell et al., 2018; Maynard, Blackwell, et al., 2018; Pettigrew et al., 2016). 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, Blackwell, et al. (2018) found that more participants said cancer, mental health and fertility messages

provided new information but a smaller majority believed these messages to be 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 warnings may no longer serve their purpose.

Product information

Alcohol content

There is limited research exploring whether provision of alcohol content information impacts on people's judgment and behavioural compliance. Research included in this rapid review is mixed in relation to the impact %ABV information. 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 judgment and behavioural compliance also remains under-explored. In an experimental study, Maynard, Langfield, et al. (2018) 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, Blackwell, et al. (2018), 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, 2010; Maynard, Langfield, et al., 2018)

Nutrition information

Evidence on the impact of nutrition information suggests such information does not influence consumers' judgment and behavioural compliance. In two studies, Maynard et al. (Maynard, Langfield, et al. 2018, Maynard, Blackwell, et al. 2018) 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 these studies said that energy content and calorie information would be relevant to people on a restricted diet (Maynard, Langfield, et al., 2018; Walker et al., 2019a) with a small proportion of participants saying they may eat less food based on calorie information on alcohol labels (Maynard, Blackwell, et al., 2018). 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).

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.

Impact of type and form of information on consumer attention, recall, comprehension, judgment and behavioural compliance

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) as they may increase visibility and noticeability (Coomber et al., 2018; Dossou et al., 2017), especially when the label is large and colourful (Hall & Partners, 2018; Jones & Gregory, 2010). Larger labels are also attended to longer in eye-tracking studies (Kersbergen & Field, 2017; Sillero-Rejon et al., 2020), 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, 2017). 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 (Annunziata et al., 2019; Coomber et al., 2017, 2018; Dossou et al., 2017; Roderique-Davies et al., 2018). Participants in one study preferred larger and bolder labels on the front of the bottle (Vallance et al., 2018). In addition, the context of the warning (i.e. surrounded by other elements) can reduce its visibility (Dossou et al., 2017).

Packaging. 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, 2017).

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). 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, Blackwell, et al., 2018; 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 (Annunziata et al., 2016, 2019; Jones & Gregory, 2010). 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.

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 and Glock (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.

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, Blackwell, et al., 2018), especially in at-risk groups (i.e. those who drink more) (Jarvis & Pettigrew, 2013). They may also lead to more accurate reasoning in situations, pertinent to decisions to drink (Zahra et al., 2015). Zahra et al. (2015) 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 & Krolak-Schwerdt, 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 and Krolak-Schwerdt (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 (2016) 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).

Explicit statements

Research supports the use of explicit statements to communicate health warnings (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, Laughery et al., 1993). 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. Other research provides support for the use of the words 'health warning' on alcohol labels (FARE, 2011; Thomson et al., 2012) but the use of 'government health warning' 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. This is further supported by MacKinnon (1993) 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 (Authayarat et al., 2018; CRIOC, 2011). 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 also be perceived as too confronting (Coomber et al., 2017) and might trigger defensive responses (Brown & Locker, 2009).

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. Half of the respondents were in favour of keeping the 'dealcoholised' descriptor but the 'non-alcoholic' descriptor was described as confusing, because 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, Couturier, Frings, et al. (2018) found that the total amount of alcohol consumption increased as the label denoted lower alcohol strength. In another study, Vasiljevic, Couturier, and Marteau (2018) 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.

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. Imagery (e.g. symbols, logos, images) 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 and 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 and 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.

The combination of a pictogram and a chart or text appears to be an effective way to present health information (Hall & Partners, 2018; Rout & Hannan, 2016; Vallance et al., 2018), it decreases positive product perceptions (e.g. product looks attractive) (Al-Hamdani & Smith, 2015) and may be effective in reducing alcohol consumption (Stafford & Salmon, 2017). In terms of text, some research suggests that information in the form of statistics may be considered more relevant to participants (Coomber et al., 2017; CRIOC, 2011).

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 Equivalent[2] and the Pie Chart label[3]) and worst and slowest in the standard industry label (i.e. the Responsibility Deal condition)[4]. 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 and 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 panels[5] 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, Blackwell, et al., 2018; Roderique-Davies et al., 2018). Sillero-Rejon et al. (2020) suggest that traffic light labels can increase visual attention.

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 attention, recall, comprehension, judgment or behavioural compliance. 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.

Discussion

This rapid review explored the impact of health messaging and product information on consumer attention, recall, comprehension, judgment and behavioural compliance in the field of alcohol. The review includes 71 publications. The majority of these are from the last 10 years, highlighting the increasing interest in the role of health messaging and product information in shaping consumers' perceptions and guiding their behaviour.

The current review provides mixed support for the impact of health messaging and product information on consumer attention, recall, comprehension, judgment and behavioural compliance. It found that consumers' ability to spontaneously recall existing warning messages varies across studies and across countries. However, carefully designed labels have the potential to increase people's awareness of drinking guidelines and alcohol-related harm (Hobin et al., 2020; Schoueri-Mychasiw et al., 2020). Similarly, existing government alcohol health warning labels may not be effective in reducing

alcohol use (MacKinnon et al., 2001) but carefully designed labels have been associated with decrease in population alcohol consumption (Hobin et al., 2020; Zhao 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). The effectiveness of alcohol warning labels needs to be explored further, especially in population groups whose risk perception of alcohol-related harm may be low (e.g. young people) (Coomber et al., 2018; Jones & Gregory, 2010). Existing reviews also show that alcohol warning labels may have little efficacy in affecting risk perceptions of alcohol-related harm among adolescents (Hassan & Shiu, 2018; Scholes-Balog et al., 2012).

Standard drink/unit information on alcohol labels may lead to more accurate estimates of alcohol content when compared to %ABV information (Vallance et al., 2018) but consumers might find it difficult to interpret standard drink/unit information (Vallance et al., 2018). Understanding of such information can be increased if it is presented alongside low-risk drinking guidelines (Hobin et al., 2018). Energy labels also have the potential to increase the accuracy of consumers' estimates of energy content in alcohol products (Walker et al., 2019b) but it is unclear whether this leads to reduced alcohol consumption.

This rapid review did not identify studies looking at the impact of alcohol 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. However, if ingredients lists are to be added to alcohol labels, this needs to be done with caution as research from the tobacco field suggests that information on tar, nicotine and carbon monoxide emission numbers can mislead smokers to believe that some tobacco products are less harmful than others (Chung-Hall et al., 2016).

The rapid review provides evidence that alcohol labels have the potential to be effective in increasing consumer attention, recall, comprehension, judgment and behavioural compliance. 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. This could be achieved by using large, colourful labels on the front of alcohol products (e.g. Jones & Gregory, 2010; Pham et al., 2018) or through the use of plain packaging (e.g. Al-Hamdani & Smith, 2017). These findings are in line with evidence from the fields of tobacco and foods high in fat, sugar and/or salt, which support the use of prominent labels (Grunert & Wills, 2017) and plain packaging (McNeill et al., 2017; Moodie et al., 2012, 2013; Stead et al., 2013).

Second, the content of labels needs to be carefully designed to communicate information in a clear way. This could be achieved by presenting information, which links alcohol to specific diseases (e.g. cancer) (e.g. Hobin et al., 2020; Pechey et al., 2020) and is focused on short-term harms (Annunziata et al., 2019). A previous review also found that health warnings on alcohol products are more effective when they link alcohol with specific harms (Jones & Gordon, 2013).

Third, the form of presentation and framing of messages need to be considered so information is communicated in the most effective way. This could be done by using explicit, negatively-framed statements, especially statements that contain the phrase 'health warning' (Blackwell et al., 2018; Thomson et al., 2012). Negatively framed messages may be particularly effective among 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, 2012). One explanation for this could be that unlike smoking, people may (inaccurately) associate alcohol with positive health (e.g. moderate wine consumption, Vecchio et al., 2017) and social (e.g. social bonding, Emslie et al., 2013) benefits.

The review found evidence in support of colour-coded schemes, such as traffic light systems, in helping people to estimate alcohol serving limits (Blackwell et al., 2018). This resonates with the strong empirical support of the effectiveness of colour-coded schemes in relation to foods high in fat, sugar and/or salt (Cecchini & Warin, 2016; Dumoitier et al., 2019; Hawley et al., 2013; White & Signal, 2012).

With regards to product information communicated via alcohol labels, the review does not provide support for the use of descriptors indicating low alcohol content as these may lead to increase in alcohol consumption (Vasiljevic, Couturier, Frings, et al., 2018). Similarly, research in the field of tobacco also suggests that brand descriptors (e.g. 'light', 'mild', 'regular') may mislead consumers to believe that some tobacco products are less harmful than others (Chung-Hall et al., 2016; Shemilt et al., 2017). The review also found that 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, with this information largely absent 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 (Hawley et al., 2013; Tarabella & Voinea, 2013).

Implications for policy and research

The findings from this rapid review have implications for policy and research. The inclusion of health messaging and product information on alcohol labels can prompt consumers to make healthier decisions in relation to alcohol consumption. 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 (Salvendy, 2012; Wogalter et al., 2002) and empirical findings in the field of alcohol. Lessons on effective label designs can be learned from the fields of tobacco and foods high in fat, sugar and/or salt.

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. 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).

Strengths and limitations of the current review

This rapid review was conducted in a rigorous and transparent manner. However, a number of limitations should be acknowledged. First, 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 so publications in different languages may offer additional insights into the utility of alcohol labelling. Finally, the review findings need to be interpreted with caution due to the lack of formal quality appraisal. Overall, many of the included studies were conducted in experimental environments, so their results may not be generalizable to 'real world' settings. In addition, studies were primarily cross-sectional precluding interpretation of causal relationships. There is also heterogeneity of alcohol label components and study outcomes across the included studies. There is a need for more longitudinal studies that explore the effect of carefully designed alcohol labels on behavioural outcomes (e.g.

alcohol consumption, purchasing behaviour) to determine the impact of specific label components on behaviour and whether results from experimental studies can be generalised to real world settings.

Conclusion

This rapid review shows that alcohol labels can positively influence consumers' attention, recall, comprehension, judgment and behavioural compliance. However, for labels to be effective, they need to be carefully designed, to include a combination of health messaging and product information. In addition, key information needs to be visible and presented in a clear way. The review findings have implications for alcohol labelling research and policy.

Notes

1. Number of studies is higher than number of publications as some publications described more than one study.
2. The Food Label Equivalent label specifies the number of units per serving and what percentage of the guideline weekly amount these units represent.
3. 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.
4. The Responsibility Deal condition specifies the total number of units in the container.
5. The Serving Facts panel contains a statement that includes levels of calories, carbohydrates, fat, and alcohol

    Content, on the product container.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

References

Abrami, P. C., Borokhovski, E., Bernard, R. M., Wade, C. A., Tamim, R., Persson, T., Bethel, E., Hanz, K., & Surkes, M. A. (2010). Issues in conducting and disseminating brief reviews of evidence. *Evidence & Policy: A Journal of Research, Debate and Practice*, 6(3), 371–389. https://doi.org/10.1332/174426410X524866

Al-Hamdani, M., & Smith, S. M. (2015). Alcohol warning label perceptions: Emerging evidence for alcohol policy. *Canadian Journal of Public Health*, 106, e395–e400. https://doi.org/10.17269/CJPH.106.5116

Al-Hamdani, M., & Smith, S. M. (2017). Alcohol warning label perceptions: Do warning sizes and plain packaging matter? *Journal of Studies on Alcohol and Drugs*, 78(1), 79–87. https://doi.org/10.15288/jsad.2017.78.79

Anastasiou, K., Miller, M., & Dickinson, K. (2019). The relationship between food label use and dietary intake in adults: A systematic review. *Apetite*, 138, 280–291. https://doi.org/10.1016/j.appet.2019.03.025

Andrews, J. C., Netemeyer, R. G., & Durvasula, S. (1990). Believability and attitudes toward alcohol warning label information: The role of persuasive communications theory. *Journal of Public Policy & Marketing*, 9(1), 1–15. https://doi.org/10.1177/074391569000900101

Annunziata, A., Agnoli, L., Vecchio, R., Charters, S., & Mariani, A. (2019). Health warnings on wine labels: a discrete choice analysis of Italian and French Generation Y consumers. *Wine Economics and Policy*, 8(1), 81–90. https://doi.org/10.1016/j.wep.2019.03.001

Annunziata, A., Pomarici, E., Vecchio, R., & Mariani, A. (2016). Nutritional information and health warnings on wine labels: Exploring consumer interest and preferences. *Appetite*, 106, 58–69. https://doi.org/10.1016/j.appet.2016.02.152

Argo, J. J., & Main, K. J. (2004). Meta-analyses of the effectiveness of warning labels. *Journal of Public Policy & Marketing*, 23(2), 193–208. https://doi.org/10.1509/jppm.23.2.193.51400

Armitage, C. A., & Arden, M. A. (2016). Enhancing the effectiveness of alcohol warning labels with a self-affirming implementation intention. *Health Psychology*, 35(10), 1159–1163. https://doi.org/10.1037/hea0000376

Authayarat, W., Kasornsuwan, P., & Jiamsanguanwong, A. (2018). Design and validation of affective warning pictorials on alcohol container labels. In W. Chung & C. Shin (Eds.), *Advances in affective and pleasurable design. AHFE 2017. Advances in intelligent systems and computing*, 585. Springer.

Bambra, C., Joyce, K. E., Bellis, M. A., Greatley, A., Greengross, S., Hughes, S., Lincoln, P., Lobstein, T., Naylor, C., Salay, R., Wiseman, M., & Maryon-Davis, A. (2010). Reducing health inequalities in priority public health conditions: Using rapid review to develop proposals for evidence-based policy. *Journal of Public Health*, 32, 496–505. https://doi.org/10.1093/pubmed/fdq028

Blackwell, A. K. M., Drax, K., Attwood, A. S., Munafo, M. R., & Maynard, O. M. (2018). Informing drinkers: Can current UK alcohol labels be improved. *Drug and Alcohol Dependence*, 192, 163–170. https://doi.org/10.1016/j.drugalcdep.2018.07.032

Bramer, W. M., Rethlefsen, M. L., Kleijnen, J., & Franco, O. H. (2017). Optimal database combinations for literature searches in systematic reviews: A prospective exploratory study. *Systematic Reviews*, 6(1), 6. https://doi.org/10.1186/s13643-017-0644-y

Brown, H. M., Rollo, M. E., de Vlieger, N. M., Collins, C. E., & Bucher, T. (2018). Influence of the nutrition and health information presented on food labels on portion size consumed: A systematic review. *Nutrition Reviews*, 76, 655–677. https://doi.org/10.1093/nutrit/nuy019

Brown, S., & Locker, E. (2009). Defensive responses to an emotive anti-alcohol message. *Psychology & Health*, 24(5), 517–528. https://doi.org/10.1080/08870440801911130

Bui, M., Burton, S., Howlett, E., & Kozup, J. (2008). What am I drinking? The effects of serving facts information on alcohol beverage containers. *Journal of Consumer Affairs*, 42(1), 81–99. https://doi.org/10.1111/j.1745-6606.2007.00095.x

Canadian Cancer Society (2016). *Cigarette package health warnings – international status report*. Available from CCS-international-cigarette-packaging-report-2016-English.pdf

Cecchini, M., & Warin, L. (2016). Impact of food labelling systems on food choices and eating behaviours: A systematic review and meta-analysis of randomized studies. *Obesity Reviews*, 17(3), 201–210. https://doi.org/10.1111/obr.12364

Chen, Y., & Yang, Z. J. (2015). Message formats, numeracy, risk perceptions of alcohol-attributable cancer, and intentions for binge drinking among college students. *Journal of Drug Education*, 45(1), 37–55. https://doi.org/10.1177/0047237915604062

Chung-Hall, J., Craig, L., Gravely, S., Sansone, N., & Fong, G. T. (2016). *Impact of the WHO framework convention on tobacco control on the implementation and effectiveness of tobacco control measures: A global evidence review*. ITC Project. University of Waterloo.

Clarke, N., Pechey, E., Mantzari, E., Blackwell, A., De-Loyde, K., Morris, R. W., Munafo, M. R., Marteau, T. M., & Hollands, G. J. (2020). Impact of health warning labels communicating the risk of cancer on alcohol selection: An online experimental study. *Addiction*, 116(1), 41–52. https://doi.org/10.1111/add.15072

Collymore, N. N., & McDermott, M. R. (2016). Evaluating the effects of six alcohol-related message frames on emotions and intentions: The neglected role of disgust. *Journal of Health Psychology*, 21, 1907–1917. https://doi.org/10.1177/1359105314567910

Coomber, K., Hayley, A., & Miller, P. G. (2018). Unconvincing and ineffective: Young adult responses to current Australian alcohol product warnings. *Australian Journal of Psychology*, 70(2), 131–138. https://doi.org/10.1111/ajpy.12177

Coomber, K., Hayley, A., Giorgi, C., & Miller, P. G. (2017). A qualitative investigation of Australian young adult responses to pictorial and graphic alcohol product warnings. *Journal of Drug Issues*, 47(4), 622–637. https://doi.org/10.1177/0022042617719443

Coomber, K., Jones, S. C., Martino, F., & Miller, P. G. (2017). Predictors of awareness of standard drink labelling and drinking guidelines to reduce negative health effects among Australian drinkers. *Drug and Alcohol Review*, 36(2), 200–209. https://doi.org/10.1111/dar.12383

Coomber, K., Martino, F., Barbour, I. R., Mayshak, R., & Miller, P. G. (2015). Do consumers 'get the facts'? A survey of alcohol warning label recognition in australia. *BMC Public Health*, 15(1), 816. https://doi.org/10.1186/s12889-015-2160-0

Creyer, E. H., Kozup, J. C., & Burton, S. (2002). An experimental assessment of the effects of two alcoholic beverage health warnings across countries and binge-drinking status. *Journal of Consumer Affairs*, 36(2), 171–202. https://doi.org/10.1111/j.1745-6606.2002.tb00429.x

CRIOC, Research and Information Centre for Consumer Organizations (2011). *Project PROTECT: How do young consumers respond to alcohol labelling and prevention?* https://webgate.ec.europa.eu/chafea_pdb/assets/files/pdb/20081205/20081205_oth-04_en_ps_how_do_young_consumers_respond_to_alcohol_labelling.pdf

Critchlow, N., Jones, D., Moodie, C., MacKintosh, A. M., Fitzgerald, N., Hooper, L., Thomas, C., & Vohra, J. (2020). Awareness of product-related information, health messages and warnings on alcohol packaging among adolescents: A cross-sectional survey in the United Kingdom. *Journal of Public Health*, 42(3), e223–e230. https://doi.org/10.1093/pubmed/fdz080

Crockett, R. A., King, S. E., Marteau, T. M., Prevost, A. T., Bignardi, G., Roberts, N. W., Stubbs, B., Hollands, G. J., & Jebb, S. A. (2018). Nutritional labelling for healthier food or non-alcoholic drink purchasing and consumption. *Cochrane Database of Systematic Reviews*, 2, CD009315. https://doi.org/10.1002/14651858.CD009315.pub2

DeCarlo, T. E., Parrott, R., Rody, R., & Winsor, R. D. (1997). Alcohol warnings and warning labels: An examination of alternative alcohol warning messages and perceived effectiveness. *Journal of Consumer Marketing*, 14(6), 448–462. https://doi.org/10.1108/07363769710186060

Department of Health and Social Care (2018). *The Government response to the consultation on low alcohol descriptors*. Department of Health and Social Care.

Dobbins, M. (2017). *Rapid Review Guidebook: Steps for conducting a rapid review*. https://www.nccmt.ca/uploads/media/media/0001/01/a816af720e4d587e13da6bb307df8c907a5dff9a.pdf

Dossou, G., Gallopel-Morvan, K., & Diouf, J. F. (2017). The effectiveness of current French health warnings displayed on alcohol advertisements and alcoholic beverages. *European Journal of Public Health*, 27(4), 699–704. https://doi.org/10.1093/eurpub/ckw263

Dumoitier, A., Abbo, V., Neuhofer, Z. T., & McFadden, B. R. (2019). A review of nutrition labeling and food choice in the United States. *Obesity Science & Practice*, 5(6), 581–591. https://doi.org/10.1002/osp4.374

Emslie, C., Hunt, K., & Lyons, A. (2013). The role of alcohol in forging and maintaining friendships amongst Scottish men in midlife. *Health Psychology*, 32(1), 33–41. https://doi.org/10.1037/a0029874

Eurocare (2016). *Eurocare report on alcohol policy*. European Alcohol Policy Alliance.

Foundation for Alcohol Research & Education (FARE). (2011). *Alcohol health labelling: Community perceptions of the FARE and DrinkWise model alcohol labels*. Deakin.

Gallagher, K. M., & Updegraff, J. A. (2012). Health message framing effects on attitudes, intentions, and behavior: A meta-analytic review. *Annals of Behavioral Medicine*, 43(1), 101–116. https://doi.org/10.1007/s12160-011-9308-7

Garretson, J. A., & Burton, S. (1998). Alcoholic beverage sales promotion: An initial investigation of the role of warning messages and brand characters among consumers over and under the legal drinking age.

Journal of Public Policy & Marketing, 17(1), 35–47. https://doi.org/10.1177/074391569801700105

Glock, S., & Krolak-Schwerdt, S. (2013). Changing outcome expectancies, drinking intentions and impicait attitudes toward alcohol: A comparison of positive expectancy-related and health-related alcohol warning labels. *Applied Psychology: Health and Well-Being*, 5, 332–347. https://doi.org/10.1111/aphw.12013

Greenfield, T. K., Graves, K. L., & Kaskutas, L. A. (1999). Long-term effects of alcohol warning labels: Findings from a comparison of the United States and Ontario. *Psychology and Marketing*, 16(3), 261–282. https://doi.org/10.1002/(SICI)1520-6793(199905)16:3<261::AID-MAR5>3.0.CO;2-Z

Grunert, K. G., & Wills, J. M. (2017). A review of European research on consumer response to nutrition information on food labels. *Journal of Public Health*, 15(5), 385–399. https://doi.org/10.1007/s10389-007-0101-9

Hall and Partners (2018). *Understanding of consumer information messaging on alcohol products. Focus group testing report*. The Foundation for Alcohol Research and Education.

Hammond, D. (2011). Health warning messages on tobacco products: A review. *Tobacco Control*, 20, 327–337. https://doi.org/10.1136/tc.2010.037630

Hassan, L., & Shiu, E. (2018). A systematic review of the efficacy of alcohol warning labels. *Journal of Social Marketing*, 8(3), 333–352. https://doi.org/10.1108/JSOCM-03-2017-0020

Hawley, K. L., Roberto, C. A., Bragg, M. A., Liu, P. J., Schwartz, M. B., & Brownell, K. D. (2013). The science on front-of-package food labels. *Public Health Nutrition*, 16(3), 430–439. https://doi.org/10.1017/S1368980012000754

Health Promotion Agency (2017). *Attitudes to and awareness of alcohol pregnancy warning labels: Attitudes and Behaviour towards Alcohol Survey 2015/16*. Health Promotion Agency.

Hobin, E., Vallance, K., Zuo, F., Stockwell, T., Rosella, L., Simniceanu, A., White, C., & Hammond, D. (2018). Testing the efficacy of alcohol labels with standard drink information and national drinking guidelines on consumers' ability to estimate alcohol consumption. *Alcohol and Alcoholism*, 53, 3–11. https://doi.org/10.1093/alcalc/agx052

Hobin, E., Weerasinghe, A., Vallance, K., Hammond, D., McGavock, J., Greenfield, T. K., Schoueri-Mychasiw, N., Paradis, C., & Stockwell, T. (2020). Testing alcohol labels as a tool to communicate cancer risk to drinkers: A real-world quasi-experimental study. *Journal of Studies on Alcohol and Drugs*, 81(2), 249–261. https://doi.org/10.15288/jsad.2020.81.249

Hopewell, S., McDonald, S., Clarke, M., & Egger, M. (2007). Grey literature in metaanalyses of randomised trials of health care interventions. *Cochrane Database of Systematic Reviews*, (2), MR000010. https://doi.org/10.1002/14651858.MR000010.pub3

Jarvis, W., & Pettigrew, S. (2013). The relative influence of alcohol warning statement type on young drinkers' stated choices. *Food Quality and Preference*, 28(1), 244–252. https://doi.org/10.1016/j.foodqual.2012.08.011

Jones, S., & Gordon, R. (2013). *Alcohol warning labels: Are they effective?* Evidence brief. Deeble Institute.

Jones, S., & Gregory, P. (2010). Health warning labels on alcohol products—the views of Australian university students. *Contemporary Drug Problems*, 37(1), 109–137. https://doi.org/10.1177/009145091003700106

Jones, S. C., & Gregory, P. (2009). The impact of more visible standard drink labelling on youth alcohol consumption: Helping young people drink (ir)responsibly? *Drug and Alcohol Review*, 28(3), 230–234. https://doi.org/10.1111/j.1465-3362.2008.00020.x

Jonegenelis, M. I., Pratt, I. S., Slevin, T., Chikritzhs, T., Liang, W., & Pettigrew, S. (2018). The effect of chronic disease warning statements on alcohol-related health beliefs and consumption intentions among at-risk drinkers. *Health Education Research*, 33(5), 351–360. https://doi.org/10.1093/her/cyy025

Kersbergen, I., & Field, M. (2017). Alcohol consumers' attention to warning labels and brand information on alcohol packaging: Findings from cross-sectional and experimental studies. *BMC Public Health*, 17(1), 123. https://doi.org/10.1186/s12889-017-4055-8

Khangura, S., Konnyu, K., Cushman, R., Grimshaw, J., & Moher, D. (2012). Evidence summaries: the evolution of a rapid review approach. *Systematic Reviews*, *1*(1), 10. https://doi.org/10.1186/2046-4053-1-10

Krischler, M., & Glock, S. (2015). Alcohol warning labels formulated as questions change alcohol-related outcome expectancies: A pilot study. *Addiction Research & Theory*, *23*(4), 343–349. https://doi.org/10.3109/16066359.2015.1009829

Laughery, K. R., Vaubel, K. P., Young, S. L., Brelsford, J. W., Jr, & Rowe, A. L. (1993). Explicitness of consequence information in warnings. *Safety Science*, *16*(5-6), 597–613. https://doi.org/10.1016/0925-7535(93)90025-9

MacKinnon, D. P. (1993). A choice-based method to compare alternative alcohol warning labels. *Journal of Studies on Alcohol*, *54*(5), 614–617. https://doi.org/10.15288/jsa.1993.54.614

MacKinnon, D. P., Nohre, L., Cheong, J. W., Stacy, A. W., & Pentz, M. A. (2001). Longitudinal relationship between the alcohol warning label and alcohol consumption. *Journal of Studies on Alcohol*, *62*(2), 221–227. https://doi.org/10.15288/jsa.2001.62.221

MacKinnon, D. P., Nohre, L., Pentz, M. A., & Stacy, A. W. (2000). The alcohol warning label and adolescents: 5-year effects. *American Journal of Public Health*, *90*, 1589–1594.

MacKinnon, D. P., Pentz, M. A., & Stacy, A. W. (1993). The alcohol warning label and adolescents: The first year. *American Journal of Public Health*, *83*(4), 585–587. https://doi.org/10.2105/AJPH.83.4.585

Martin-Moreno, J. M., Harris, M. E., Breda, J., Møller, L., Alfonso-Sanchez, J. L., & Gorgojo, L. (2013). Enhanced labelling on alcoholic drinks: Reviewing the evidence to guide alcohol policy. *The European Journal of Public Health*, *23*(6), 1082–1087. https://doi.org/10.1093/eurpub/ckt046

Maynard, O. M., Blackwell, A., Munafo, M., & Attwood, A. (2018). *Know your limits: Labelling interventions to reduce alcohol consumption*. Alcohol Research UK.

Maynard, O. M., Langfield, T., Attwood, A. S., Allen, E., Drew, I., Votier, A., & Munafo, M. R. (2018). No impact of calorie or unit information on ad libitum alcohol consumption. *Alcohol & Alcoholism*, *53*, 12–19. https://doi.org/10.1093/alcalc/agx066

McCauley, D. (2020). *Ministers approve mandatory alcohol pregnancy warning label*. The Sydney Morning Herald.

McNeill, A., Gravely, S., Hitchman, S. C., Bauld, L., Hammond, D., & Hartmann-Boyce, J. (2017). Tobacco packaging design for reducing tobacco use. *Cochrane Database of Systematic Reviews*, (4), CD011244. https://doi.org/10.1002/14651858.CD011244.pub2

Miller, E. R., Ramsey, I. J., Baratiny, G. Y., & Oliver, I. N. (2016). Message on a bottle: Are alcohol warning labels about cancer appropriate? *BMC Public Health*, *16*, 139. https://doi.org/10.1186/s12889-016-2812-8

Moodie, C., Angus, K., Stead, M., & Bauld, L. (2013). *Plain tobacco packaging research: An update*. Centre for Tobacco Control Research, Institute for Social Marketing, University of Stirling.

Moodie, C., Stead, M., Bauld, L., McNeill, A., Angus, K., Hinds, K., & Kwan, I. (2012). *Plain tobacco packaging: A systematic review*. Centre for Tobacco Control Research, Institute for Social Marketing, University of Stirling.

Noar, S. M., Francis, D. B., Bridges, C., Sontag, J. M., Ribisl, K. M., & Brewer, N. T. (2016). The impact of strengthening cigarette pack warnings: Systematic review of longitudinal observational studies. *Social Science & Medicine*, *164*, 118–129. https://doi.org/10.1016/j.socscimed.2016.06.011

Oostenbach, L. H., Slits, E., Robinson, E., & Sacks, G. (2019). Systematic review of the impact of nutrition claims related to fat, sugar and energy content on food choices and energy intake. *BMC Public Health*, *19*(1), 1296. https://doi.org/10.1186/s12889-019-7622-3

Osiowy, M., Stockwell, T., Zhao, J., Thompson, K., & Moore, S. (2015). How much did you actually drink last night? An evaluation of standard drink labels as an aid to monitoring personal consumption. *Addiction Research & Theory*, *23*(2), 163–169. https://doi.org/10.3109/16066359.2014.955480

Pechey, E., Clarke, N., Mantzari, E., Blackwell, A. K. M., De-Loyde, K., Morris, R. W., Marteau, T. M., & Hollands, G. J. (2020). Image-and-text health warning labels on alcohol and food: Potential effectiveness and acceptability. *BMC Public Health*, *20*, 1–14.

Pettigrew, S., Jongenelis, M., Chikritzhs, T., Slevin, T., Pratt, I. S., Glance, D., & Liang, W. (2014). Developing cancer warning statements for alcoholic beverages. *BMC Public Health*, *14*, 786.

Pettigrew, S., Jongenelis, M., Glance, D., Chikritzhs, T., Pratt, I. S., Slevin, T., Liang, W., & Wakefield, M. (2016). The effect of cancer warning statements on alcohol consumption intentions. *Health Education Research*, *31*(1), 60–69. https://doi.org/10.1093/her/cyv067

Pham, C., Rundle-Thiele, S., Parkinson, J., & Li, S. (2018). Alcohol warning label awareness and attention: a multi-method study. *Alcohol and Alcoholism*, *53*(1), 39–45. https://doi.org/10.1093/alcalc/agx087

Roderique-Davies, G., John, B., Jones, S., & Leeworthy, S. (2018). *Investigating the potential impact of changing health messages on alcohol products*. Alcohol Research UK.

Rout, J., & Hannan, T. (2016). *Consumer awareness and understanding of alcohol pregnancy warning labels*. Health Promotion Agency.

Salvendy, G. (2012). *Handbook of human factors and ergonomics* (4th ed.). John Wiley & Sons.

Shemilt, I., Hendry, V., & Marteau, T. M. (2017). What do we know about the effects of exposure to 'Low alcohol' and equivalent product labelling on the amounts of alcohol, food and tobacco people select and consume? A systematic review. *BMC Public Health*, *17*, 29. https://doi.org/10.1186/s12889-016-3956-2

Scholes-Balog, K. E., Heerde, J. A., & Hemphill, S. A. (2012). Alcohol warning labels: Unlikely to affect alcohol-related beliefs and behaviours in adolescents. *Australian and New Zealand Journal of Public Health*, *36*(6), 524–529. https://doi.org/10.1111/j.1753-6405.2012.00934.x

Schoueri-Mychasiw, N., Weerasinghe, A., Vallance, K., Stockwell, T., Zhao, J., Hammond, D., McGavock, J., Greenfield, T., Paradis, C., & Hobin, E. (2020). Examining the impact of alcohol labels on awareness and knowledge of national drinking guidelines: A real-world study in Yukon. *Journal of Studies on Alcohol and Drugs*, *81*(2), 262–272. https://doi.org/10.15288/jsad.2020.81.262

Sillero-Rejon, C., Attwood, A. S., Blackwell, A. K. M., & Ibáñez-Zapata, J. A., Munafò, M. R., & Maynard, O. M. (2018). Alcohol pictorial health warning labels: The impact of self-affirmation and health warning severity. *BMC Public Health*, *18*(1), 18. https://doi.org/10.1186/s12889-018-6243-6

Sillero-Rejon, C., Maynard, O., & Ibanez-Zapata, J. A. (2020). Visual attention to alcohol labels: An exploratory eye-tracking experiment. *Adicciones*, *32*, 202–207.

Stafford, L., & Salmon, J. (2017). Alcohol health warnings can influence the speed of consumption. *Journal of Public Health*, *25*(2), 147–154. https://doi.org/10.1007/s10389-016-0770-3

Stead, M., Moodie, C., Angus, K., Bauld, L., McNeill, A., Thomas, J., & Hastings, G. (2013). Is consumer response to plain/standardised tobacco packaging consistent with framework convention on tobacco control guidelines? A systematic review of quantitative studies. *PLoS One*, *8*, e75919. https://doi.org/10.1371/journal.pone.0075919

Stockwell, T. (2006). *A review of research into the impacts of alcohol warning labels on attitudes and behaviour*. Centre for Addictions Research of BC.

Stockwell, T., Blaze-Temple, D., & Walker, C. (1991a). A test of the proposal to label containers of alcohol drink with alcohol content in Standard Drinks. *Health Promotion International*, *6*(3), 207–215. https://doi.org/10.1093/heapro/6.3.207

Stockwell, T., Blaze-Temple, D., & Walker, C. (1991b). The effect of 'standard drink' labelling on the ability of drinkers to pour a 'standard drink'. *Australian Journal of Public Health*, *15*(1), 56–63. https://doi.org/10.1111/j.1753-6405.1991.tb00011.x

Tam, T. W., & Greenfield, T. K. (2010). Do alcohol warning labels influence men's and women's attempts to deter others from driving when intoxicated? *Human Factors and Ergonomics in Manufacturing & Service Industries*, *20*(6), 538–546. https://doi.org/10.1002/hfm.20239

Tarabella, A., & Voinea, L. (2013). Advantages and limtiations of the front-of package (FOP) labeling systems in guiding the consumers' healthy food choice. *Amfiteatru Economic*, *15*, 198–209.

The Government of Canada (2020). *Labelling requirements for alcoholic beverages*. https://inspection.canada.ca/food-label-requirements/labelling/industry/alcohol/eng/1392909001375/1392909133296

Thomas, M. (2012). *Alcohol warning labels - do they work?* Parliament of Australia Department of Parliamentary Services.

Thomson, L. M., Vandenberg, B., & Fitzgerald, J. L. (2012). An exploratory study of drinkers' views of health information and warning labels on alcohol containers. *Drug and Alcohol Review*, 31(2), 240–247. https://doi.org/10.1111/j.1465-3362.2011.00343.x

Vallance, K., Romanovska, I., Stockwell, T., Hammond, D., Rosella, L., & Hobin, E. (2018). "We have a right to know": Exploring consumer opinions on content, design and acceptability of enhanced alcohol labels. *Alcohol and Alcoholism*, 53, 20–25. https://doi.org/10.1093/alcalc/agx068

Vallance, K., Stockwell, T., Zhao, J., Shokar, S., Schoueri-Mychasiw, N., Hammond, D., Greenfield, T. K., McGavock, J., Weerasinghe, A., & Hobin, E. (2020). Baseline assessment of alcohol-related knowledge of and support for alcohol warning labels among alcohol consumers in Northern Canada and associations with key sociodemographic characteristics. *Journal of Studies on Alcohol and Drugs*, 81(2), 238–248. https://doi.org/10.15288/jsad.2020.81.238

Vasiljevic, M., Couturier, D. L., & Marteau, T. (2018). Impact on product appeal of labeling wine and beer with a) lower strength alcohol verbal descriptors and b) percent alcohol by volume (%ABV): An experimental study. *Psychology of Addictive Behaviors*, 32(7), 779–791. https://doi.org/10.1037/adb0000376

Vasiljevic, M., Couturier, D. L., Frings, D., Moss, A. C., Albery, I. P., & Marteau, T. (2018). Impact of lower strength alcohol labelling in consumption: a randomized controlled trial. *Health Psychology*, 37(7), 658–667. https://doi.org/10.1037/hea0000622

Vecchio, R., Decordi, G., Grésillon, L., Gugenberger, C., Mahéo, M., & Jourjon, F. (2017). European consumers' perception of moderate wine consumption on health. *Wine Economics and Policy*, 6(1), 14–22. https://doi.org/10.1016/j.wep.2017.04.001

Walker, N., McCormack, J., Verbiest, M., Jiang, Y., Lang, B., & Ni Murchu, C. (2019a). *Energy labelling for alcoholic beverages in New Zealand: Consumer perceptions. Phase 1 report: Focus groups*. Health Promotion Agency.

Walker, N., McCormack, J., Verbiest, M., Jiang, Y., Lang, B., & Ni Murchu, C. (2019b). *Energy labelling for alcoholic beverages in New Zealand: Impact on consumer purchase and consumption. Phase 2 report: Randomised trial*. Health Promotion Agency.

Webster-Harrison, P. J., Barton, A. G., Sanders, H. P., Anderson, S. D., & Dobbs, F. (2002). Alcohol awareness and unit labelling. *Journal of Public Health Medicine*, 24(4), 332–333. https://doi.org/10.1093/pubmed/24.4.332

White, J., & Signal, L. (2012). Submissions to the Australian and New Zealand Review of Food Labelling Law and Policy support traffic light nutrition labelling. *Australian and New Zealand Journal of Public Health*, 36, 446–451.

WHO (2010). *Global strategy to reduce the harmful use of alcohol*. World Health Organisation.

WHO (2017). *Alcohol labelling A discussion document on policy options*. World Health Organisation.

WHO (2018). *Global status report on alcohol and health*. World Health Organisation.

Wigg, S., & Stafford, L. (2016). Health warnings on alcoholic beverages: Perceptions of the health risks and intentions towards alcohol consumption. *PlosOne*, 11, e0153027.

Wogalter, M. S., Conzola, V. C., & Smith-Jackson, T. L. (2002). Research-based guidelines for warning design and evaluation. *Applied Ergonomics*, 33(3), 219–230. https://doi.org/10.1016/S0003-6870(02)00009-1

Zahra, D., Monk, R. L., & Corder, E. (2015). "IF you drink alcohol, THEN you will get cancer": Investigating how reasoning accuracy is affected by pictorially presented graphic alcohol warnings. *Alcohol and Alcoholism*, 50, 608–616. https://doi.org/10.1093/alcalc/agv029

Zhao, J., Stockwell, T., Vallance, K., & Hobin, E. (2020). The effects of alcohol warning labels on population alcohol consumption: An interrupted time series analysis of alcohol sales in Yukon. *Journal of Studies on Alcohol and Drugs*, 81(2), 225–237. https://doi.org/10.15288/jsad.2020.81.225