


THE LEVEL OF CONSUMERS' KNOWLEDGE ON THE INFLUENCE OF ETHYL ALCOHOL ON HEALTH – A REVIEW OF LITERATURE

POZIOM WIEDZY KONSUMENTÓW NA TEMAT WPŁYWU ALKOHOLU ETYLOWEGO NA ZDROWIE – PRZEGLĄD PIŚMIENICTWA

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Abstract

Consumption of alcoholic beverages is commonplace all over the world, and excessive consumption has numerous health consequences. The ongoing coronavirus pandemic has resulted in a change in ethanol consumption behaviour. There are not many review studies that have examined the level of consumers' knowledge of the health effects of ethyl alcohol. Therefore the aim of this study was to assess the level of knowledge and beliefs among consumers regarding the impact of ethyl alcohol on health.

A review of the available research showed that the knowledge in the context of all assessed aspects is insufficient regardless of the study group. The term “standard drink” for ethyl alco-

Streszczenie

Spożywanie napojów alkoholowych jest powszechne na całym świecie, a nadmierna ich konsumpcja niesie ze sobą liczne konsekwencje zdrowotne. Trwająca pandemia koronawirusa spowodowała zmianę zachowań związanych ze spożywaniem etanolu. Istnieje niewiele badań przeglądowych, w których analizowano poziom wiedzy konsumentów na temat wpływu alkoholu etylowego na zdrowie. Z tego względu celem niniejszej pracy była ocena poziomu wiedzy i przekonań konsumentów dotyczących wpływu alkoholu etylowego na zdrowie.

Przeгляд dostępnych badań wykazał niewystarczający poziom wiedzy w kontekście wszystkich ocenianych aspektów bez względu na badaną grupę.

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hol is often unknown or not understood, which translates into higher consumption. The energy value of alcoholic beverages is often underestimated as are the health consequences of excessive consumption. The analysed studies also indicated that there is a lack of knowledge on the impact of ethyl alcohol on pregnancies and lactation, and the internet is the most common source of knowledge in this area. Therefore it seems necessary to conduct educational activities, taking into account the participation of health professionals and educational institutions, aimed at increasing consumer awareness of the impact of ethanol on health.

Keywords: Alcohol, Knowledge, Health.

Termin „porcja standardowa” w odniesieniu do alkoholu etylowego jest często nieznan lub jego znaczenie niezrozumiałe, co przekłada się na większe jego spożycie. Wartość energetyczna napojów alkoholowych bywa często niedoceniana, podobnie jak konsekwencje zdrowotne wynikające z ich nadmiernej konsumpcji. W analizowanych badaniach wskazywano także brak wiedzy na temat wpływu alkoholu etylowego na ciążę i laktację, a najczęstszym źródłem czerpania wiedzy w tym zakresie jest internet. Dlatego też konieczne wydaje się prowadzenie działań edukacyjnych uwzględniających udział pracowników służby zdrowia i placówek oświatowych mających na celu zwiększenie świadomości konsumentów na temat wpływu etanolu na zdrowie.

Słowa kluczowe: alkohol, wiedza, zdrowie.

■ INTRODUCTION

As a component of alcoholic beverages, ethanol is consumed all over the world and plays an important role in social life [1]. Consumption of alcoholic beverages varies regionally, with the lowest consumption in Africa and the Middle East and the highest in Europe, Australia and North America [2]. Consumption of ethyl alcohol is strongly dependent on the socio-cultural situation and current trends [3]. Recently, due to the COVID-19 pandemic, there has been both an observed increase [4-7] and a reduction [8] in the consumption of alcoholic beverages, although the results of available reviews do not indicate significant changes in this respect [9]. On the other hand, the developing social media creates a trend promoting a healthy lifestyle, which also includes the popularisation of alcohol abstinence [10]. Nevertheless, excessive consumption of alcoholic beverages continues to be a global problem with long-term health consequences.

Worldwide, ethanol abuse is responsible for more than 5% of all deaths annually [11], surpassing the health consequences of excess body weight or lack of physical activity [12]. Around 2.3 billion people worldwide report regular consumption of alcoholic beverages, with an average of nearly 6 liters of ethanol per person per year [11]. It is estimated that alcohol dependence affects more than 5% of people over the age of 15 worldwide, with more men (8.8%) than women (2.1%) affected [13].

The Independent Scientific Committee on Drugs in Great Britain has attempted to assess the health, psychological and social harm caused by the use of popular psychoactive substances and has identified ethyl alcohol as the most harmful of all substances tested [14]. There are many studies on the consequences of excessive ethanol consumption. The short-term effects of alcohol abuse are most often the result of binge drinking and include alcohol intoxication, injuries, aggressive behaviour and risky sexual behaviour [15-19]. Over time, excessive consumption of alcoholic beverages can lead to the development of chronic diseases such as hypertension [20, 21], heart disease [22, 23], liver disease [24, 25], cancer [26], strokes or weakening of the immune system [11, 27]. In addition, long-term exposure to ethyl alcohol may contribute to learning and memory problems [11], depression, anxiety disorders as well as social and family problems [28]. For this reason, the World Health Organization (WHO) guidelines on hazardous alcohol consumption define the “standard drink” as 10 g of pure alcohol, and recommend that both men and women should not exceed two standard drinks of ethanol per day [29].

The conducted research on the level of consumers’ knowledge of the impact of ethanol on health concerns mainly specific professional groups [30, 31] or focuses on the analysis of women’s knowledge in various physiological states [32] and is often conducted on small population groups that cannot be considered representative [33, 34].

Analysing the research conducted in different regions of the world, it was observed that consumers' general knowledge of alcoholic beverages is low [32-35], only a small percentage of respondents are aware of the existence of guidelines on the amount of ethanol consumed considered to be safe [31, 35], most respondents cannot estimate the energy value of alcoholic beverages [35, 36] or cannot indicate the symptoms of ethanol dependence [37] and possible risks of its excessive consumption [34, 36]. Due to the observed gaps in knowledge and misconceptions about the impact of ethanol on health, an attempt was made to compare the level of knowledge and beliefs of consumers of alcoholic beverages from different regions of the world regarding the impact of ethyl alcohol on health.

The basis for assessing the current state of knowledge was a review of the literature available in the PubMed, Science Direct and Wiley Online Library databases. In order to search for all publications concerning the assessment of the level of consumers' knowledge of the impact of ethanol on health, key words such as "alcohol", "alcoholic beverages", "consumer knowledge", "level of knowledge", "alcohol use disorder", "health", "alcohol consumption" and their combinations were used. The search yielded 4989 studies including original studies, reviews and meta-analyses. Most concerned scientific discoveries on the impact of ethyl alcohol on health or the work of specific organs, systems, development and prevention of diseases, and was published earlier than 2003. Due to the discussed studies being significantly outside the scope of this study, it was decided to exclude them from the review. Ultimately, 124 original studies, meta-analyses and reviews published in the last 20 years were selected.

■ LITERATURE REVIEW

Knowledge of the energy value of alcoholic beverages

The energy value of alcoholic beverages depends mainly on the ethanol content (1 g of ethanol provides 7 kcal) but also on the amount of carbohydrates and, to a small extent, on the protein content, which is present only in beer and wine. When analysing the energy value of alcoholic beverages, it is worth considering the portions usually consumed, because one customary portion of beer

is a 500 ml can or bottle. The calorific value of such a drink will therefore be approx. 215 kcal. On the other hand, one habitually consumed portion of vodka is a glass with a capacity of 40 ml, which provides approx. 92 kcal.

The analysis of the available literature data on the nutritional value of alcoholic beverages showed most respondents considered alcohol to be of high energy value [36, 38, 39]. In a study that analysed the knowledge of 179 adult Londoners, it was observed that a high percentage of respondents (over 50%) were unable to correctly estimate the energy value of alcoholic beverages, claiming that a standard bottle of beer (215 kcal/500 ml) contains fewer calories than a can of cola (139 kcal/330 ml) [36]. In a study conducted among German consumers by Pabst *et al.* [38], the authors showed that it was very difficult for participants to assess the caloric value of alcoholic beverages. Although the survey was conducted with a small number of respondents (21 adults), over 70% considered alcoholic beverages to be high energy products and strongly overestimated their calorific value. Of the 450 British respondents participating in the study by Maynard *et al.* [39], all participants overestimated the energy value of alcoholic beverages like beer and the so-called alcopops (flavoured alcoholic or malt beverage [40]). The meta-analysis by Robinson *et al.* [41] included eight studies on consumer awareness of the energy value of alcoholic beverages. These studies typically asked participants to estimate the caloric value of various beverages. In all studies, a significant proportion (approx. 38%) of participants were unable to correctly estimate the caloric value of alcoholic beverages. In 4 out of 6 analysed studies, respondents overestimated the energy value of alcoholic beverages. Based on these results, the authors concluded there is a moderate degree of evidence that people are unaware of the energy value of alcoholic beverages [41].

There is too little research evaluating the knowledge of adults in this area to clearly determine the cause of this phenomenon. Nevertheless, consumers' limited knowledge regarding the energy value of alcoholic beverages points to the need to increase general awareness in this respect. Including information on the energy value on the labels of alcoholic beverages is positively perceived by consumers and could have a beneficial impact on their behaviour by reducing the quantity and

choosing beverages with a lower content of ethyl alcohol [42].

Knowledge of the term “standard drink” in the context of ethyl alcohol

The World Health Organization (WHO) guidelines on hazardous alcohol consumption define a “standard drink” of alcohol as 10 g of ethanol. Recommendations for intake limits are not identical around the world. WHO recommends that both men and women should not exceed two standard drinks of ethyl alcohol per day [29]. The American guidelines developed for 2020-2025 indicate the need to limit the consumption of alcoholic beverages to a maximum of 2 standard drinks for men and a maximum of one for women on days when ethyl alcohol is consumed [43].

There is often a question about the knowledge of the term “standard drink” in the various questionnaires in studies assessing respondents’ knowledge of the effects of ethyl alcohol abuse. In the study by Isted *et al.* [36], in which the knowledge of 179 adult patients of London medical facilities was analysed using anonymous written questionnaires, almost all respondents declared some knowledge though less than 3/4 of them were able to correctly determine the maximum recommended intake. Importantly, UK opinion polls have shown that despite the general awareness of the government guidelines and recommendations for “sensible drinking” of alcoholic beverages, there is still a lack of understanding of the guidelines based on standard drink among people aged 16-25 [44, 45]. In the study by Vallance *et al.* [46] with 836 customers of Canadian liquor stores, only 29.5% of participants correctly indicated the number of standard drinks in standard volumes of various types of alcoholic beverages, and the authors also noted a positive relationship between the correct estimation of the number of standard drinks in a given portion of alcoholic beverage and female sex, age over 45, higher annual income and greater health awareness.

Devos-Comby and Lange [47], who conducted an analysis of the validity of self-reported amounts of alcoholic beverages served in 18 countries around the world, indicate that alcoholic beverages served by participants usually contained more ethanol than one standard drink. The biggest differences were observed in the case of alcoholic cocktails, vodka and wine and beer. More than 200

adult women participated in a study conducted in Edinburgh [48] that aimed to assess the knowledge on alcohol-consumption limit guidelines. The results indicate that almost half of the respondents exceeded the daily intake limits, with more than 20% declaring that the results of the test will affect their future self-control of consumption.

Several studies [46, 49-51] show a comparably low percentage of Canadians (less than 50%) who were accurately able to report the gender-specific daily and weekly limits for ethanol consumption recommended in Canadian guidelines. Knowledge of both intake limits was better in respondents with higher education and that of daily limits was superior in people with a higher subjective level of health awareness. In a study conducted in England, it was noted that only 10% of the surveyed men and 15% of the surveyed women, who declaring regular consumption of alcoholic beverages, were able to correctly identify the guidelines regarding the recommended limits of consumption by gender and declared their occasional use to track own consumption [52].

Studies show that many adults have insufficient knowledge of the content of ethyl alcohol, safe doses and limits of consumption recommended by public health organisations. Available literature data suggest that misconceptions about the content of ethanol in popular alcoholic beverages can be corrected through appropriately developed educational activities e.g., using mobile applications [53] or selling and serving alcoholic beverages in containers of single-portion standard drinks of ethanol [47]. The effectiveness of such actions was indicated by Dixon *et al.* [54], who conducted a cross-sectional study among Australian women aged 25-54. The year-long “Alcohol and Cancer” media campaign consisted of three waves of TV and print ads. After completing the educational activities, an increase in general knowledge of consumption limits was observed, as was a significant increase in the percentage of women expressing intentions to reduce ethanol consumption.

Knowledge of the influence of ethyl alcohol on the risk of diseases

Consumers are exposed to a range of conflicting information in the scientific and popular press regarding the health effects of excessive consumption of alcoholic beverages. Ethyl alcohol is a toxic substance and one of the risk factors for many

diseases. The consequences of excessive consumption of alcoholic beverages depend on the mechanism by which ethanol affects the body. Excessive consumption can negatively affect the work of organs or tissues, but also can cause poisoning and addiction, leading to self-mutilation and violence [55]. Despite the consistent views and guidelines of leading public health organisations, many people around the world still vastly overestimate the positive effects of moderate alcohol consumption [56]. A study conducted in 27 European Union countries showed that more than half of the participants perceived ethyl alcohol as a medium health risk factor, and as many as 15% of respondents did not associate ethanol consumption with health problems [57].

Cancers

Ethyl alcohol is a carcinogen [58]; the recommendation to limit it is constantly present in the guidelines aimed at preventing cancer [59]. In an Australian study of nearly 2500 adults recruited from a research company's participant database, the authors found that only 47% of participants identified drinking too much ethanol as a risk factor for cancer, with women more likely than men to cite alcoholic beverages as a potential cause of cancer development [52]. In a cross-sectional study by Thomsen *et al.* [60] with the participation of 3000 people aged 18-74, the awareness of the Danish population regarding cancer risk factors was assessed. Less than 40% of respondents were aware of the impact of ethanol consumption on the risk of developing liver cancer, and only 9.6% of respondents indicated ethanol as a risk factor for developing breast cancer. Health Research Board experts, in a study involving over 1000 Irish people, indicated that less than half of the respondents believed that drinking alcohol may increase the risk of developing breast cancer, and 35% did not see the cause of the increased risk of colorectal cancer in excessive consumption of alcoholic beverages [61]. Similar results were also obtained by the authors of other studies, which observed that the relationship between the consumption of alcoholic beverages and the risk of liver cancer is better known than the effect of ethanol on cancers of other organs [62-64]. The potential cause of this phenomenon is seen in the intuitive combination of the effect of ethanol on the elements of the digestive system with which it has direct contact (oe-

sophagus, stomach, liver, pancreas etc.), compared to other parts of the body like breasts, intestine or skin [60]. OECD [65] indicates that comprehensive actions including limiting the promotion of alcoholic beverages or changes in their availability can be effective and cost-effective in the prevention of excessive ethyl alcohol drinking.

Diseases of the digestive and cardiovascular systems

One of the most likely effects of ethanol abuse is liver damage due to it being the organ responsible for its metabolism. The most common liver diseases include fatty liver, alcoholic hepatitis, cirrhosis and liver failure [66-69]. In addition to the most obvious consequences of excessive ethanol consumption, it is worth mentioning the possible development of chronic kidney disease or an increased risk of albuminuria [70]. The harmful effects of excessive consumption of alcoholic beverages also include the development of cardiomyopathy, arrhythmias, increased frequency of strokes and an increased risk of hypertension [71]. Long-term and excessive consumption of alcoholic beverages may increase the risk of strokes due to high blood pressure [15, 72].

Participants in the study conducted by Barber [56] showed limited knowledge of the impact of alcohol consumption on long-term health outcomes. The only identified long-term effects of alcohol consumption were adverse effects on the liver and kidneys. A study by Isted *et al.* [36] showed a similar relationships. All respondents stated that excessive alcohol use is associated with liver disease, a large percentage of respondents also indicated an increased risk of hypertension. A slightly lower awareness was observed by the authors of a study conducted in Australia [62]. Out of over 1000 participants recruited from a research company's participant database, only slightly more than 60% indicated cirrhosis of the liver, less than 45% reported stomach diseases and less than 33% indicated pancreatitis as a possible consequence of excessive consumption of ethyl alcohol [62]. Contrary to the results obtained in studies involving Europeans, analyses carried out on a group of 400 men in South East Nigeria selected using the quota sampling technique and representing 14% of the entire region's adult men population, indicate that over 80% of respondents are not

aware that the consumption of ethyl alcohol can lead to liver disease or kidney disease [73].

In a study involving over 1300 people conducted among schoolchildren living in Nigeria, it was observed that more than half of the surveyed boys (55%) and less than half of the girls (45%) were not aware of the negative impact of excessive consumption of alcoholic beverages on heart disease [74]. Of the nearly 300 participants in an anonymous single-centre cross-sectional survey of hospitalised patients in Massachusetts, 70% declared that moderate ethanol consumption is healthy for the heart [75]. Similar results were obtained in a study by Coomber *et al.* [62], which assessed awareness of the short-term and long-term effects of alcohol consumption among over 1000 Australian drinkers. According to the authors, only 40% of respondents correctly listed heart and circulatory system diseases as a result of excessive ethanol consumption. Mediling *et al.* [75] indicate that a possible reason for the lack of sufficient knowledge in this area is misinformation transmitted through the media from which, according to research, consumers gain the most knowledge of the impact of alcoholic beverages on health. Therefore involving the popular media in re-education activities is recommended; this will have a positive impact on increasing awareness of the health risks associated with alcohol consumption [76].

Cognitive functions and mental health

Consumption of ethyl alcohol promotes the development of dementia as well as weakening the immune system, which may result in brain disorders [15, 72]. Excessive consumption of alcoholic beverages also has social effects like increased crime, domestic and sexual violence, increased incidence of road accidents and drowning [77].

In a study by Pedersen *et al.* [78], which assessed ethanol expectations depending on the type of alcoholic beverage consumed in a group of 498 young adults randomly divided into subgroups, it was observed that respondents significantly more often indicated wine as a stress-reducing drink compared to beer or spirit drinks. In addition, the participants of the study reported that of all the analysed alcoholic beverages, it is wine that will have the least impact on health risk, aggression or self-esteem after consumption, which, according to the authors, may result in an increased

risk of its excessive consumption. Moreover, in an online study conducted by Ferretti *et al.* [79] on over 1500 Italian students, it was observed that people with more knowledge of alcohol metabolism and awareness of the negative effects of its excessive consumption showed a greater tendency to get drunk on wine in order to deal with their emotions.

In a study of 369 men from rural South East Nigeria analysing beliefs about the use and abuse of alcohol, it was observed that the majority of respondents confirm the consumption of alcoholic beverages stimulates aggressive behaviour, reduces concentration and encourages irrational decisions [73].

In the context of alcohol dependence, the results of Polish research indicate that the majority of young adults are aware of the addictive influence of wine and beer [80, 81]. In a study conducted by Wysokińska and Kołota [35] in a group of 480 people aged 18-35, the frequency of consumption of alcoholic beverages and the level of young adults' knowledge of the impact of ethanol on health were assessed. Most of the respondents pointed to the possibility of dependence in the case of consuming only beer and confirmed the existence of a relationship between occasional binge drinking and an increased risk of dependence. A larger percentage of almost 25% of the respondents considered ethyl alcohol an aid in the treatment of colds or headaches. A study conducted in a group of Wrocław university students [81] with an average age of 23, showed that over 80% of the respondents were aware of the risk of dependence if they only consumed beer or wine. Students were also asked questions to check their attitude to common stereotypes related to alcohol dependence and those dependent to ethanol. The results indicate that the respondents are aware of the existence of stereotypes and do not perceive alcohol dependence through that prism.

These results confirm the need to conduct educational activities to increase consumer awareness of the risks and negative effects of excessive alcohol consumption in order to cope with difficult emotions. Therefore it seems very important to plan and undertake appropriate educational activities that increase parental involvement in order to create safe social spaces for young people and prevent the development of alcohol-related disorders in young people [82]. Educational programmes

designed for younger age groups to challenge erroneous expectations and beliefs related to alcohol may be effective in raising awareness of its effects and reducing the frequency and volume of alcohol consumption in the future, which will have a positive impact on the risk of developing dependence [83]. The effectiveness of interventions of this kind was reported in a systematic review by Janssen *et al.* [84]. The authors described the effects of alcohol prevention intervention developed in accordance with the principles of social marketing. Educational programmes with 18 to 24-year-olds from the United States region resulted in a significant reduction in the amount of alcoholic beverages consumed as well as increased awareness of the consequences of driving and the risk of dangerous sexual events under the influence of ethanol.

Knowledge of the influence of ethyl alcohol on pregnancy and lactation

Despite the many educational activities undertaken by various institutions, the consumption of alcoholic beverages by pregnant women continues to be an important problem all over the world [85] because one of the most serious health consequences of drinking alcoholic beverages at this time is the development of Foetal Alcohol Syndrome (FAS) [86-88].

Studies describing the level of knowledge of women in this field showed that most of them encountered information about the negative impact of ethanol on the development of pregnancy and the foetus [89, 90]. The available literature data indicate that women with higher education level were more likely to say that the consumption of ethyl alcohol during pregnancy would harm the unborn child [89, 91]. In the study by Kajak and Olejniczak [92], it was observed that in almost 80% of cases, the gynaecologist did not inform the patient about the effects of drinking alcohol by a pregnant woman during the first visit. Similar results were obtained in studies conducted in other countries. The authors of a study conducted in Israel, assessing the level of consumption and knowledge of pregnant women about the impact of ethanol consumption on foetal development, showed that out of 802 respondents recruited through online advertisements, social media and the Midgam project web panel, as many as 39.5% were not informed about the guidelines for alcohol

consumption during pregnancy [32]. According to research, one of the reasons pregnant women consumed alcoholic beverages was the recommendation of a doctor or nurse [93]. Similar results were reported in the study by Elek *et al.* [94], in which most of the 149 participants in a study evaluating women's knowledge, views and experiences regarding alcohol consumption during pregnancy received information on the recommended abstinence from alcohol during pregnancy. However, there have been cases where health professionals have stated that it is "okay" to drink alcoholic beverages during pregnancy and have recommended moderate wine consumption.

When analysing the opinions of high school students in this context, it is indicated that almost 30% of young men treated wine as a safe drink in pregnancy and the development of the foetus [92]. In another study, less than half of the non-pregnant respondents strongly disagreed with this statement [90]. The available studies have shown that, regardless of the age group, some (26% and 10%) believe that only the dose is dangerous and that alcoholic beverages consumed in safe amounts do not pose a risk to pregnant women, but a significant proportion of respondents (38% and 26%) are unable to determine what this safe dose is [90, 92].

A study conducted in a group of Polish students showed that as many as 1/3 of respondents do not know the term and/or definition of foetal alcohol syndrome. Importantly, not all respondents knew (28%) that FAS can be prevented by excluding the consumption of alcoholic beverages during pregnancy [95]. Even more disturbing results were obtained in a study analysing the knowledge of pregnant women about FAS because more than half of the surveyed women had not heard of this term and did not understand its meaning [93]. In another study that examined the knowledge of 24 women from the South African region, a significant percentage of respondents were unfamiliar with the concept of FASD and their general knowledge of the effects of foetal alcohol exposure was inaccurate [96]. In a study by Zarzeczna-Baran *et al.* [95], a high percentage of respondents (76%) were aware of the incurability and irreversibility of FAS-related disorders. It is worth noting that the authors of the study showed a statistically significant correlation between frequent consumption of alcoholic beverages and lower knowledge of FAS, which is a real danger of reducing the sensitivity of society to the consumption

of ethyl alcohol by pregnant women. Similar results were obtained in a study conducted in Australia with over 1000 women aged between 18 and 45, in which, as a result of a telephone interview, it was shown that as many as 38.5% of respondents had not heard about the negative effects of alcohol on the fetus, and over 16% of respondents did not agree that disability resulting from FASD can last a lifetime [97].

There are few studies assessing breastfeeding women's knowledge of the consumption of alcoholic beverages. The available literature showed that the amount of ethyl alcohol in human milk is equal to the concentration of ethanol in the blood; however, due to the pharmacokinetic profile of ethanol, it is not accumulated in breast milk – the concentration of ethanol in breast milk decreases with time after consumption [98]. Accordingly, current recommendations indicate that the safest choice, both for the baby and the mother, is to refrain from consuming alcoholic beverages during lactation [99].

Galactogogues are pro-lactogenic substances i.e., those that stimulate the process of milk production in the mammary glands. Recently, one of the most popular galactogogues has been beer. The available literature assessing the consumption of beer during lactation in order to increase milk production indicates that this effect is less and less popular. Pepino and Mennella [100] conducted a study in which 167 women aged 20-35 were asked about the advice they received from health care workers and their relatives in the context of stimulating lactation. About a quarter of the respondents reported that the doctor advised them to consume alcoholic beverages during lactation, and that their relatives were much more likely to encourage drinking alcoholic beverages during lactation than during pregnancy. In another study [101] of 188 breastfeeding mothers, it was observed that some women reported they used a variety of drinks and foods to enhance lactation like e.g., beer or brewer's yeast, although they were not among the most commonly used substances.

As the analysed studies show, the level of knowledge of the influence of ethanol on the course of pregnancy and lactation is not sufficient both in the men's and women's groups. There is a need for systematic education in this area, especially in the group of young women though also for increasing the involvement of medical personnel in this process.

Knowledge of the beneficial effects of consuming alcoholic beverages

There is a belief in social media and numerous popular science articles that small amounts of ethyl alcohol can positively affect human health. Information like this spread at social and family gatherings and duplicated by people associated with medicine, has made this belief widespread in society [36, 56]. There is observational evidence to suggest that low consumption of alcoholic beverages may have a moderate protective effect against the development of heart disease though with the proviso that this effect is completely reversed when the maximum recommended intake is exceeded [102, 103]. More recent results indicate that this protective effect may be greatly overestimated or at all non-existent. The study by Holmes *et al.* [104] showed that limiting the consumption of alcoholic beverages regardless of the current level of consumption (light, moderate or high) is beneficial in the context of the prevention of cardiovascular diseases. Similar issues were raised by Chiva-Blanch and Badimon [105] in a review on the influence of alcohol on cardiovascular risk and by Olas and Bryś [106] in a review on the beneficial effects of beer on the cardiovascular system. The authors emphasise the benefits of low and moderate ethanol consumption for a reduced risk of cardiovascular disease, but note unexplained controversy related to dose, type of alcoholic beverage and age, gender and genotype-specific differences [105]. Moreover, the health effects may also depend on the presence of other ingredients in alcoholic beverages, so to establish the truth of this thesis, the authors indicate the need for more randomised clinical trials [106].

The studies assessing adult beliefs about alcoholic beverages and their potentially positive effects on the human body are limited in the available literature. Students of Gdańsk university, when asked about the health benefits of consuming wine, indicated minimising the risk of heart attack and stroke. In addition to the influence on the circulatory system, the students also mentioned a beneficial effect on the improvement of metabolism, carbohydrate metabolism and the improvement of the digestive system by stimulating the digestive process. In the discussed study, women also declared they consumed wine due to its calming properties [107]. Compared to other alcoholic beverages, wine was the most frequently mentioned

drink with possible health-promoting properties by consumers [108-110]. In a study conducted in the USA with the participation of 211 wine consumers, it was shown that over 70% of respondents indicated a positive effect on the cardiovascular system as health-promoting properties of red wine consumption, as well as the ability to lower blood cholesterol levels. In addition, participants also cited the benefits of blood sugar control and improved memory as health effects of red wine consumption [110]. Similar conclusions were drawn by the authors of a study conducted with 500 people from regions of Italy, Spain and France, in which more than 30% of respondents agreed that wine can have a positive effect on health if consumed in limited quantities [111]. It is interesting that in the study by Isted *et al.* [36], respondents who drink in a risky manner significantly more often indicated that a low level of consumption of alcoholic beverages brings health benefits compared to people from the group at low risk of harmful consumption. In addition, research conducted by Lizama *et al.* showed that of over 2500 Australian women diagnosed with breast cancer between the ages of 18 and 80, 23% believe that red wine reduces the risk of breast cancer [112], and from a group of 355 adults living in Australia, as many as 52% of respondents believe that red wine reduces or has no effect on cancer risk [113].

Although there are studies showing the beneficial effects of small amounts of ethyl alcohol on health [71, 114, 115], the scale of positive action is often overestimated. Knowledge of this kind is often based on popular stereotypes, which results in greater social tolerance to alcohol consumption. Consumers still declare confusion about the health impact of alcoholic beverages, which indicates the need for educational activities in this area. Many are also interested in the impact of nutrition on health and the use of healthier alternatives to alcoholic beverages, which, according to the authors of the research, is an opportunity to popularise non-alcoholic substitutes for wine or beer [116].

Sources of knowledge of the influence of ethyl alcohol on the body

When analysing the literature in terms of the knowledge of the impact of ethyl alcohol on health, one should also take into account the normal sources of information in this area. It is well known that children learn from observing adults.

Nowadays, media content also has a big impact on the level of children's knowledge [117, 118]. Regardless of the place of the study or the group of respondents, the most frequently mentioned source of knowledge was the internet, followed by television and then teachers [90, 92, 95, 119]. This seems dangerous given the amount of contradictory and false information appearing in the media. Healthcare professionals should be the most reliable source of knowledge of the health effects of ethyl alcohol. Unfortunately, they are a small percentage of the listed sources in this field [90, 117, 120]. This may be due to the low involvement of health care professionals in educating society on the impact of ethanol on human health. The data available in the literature shows that doctors are often concerned about the frequency of alcohol consumption during follow-up visits due to the risk of a negative patient reaction [121, 122]. Scientific research indicates that a significant percentage of the population agrees with the statement that the topic of alcoholic-beverage consumption-related habits should appear in every consultation with a family doctor and this is where they would ask for help [90, 123, 124]. This data makes it clear that research to assess the level of involvement of doctors and health care professionals in educating the public about the impact of alcoholic beverages on human health should be constantly conducted. Importantly, research with the participation of school youth shows that more than half of the respondents do not feel the need to deepen their knowledge in the context of the negative effects of ethanol abuse, which may increase the risk of developing alcohol dependence [119].

There is a need for greater involvement of healthcare professionals as well as teachers and parents in educating children and adolescents about ethyl alcohol to reduce the risk of excessive ethanol consumption in the future.

■ CONCLUSIONS

The analysis of the available literature shows that the level of knowledge of the impact of alcoholic beverages on health, as well as the knowledge of basic guidelines and recommendations of leading scientific societies, is seldom a subject of scientific research. Most of the studies discussed are of low or medium quality limited to a small study group or just one city, which makes it impossible

to draw reliable cause-and-effect relationships and discuss them. There is a lack of current review studies in which the authors assessed changes in the levels of knowledge of individual population groups, as well as analyses of the effectiveness of educational activities undertaken within specific countries and around the world. The presented study shows the need to conduct research on the consequences of consuming alcoholic beverages at the level of consumer knowledge. It also shows areas that require increased action, like placing health information on the front of the pack on all alcoholic products thus presenting a variety

of messages to inform about both the short-term and long-term negative health and social effects of alcohol consumption. Also educational activities among young people at alcohol are particularly important, and can have a real impact on alcoholic beverage-related consumption habits.

The limitation of this study is that it is not possible to support a thesis in longitudinal studies on the positive effects of educational activities on the level of consumer knowledge. Future studies should focus on the long-term effects of interventions of this kind.

Conflict of interest/Konflikt interesów

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Ethics/Etyka

The work described in this article has been carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) on medical research involving human subjects, EU Directive (210/63/EU) on protection of animals used for scientific purposes, Uniform Requirements for manuscripts submitted to biomedical journals and the ethical principles defined in the Farmington Consensus of 1997.

Treści przedstawione w pracy są zgodne z zasadami Deklaracji Helsińskiej odnoszącymi się do badań z udziałem ludzi, dyrektywami UE dotyczącymi ochrony zwierząt używanych do celów naukowych, ujednoliconymi wymaganiami dla czasopism biomedycznych oraz z zasadami etycznymi określonymi w Porozumieniu z Farmington w 1997 roku.

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