

STUDENTS' PERCEPTION OF CALORIES IN ALCOHOL - CONTAINING BEVERAGES

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Ås, August 15th 2013

Lise Vermelid Helgesen

STUDENT'S PERCEPTION OF CALORIES IN ALCOHOL CONTAINING DRINKS

ABSTRACT

With the increasing weight problems in the population as a background, this project focused on alcohol's role in people's overweight issues. To identify students' perceptions of alcohol-containing drinks as a source of calories, both a qualitative and a quantitative method were used. A series of interviews (n=63) were conducted, using students in a bar as interviewees. The participants were divided into three groups. Group one received a beer menu without any calorie information, group two received menus with the calories displayed, and the third group received menus that showed both calories and the amount of exercise needed to burn the calories. All of the menus offered the same beers, one regular and one calorie-reduced. Both of them were offered as 0.4 liter and 0.5 liter. The students were then asked what they would order from the menu they were presented with, and what made them choose the beer they chose.

The study showed that the third group was more inclined to choose calorie-reduced beer (37% compared to 15% and 8% in group one and two), and fewer of the students chose to drink the biggest size available of the regular beer (from 70% choosing this beer in group two to 47% in group three). Besides the effect of listing work out needed to burn calories as a way of getting people to drink less and calorie-reduced, the interviews revealed that the main factors determining students' choice of drinks are size, calorie content, price and taste. The study also revealed that there is little interest among students for listing calories in menus, and that students seem to not care about calories when they are out drinking.

The interviews were followed up with an online questionnaire (n=133) that revealed that many students are concerned about gaining weight. The students are knowledgeable about general nutrition and daily requirements. When it comes to alcohol-containing drinks and calorie intake on days they drink alcohol however, the students' knowledge is poor. They do relate drinking of alcohol to overweight and some are interested in having calorie content listed in menus and labels containing calorie information on bottles. Half of the students would also be inclined to choose different drinks, drink less or both if they got to know how much they would have to work out for each drink they had.

Still, both taste and price are more important factors to the students than calorie content when they decide what to drink. 52% meant however that labels with calorie content will be somewhat useful to their drinking choice.

The main finding in this study was the fact that almost all students do not care about calories when they are out drinking. They do however care to change drinking behavior if the calorie information is shown to them in an easy, understandable way, like minutes of work-out.

STUDENTERS OPPFATNING AV KALORIER I ALKOHOLHOLDIG DRIKKE

SAMMENDRAG

Med bakgrunn i de økende problemer med overvekt i samfunnet, fokuserte dette prosjektet på alkoholens rolle i befolkningens overvektproblemer. For å finne ut av hvordan studenter oppfatter alkoholholdig drikke som en energikilde som bidrar til overvekt, ble både en kvalitativ og en kvantitativ metode brukt. Det ble gjennomført en intervjurunde (n=63) med studenter i en bar, hvor studentene ble presentert en ølmeny. Studentene var delt inn i tre grupper, som fikk ulike menyer. Gruppe en fikk en meny uten kaloriinformasjon, gruppe to fikk en meny som viste kaloriinnholdet i de ulike øltypene mens gruppe tre fikk en meny som viste både kaloriinnhold og den mengden trening som behøves for å forbrenne kaloriene fra den enkelte ølen. Alle menyene tilbød de samme øltypene, en vanlig og en kalorireduert. Begge som både 0,4 liter og 0,5 liter.

Forskningen viste at gruppe tre var mer tilbøyelig til å velge kalorireduert øl (37 % i forhold til 15 % og 8 % i gruppe en og gruppe to) og færre av studentene valgte den største størrelsen av den ølen med høyest kaloriinnhold (fra 70 % som valgte denne ølen i gruppe to til 47 % i gruppe tre). I tillegg til effekten det ga å oppgi nødvendig treningsmengde for å forbrenne kaloriene som en metode for å få forbrukere til å drikke mindre mengder og å velge kalorireduerte varianter, viste intervjuene at hovedfaktorene for studenters valg av drikke er størrelse, kaloriinnhold, pris og smak. Studien viste også at det er liten interesse blant studenter for å ha menyer som inneholder kaloriinformasjon, og at de ikke bryr seg om kalorier når de er ute og drikker.

Intervjuene ble fulgt opp av en elektronisk spørreundersøkelse (n=133) som viste at mange studenter er engstelige med tanke på vektøkning. Studentene har god kunnskap om generell ernæring og daglig inntak, men når det kommer til alkoholholdig drikke og kaloriinntak dager de inntar alkohol, er kunnskapen deres dårlig. De assosierer alkoholholdig drikke til overvekt, og noen er interessert i å ha kaloriinnhold tilgjengelig på flasker/bokser. Halvparten av studentene ville også være tilbøyelige til å velge en annen type drikke, drikke mindre eller både og, om de fikk informasjon om mengde trening som skulle til for å forbrenne kaloriene fra de ulike drikkene.

Allikevel er både smak og pris mer viktige faktorer for studentene enn kaloriinnhold når det gjelder å bestemme hva de skal drikke. 52 % mente imidlertid at etiketter med kaloriinnhold ville vært litt nyttig når de skal velge drikke.

Hovedfunnet i denne studien er faktumet at nesten ingen studenter bryr seg om kalorier når de er ute og drikker. De bryr seg imidlertid nok til å endre drikkevaner når kaloriinformasjonen blir gitt dem på en enkel, forståelig måte, som for eksempel antall minutter trening,

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1. INTRODUCTION

The Norwegian institute of public health stated in 2011 that “Overweight and obesity have been of increasing concern in Norway during the last 20-30 years” [1], and that “knowledge is needed about the causes of overweight and obesity, and about the ways in which these causes may best be modified”[2].

The best known cause of the increased weight in the population is the imbalance between energy intake and energy use. An often forgotten source of a great amount of calories is alcoholic beverages. Alcohol contains 7 calories per gram, and is, aside from fat, the macronutrient with the highest energy [3]. A glass of regular beer or wine contains just over 100 calories. Cocktails with added sweet mixes, cream liquor, and coconut mix quickly add hundreds of calories [3]. One of the backgrounds for this research is the assumption that consumers have little knowledge on calories in alcoholic drinks.

Suthat Liangpunsakul has examined the association between macronutrient dietary patterns and alcohol consumption [4]. The study showed that there is an alteration in the daily dietary pattern with increasing alcohol consumption and that energy derived from alcoholic beverages substitutes that from other macronutrients such as carbohydrate, protein and fat, and the major difference in nutrient intake for both genders was a significantly lower intake of carbohydrates by drinkers.

Additionally, research has shown that although drinkers have a higher calorie intake they are not more obese than non-drinkers [4]. Although several studies question the correlation between alcohol consumption and overweight, conflicting research has showed that individuals who consume alcohol but are not alcoholic appear to add alcohol calories to their calorie intake rather than replace food with alcohol; thus, they consume more total energy than individuals who do not drink [5,6]. Supporting this, Jones et al found that calories derived from alcohol did not replace the calories derived from other nutrients; they were supplemental [7].

Research on alcohol and its relation to overweight and obesity has been the subject of many reviews [6,8,9]. As alcohol appears to be very inefficient at triggering satiety mechanisms [6], the body may not register the calories consumed. This could lead individuals to consume more calories than needed [3]. There are multiple researches showing that alcohol enhances short-term appetite [6], which promotes over-consumption of energy.

Although alcohol is an energy-source, how the body processes and utilizes the energy from alcohol is very complex [4]. Jéquier sums up metabolic studies to show that ethanol energy is used with an efficiency comparable with that of a meal containing carbohydrate and fat and that it reduces fat oxidation. Furthermore there is no reason to claim that ethanol energy does not play a role in energy balance regulation [8]. Alcohol is a source of a great amount of calories and must therefore be seen as a contributor to overweight in the population.

Alcohol-containing beverages are today mainly sold without information about calorie content in Norway and most other countries. There are a few countries requiring a list of ingredients or health warnings, but none that require nutritional information. Martin-Moreno et al. reviewed available evidence to support enhanced labeling [10]. Their study supports inclusion of an ingredient list and nutritional information (calorie-content) and health warnings.

One of the main focuses of this current study was to find out whether labeling alcohol-containing beverages with calorie content will lead to a bigger awareness and decreased consumption of alcoholic drinks among students. Kypri et al. says it is possible that consumers, especially some population groups such as weight-conscious young women, might be less inclined to drink as much alcohol if they knew the calorie content of what they were consuming[11]. They had a web survey revealing that more than three quarters of the alcohol consuming population want to see both ingredients and nutritional information displayed on alcoholic beverage packaging. They say that there would be value in knowing whether such labeling might influence beverage choice or overall alcohol consumption.

My Bui et al researched the effects of serving fact information on alcohol beverage containers and highlights the fact that alcohol beverage producers are not required to disclose product nutrition information, opposed to manufacturers of most other packed food and beverage products [12]. They were interested in finding out how a label with serving facts may potentially influence consumers' perceptions of the calorie, carbohydrate, and fat levels in alcohol beverages and modify their intentions to consume these beverages. They found that consumers have a lack of confidence in their ability to accurately estimate calorie and nutrient levels of alcohol beverages. Most consumers overestimated the calorie levels for regular beer and wine, and the carbohydrate content of wine. The consumers also falsely seemed to think there were carbohydrates in and liquor and that beer contains fat.

They also found that the availability of nutrition facts information significantly decreased calorie and carbohydrate evaluations for wine, and increased consumption intentions. The results after their main study showed that there was no overall main effect of exposure to serving facts information on calorie perception, but the results supported their hypotheses that compared to consumers who did not receive nutrition facts information, the provision of objective calorie information in a label will increase consumers' perceptions of both mean calories per average drink they consumed and total calories from their total alcohol beverage consumption [12].

A review based on 58 publications from 2003-2006 on how consumers perceive, understand, like and use nutritional information on food labels, show that consumers like the idea of simplified front of pack information. The review also show that there is no insight into how labeling information is will be, used in a real-world shopping situation, and how it will affect consumers' dietary patterns, and the researchers say that there is an urgent need for more research studying consumer use of nutritional information on food labels in a real-world setting. [13].

In the current study it is tested whether listing calories in menus would have an effect on what student groups would choose to drink, and how students perceive calorie information on alcohol-containing drinks.

The aim for this current study was to get information on how consumers perceive calories in alcohol-containing beverages, and whether they see drinking alcohol as a contributor to overweight issues. What determines what consumers choose to drink and what factors can affect their choice is also of particular interest along with the question regarding calorie information. To see if labeling of bottle and menus with calories would influence beverage choice or overall alcohol consumption and if the consumers would drink less or choose differently if they knew the energy content of what they are drinking, are of special interest.

2. METHODS

2.1 OVERVIEW OF STUDY

The study consisted of two parts; a qualitative and a quantitative part. The first part was qualitative, and consisted of a round of short interviews. It was conducted with a relatively small number of people, and was designed to give insights on how consumers think when they decide what to drink. The findings from part one also provided information that was used to determine the focus of the second part.

The second part was quantitative; an online questionnaire used to obtain more data on the findings from part one, and to determine the nutritional knowledge and consciousness of calories among the participants, especially in alcohol-containing beverages. Questions about labeling of bottles and menus with nutritional information, and whether the students thought it could change drinking behavior was also part of the questionnaire.

In the study, college students were the only type of participant. One could argue that this makes the findings limited when it comes to generalizability, since they seem to be a quite homogenous group, with similarities like age and educational level. On the other hand, students should be a valuable target group for this research, because of their relatively high consumption of alcohol-containing beverages. Additionally, college students are more vulnerable to gaining weight than the general population [14].

2.2 QUALITATIVE PART

The aim of the qualitative part was to find out how and why people decide to drink what they are drinking. It was conducted in a student bar in Ås, three Friday nights in February/March 2013. The reason for doing the interviews in a bar, where students are actually drinking alcohol are summed up by J.M. de Castro. He wrote that real-world research can overcome weaknesses of laboratory studies and can teach valuable lessons that are difficult to obtain in the laboratory. In a laboratory constraints on eating could be missing, and the environment is too controlled. This could lead to variables being overestimated or important variables could be missing. Real-world studies have shown a wide array of physiologic, psychological, and social variables that can have potent and immediate effects on intake [15]. When students are actually consuming alcohol-containing beverages, they will be more inclined to act and answer like they would do when drinking.

To see if the students think differently about drinking choice and calories in alcohol-containing beverages when not drinking, some sober students were asked, and similar questions were added in the questionnaire used in part two of the study.

The study in the bar was conducted without the people being specifically recruited to be a part of the research. The reasons for not recruiting them before they were in the bar was that they

should not have been thinking too much about alcohol and overweight before taking part in the study, and to reduce the risk of only getting very health aware students to participate in the interviews. Most of the students had already been drinking when they took part in the study, while a total of thirteen students were asked to participate when they arrived at the bar, and had not been drinking. Both sober and drinking students were included to see if attitudes towards alcohol and overweight are different at a time where they are actually consuming drinks that contain alcohol. A question about how much they have had to drink that day was asked in the interview.

The interview focused around a fictive beer menu consisting of four typical beers. The menus used can be found in Appendix 1, and an overview of the beer types is seen in Table 1. There were only two different beers on the menu, one regular beer and one beer with reduced calorie content. They were both listed as 0.4 and 0.5 liter. The students were asked, one at the time, which beer they would choose if they were to order one from the menu. Afterwards they were asked questions to find out what made them choose the beer they chose. The questions asked are showed later in this chapter. The students' answers gave information on different motivations for choosing either a low calorie alternative or a regular beer. Since they also could choose size, it was possible to see if some students choose to drink smaller amounts to cut down on their calorie intake.

Table 1 – Content of the menus used in the study [16,17,18]

Menu 1	Menu 2 also included:	Menu 3 also included:
0.5 l Hansa Pilsner 54kr	205 Kcal	To burn off the calories from this beer you would have to run or swim for 18 minutes or walk fast for 46 minutes.
0.5 l Hansa Pilsner Lite 54kr	140 Kcal	To burn off the calories from this beer you would have to run or swim for 12 minutes or walk fast for 31 minutes.
0.4 l Hansa Pilsner 43kr	164 Kcal	To burn off the calories from this beer you would have to run or swim for 14 minutes or walk fast for 37 minutes.
0.4 l Hansa Pilsner Lite 43kr	112 Kcal	To burn off the calories from this beer you would have to run or swim for 10 minutes or walk fast for 25 minutes.

Menu 1 contained beer type, serving size and price. The prices were adjusted to be the same per liter, so that pricing should influence the students as little as possible. Pricing, beer types and serving sizes were the same in all three menus.

Information on calorie content was included in menu 2 to see if the number of people choosing the low calorie types changed when students were doing a more informed choice.

In the third menu information was given for each beer regarding the work out needed to compensate for the calories from the beer. This was done to see whether knowing how much work out was required to burn the amount of calories in one beer was a better motivation factor for the students to choose lower calorie beer types or a smaller serving size than information on calorie content alone.

Students in the bar were asked if they had a couple of minutes to answer some questions. Most students sat or stand in a group, and the ones that were asked to participate were taken away from their group participate. This was done both to ensure that the students were not influenced by the answers of their friends, and to get the student that were being interviewed focused and to answer honestly. The only inclusion criteria were that they liked beer, since the questions were related to drinking of beer. They were presented with one of the menus and asked: If you were to order a beer from this menu, which one would you choose?

After the students made their choice, an interview based on the following questions was conducted.

- 1) What made you chose this beer?
- 2) Did you consider the calorie content in the beers listed?
- 3) Are you conscious about calories in drinks?
- 4) Are you conscious about calories in food?
- 5) What have you been drinking today (alcohol-containing drinks)?
- 6) Do you know how many calories there is in a 0.5 liter beer? (only asked the students in the first group)
- 7) Do you know how many calories you need a day? (only asked the students in the second group)
- 8) Do you know how many calorie you have consumed today?(only asked the students in the third group)
- 9) If you were in a situation where you had to reduce your calories, would you:
 - a) Drink less
 - b) Choose a drink with fewer calories
- 10) When I'm buying a soft drink I usually chose a diet drink (true/false)
- 11) I try to keep my overall sugar intake down (true/false)
- 12) I want to know the calorie content before choosing what to drink (true/false)
- 13) Age
- 14) Gender
- 15) Study(also institute and year)
- 16) Where are you from?

2.3 QUANTITATIVE PART

Part two of the research was a questionnaire made after analysis of the interviews in part 1. It was designed to enable quantifications of statements from the interviews, and to get more data on how informed students are on calories in alcohol-containing beverages and how it affects their drinking patterns. The questionnaire had 45 questions, all listed in Appendix 2. The questionnaire was conducted online to ensure anonymity for the students participating and to be sure that no data was lost in the process.

The original plan was to send the questionnaire out electronically to all students enrolled at the University of Life Sciences. That turned out to be impossible; the students had to be recruited to take part in the research. Five days in March were spent on recruiting students on campus to take part in the study. Students were asked to give their e-mail-addresses, to later receive a link to the questionnaire. The students answered the questionnaire from home. The ones that did not respond to the original e-mail received a reminder a week after they signed up to participate. No more effort was spent on those not responding to the reminder.

It was desirable to get the same number of female and male students, in total over a hundred respondents. Students from all institutes were wanted as subjects in the research, so all institutes were visited during the collection of e-mail addresses.

The questionnaire was made in English even though most, if not all, respondents understand Norwegian. It was done to avoid misunderstanding when translating the results for the report.

After some general questions about themselves, the students were asked several questions to determine their nutritional knowledge. Questions about the student's knowledge of calories and especially about calories in alcohol-containing beverages made up most of the questionnaire. They also had to answer some questions about their feelings and opinions when it comes to drinking, working out and labeling of alcoholic drinks.

3. STATISTICS

3.1 PEARSONS CHI-SQUARED TEST

To validate the results, Pearsons chi-squared test was used. The test helps determine if the data collected has a variation just due to chance, or if the variation is actually due to one of the variables that was tested.

3.2 MANN-WHITNEY U-TEST

The Mann-Whitney U-test was used to determine if the data collected was significantly different in the situations where the same questions were asked in different groups(home versus bar) and when looking at the effect of menu treatment, and how groups with different nutritional knowledge perceived labels with calorie content.

3.3 DETERMINATION OF THE STUDENTS' NUTRITIONAL KNOWLEDGE

To evaluate the students' nutritional knowledge, questions of the type "do you think tomato ketchup is high or low in added sugar" were included in the questionnaire. In total there were 24 questions like this, with a right and a wrong answer, in addition to the possibility to answer "I do not know". One of the questions was subject to some confusion, and was therefore not taken into consideration when it came to the evaluation. One point was given for each correct answer. The maximum score was 24, translating to a student being very knowledgeable about nutrition.

4. RESULTS QUALITATIVE PART

All students that were asked to do an interview in the bar participated willingly. This made it easy to ask as many female as male students, and to get a small group of sober students to take part. In total 63 people were interviewed; 28 female and 35 male students, from different departments of the University of Life Sciences. The number of students participating on the days with different menus is listed in Table 2. The interview took between five and ten minutes with each student, and was conducted between nine and midnight on the three Fridays.

Table 2 – In total 63 students took part in the study. On the three different nights, different menus were used.

Date	Menu used	Number of participants
22.02.2013	1	21
01.03.2013	2	23
08.03.2013	3	19

4.1 DRINKING CHOICE

Figure 1 is an overview of what the students would choose to drink if they were to order from the menus. 34 out of the 63 students would choose to drink a big size regular beer type. In total, 12 students would drink a calorie reduced beer.

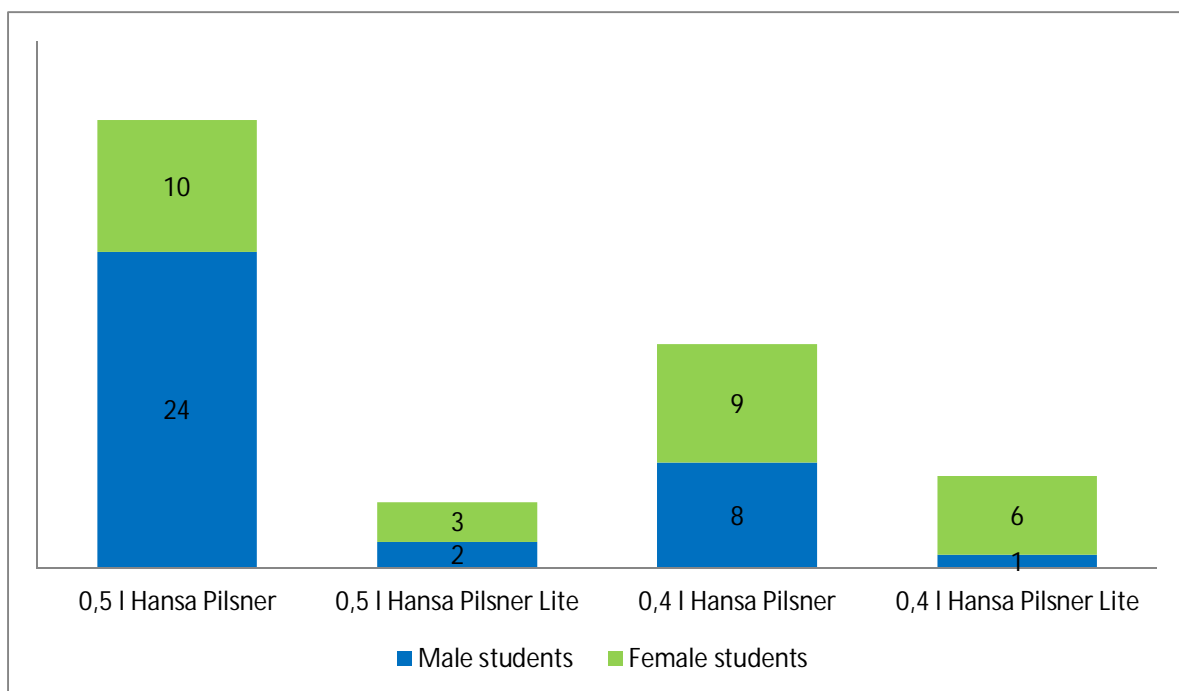


Figure 1 -Most students would chose to drink a 0, 5 liter regular beer ($p < 0.001$).

9 out of 10 male students would choose a regular beer. 75% of them would order the biggest size available. Reasons given for this choice included the ones listed in Table 3.

Table 3 - Reasons male students had for choosing 0.5 liter Hansa Pilsner

“Big size last longer”
“Light is for ladies”
“Taste is the best, costs the same”
“Contains the most, no reason to be healthy when drinking”
“Cheaper, and I do not want light”
“Habit”
“Contains more”
“Real beer, standard size”
“Big is good to reduce the amount of time spent queuing at the bar “
”Calorie difference is small”

Most female students would also choose a regular beer, but half of them chose a smaller serving size. 54% of the female students choose a 0.4 liter beer, while only 26% of male students would chose a 0.4 liter beer

More female than male students chose a calorie reduced beer. Only one male student chose the alternative with the least amount of calories; small size and calorie-reduced beer. There were in total 11% choosing this alternative.

4.2 EFFECT OF MENU TREATMENT

Figure 2 shows that the menu the students got to choose from made a difference in what the students choose. Since there was not the same number of students participating each Friday night, the figure shows the number of students in percent. Drinking choice is statistically significantly in the group presented with menu 1 and menu 2. The effect of menu treatment is significantly different when comparing menu 1 results with menu 2 results, and menu 2 results are significantly different from menu 3 results.

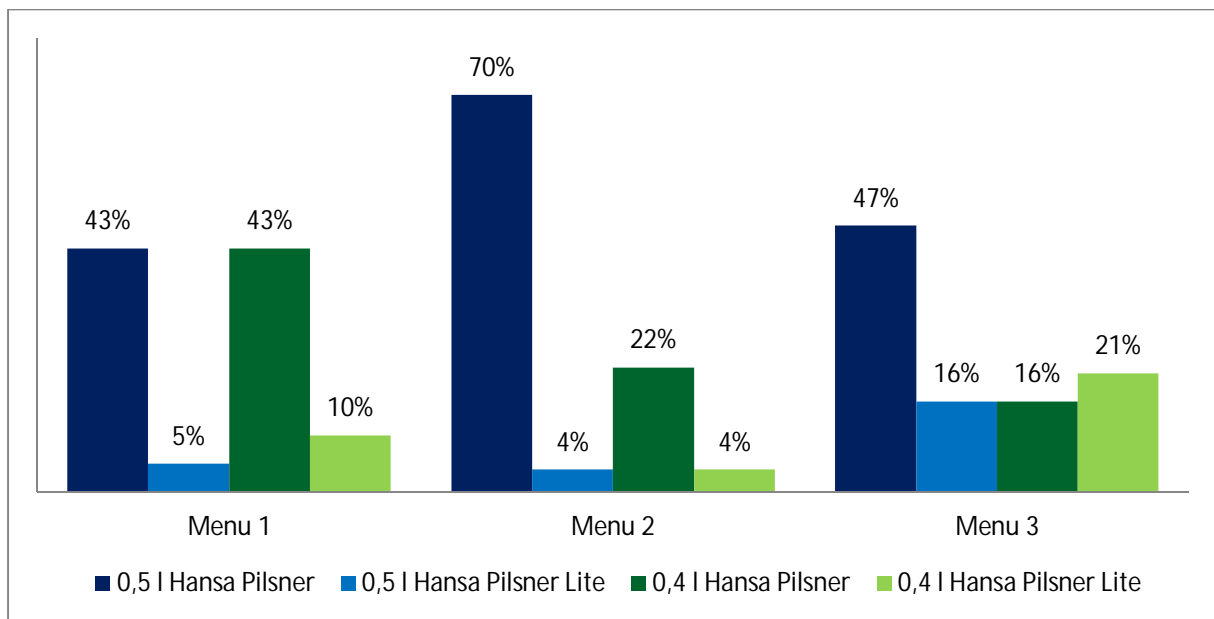


Figure 2 – Most students choose a regular beer, 0.5 liter, and there was a statistical significant difference in the choices based on what menu the student based their choice on

4.2.1 MENU 1

The first menu had no information on calorie content. 86% chose a regular beer, half of them the big size. There were only three out of the 21 students presented with menu 1 that said they would choose a calorie reduced beer. The three students stated that they do care about calories in what they drink, and that the main reason for choosing what they chose was the reduced calorie content. Two of the students that chose a calorie reduced beer, chose the small size. One of them said she chose like that because small + light = fewest calories. The other one chose a calorie reduced beer because she cared about calories but small because of the price.

4.2.2 MENU 2

Students presented with menu 2 had the calories listed in the menu. In this group 92% chose a regular beer, most of them (76%) the biggest size. There were two students who chose a calorie reduced beer after seeing this menu, both of them female. One of them chose the 0.5 liter and said she chose it because it has the “most beer in it” and that she normally buys calorie-reduced beer. The other chose the smallest size and said it was because it was the cheapest.

4.2.3 MENU 3

The third menu included both calorie content and information about the work out needed to compensate for the calories in each beer. A total of 53% choose a beer that was either calorie reduced or small. In this group 37% chose a calorie reduced beer; a total of seven students, four female and three male. One of the male students said that after reading about the calorie content and how much he would have to work out to burn the calories from the different beers: “good with fewer calories, never thought about it until now”, and ended up choosing a calorie-reduced beer.

4.3 FACTORS DETERMINING STUDENTS CHOICE OF DRINKS

When the students were asked what made them chose the beer they chose, the arguments where mainly based on size, price, taste, calorie content and habit. Described in this chapter are size, price, taste and calorie content.

4.3.1 CALORIE CONTENT

In total, 29% of the students mentioned calorie content as a reason for choosing the beer they chose. Quotes/comments are listed in Table 4, where also the number of students with the same or similar comments is included.

Table 4 – The students basing their choice on calorie content chose calorie reduced and normal beers.

Quote/Comment	Number of students
“Less calories”/Fewest calories	7
“When I am out drinking, I do not care about my calorie intake”/ “Contains the most, no reason to be healthy when drinking”	2
“I do not want calorie reduced”	2
“I do not believe in calorie reduced beer”	1
“Medium amount of calories”	1
“I would rather drink water than calorie reduced beer”	1
“There is just a small difference in calorie content”	1
“Calorie reduced beer is good”	1
“Good with fewer calories. Never thought about it until now”	1
“I do not care about calories”	1

4.3.2 SIZE

Most students (62%) chose a 0.5 liter sized beer. 38% chose a 0.4 liter beer. In total, 56% of the students mentioned size as a reason for choosing the beer they chose. Reasons for their choices are listed in Table 5, where also the number of students with the same or similar comments is included. Only four of the students that chose a smaller serving size did it to reduce their calorie intake.

Table 5 -Reasons for choosing small size beer did often not include reducing calorie intake

Quote/Comment	Number of students
“Most in it”/“Largest”	7
“Size”	6
“I like the big size”	4
“Good size”	3
“0.5 liter lasts longer”	2
“Big is good to reduce the amount of time spent queuing at the bar “/”do not have to buy a new that often”	2
“0.4 liter is good for not getting drunk”	1
“I like 0.4”	1
“Then I can drink more of them”	1
“0.4 stays fresh for longer”	1
“Standard size”	1
“More beer in it”	1
“Contains the most, no reason to be healthy when drinking”	1
“I get full from beer, so 0.4 liter is enough”	1
“Less amount = fewest calories”	1
“just is a better size”	1
“I have already been drinking a lot today”	1

4.3.3 PRICE

In total, 22% of the students mentioned price as a reason for choosing the beer they chose. Quotes/comments are listed in Table 6, where also the number of students with the same or similar comments is included.

Table 6—Although the price is similar for all beers, 14 students had price as a reason for their choice

Quote/Comment	Number of students
“Cheaper”/ “Lower price”	10
Seemed to be the cheapest one	2
Cost as much/same price	2

4.3.4 TASTE

In total, 21% of the students mentioned taste as a reason for choosing the beer they chose. Quotes/comments are listed in Table 7, where also the number of students with the same or similar comments is included.

Table 7 -There are different opinions about whether calorie reduced beer tastes good

Quote/Comment	Number of students
“It has the best taste”	4
“Calorie reduced beer does not taste good”	2
“Real beer”	2
“When you choose to drink, it must taste good”	1
“Taste is important”	1
“Calorie reduced beer actually tastes good”	1
“I would rather drink water than calorie reduced beer”	1
“Not calorie reduced(taste)”	1

4.4 CALORIE CONSCIOUS STUDENTS CHOISE OF DRINKS

23 of the 63 students answered something else than “no”, when asked if they considered the calorie content when choosing what they would like to drink. In the group presented with menu 1, three students said yes. All three were females who chose a calorie reduced beer. Five students said “Yes, but I do not care”. All five were male, and chose a regular type beer.

In group two (calories listed in the menu), the answers were not as consistent. One female student considered calorie content when choosing, and chose a calorie reduced beer from the menu. One male student said he thought about it, but the difference was small. He chose a regular beer. Five people that said they thought about it “a little”. Two of them, a male and a female student stated that even though they thought about it, taste is more important, and chose the regular beer, big size. The remaining three (two male, one female) choose small size beer. The female student chose calorie reduced beer; both male students chose a regular beer.

In group three (calories and amount of work out needed to burn the calories in each beer listed in the menu), four female students answered that they did think about calorie content when making their choice. They all chose a calorie reduced beer; three of them also chose the smallest size. One male student said “yes, when I noticed it”. He chose a small, calorie reduced beer. Another male student said “sort of, but I newer choose the one with fewest calories”. He chose a regular beer, small size. Two students, one male and one female said “I noticed the calorie contents, but it won’t affect my choice”. They both chose a regular beer, big size.

4.5 HOW STUDENTS WOULD CHOOSE TO REDUCE THEIR CALORIE INTAKE

All 63 students were asked the question: If you were in a situation where you had to reduce your calories, would you choose to drink less or chose a drink with fewer calories. The results are presented in Figure 3

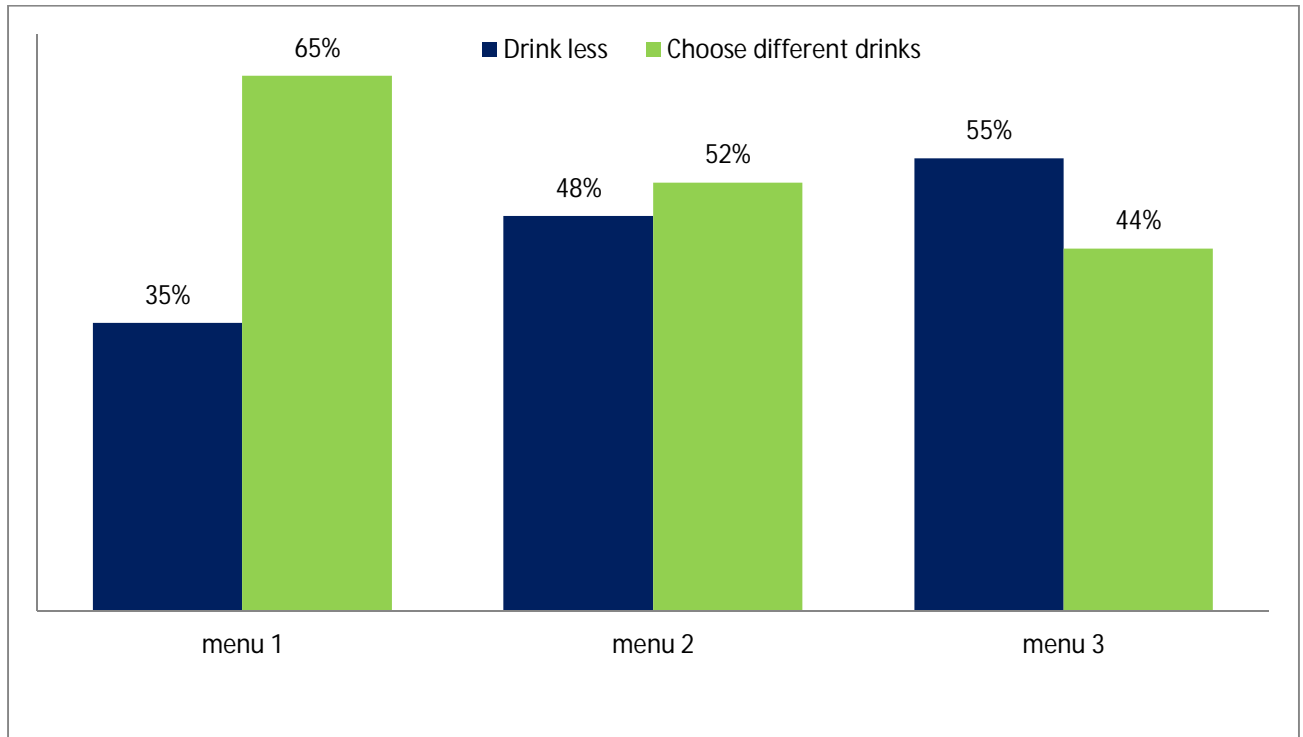


Figure 3 – How the students would choose to save on calories varies with the menu they were presented

In total, there is no statistical significant difference between the groups of students giving different answers. The bar chart shows, however, that most of the students in the first group would choose different drinks rather than drinking less to save on calories. In the second and third group, where the students got to see the calorie content of different beer types in the menus, a larger number of students said that they would rather drink less than choosing different drinks. This is to some degree observed in group two, and to a greater degree in group three.

Figure 4 displays what the students answered when presented with the statement “I want to know the calorie content before choosing what to drink”.

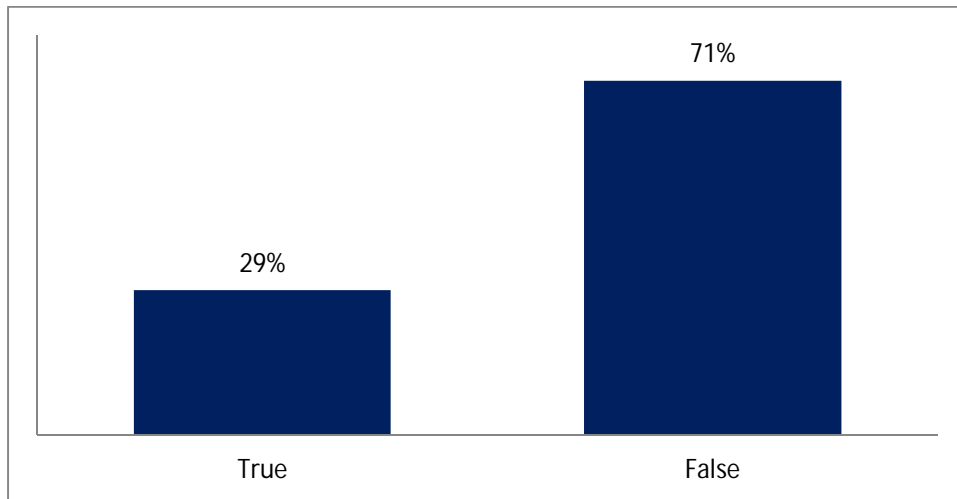


Figure 4 – 29% of the students would like to know the calorie content before choosing what to drink. The result is significant ($p < 0.05$)

4.6 CALORIE CONSCIOUSNESS

All students were asked if they are conscious about calories in drinks, and if they are conscious about calories in food. Generally they are more concerned about calories in food than in drinks. Only two out of the 63 students answered that they are more concerned about calories in drinks than in food. One of the two says she cares more about calories “from drinks than from food because the calories from drinks are added to the diet, not replacing calories from food”.

Most students answered the question with yes, no or a little, but some students gave some similar comments. The comments are listed in Table 8.

Table 8-Students who are normally concerned with their calorie intake think less about the calories when they are out drinking

“Not at a party, but normally I do care
“Before going out I care about the calories in drinks, but not when I’m out”,
“Yes, but not now”,
“No, not when I’m out drinking”,
“Yes, but not in alcohol-containing drinks”
“A little bit, but not when I’m out”.

4.7 CALORIE AWARENESS

The group presented with menu one was asked “do you know how many calories there is in a 0.5 liter beer?” 33% had no idea. The remaining answers are presented in Table 9.

Table 9 – Most of the students answering the question about calories in beer overestimated

Answer	Number of students
100-166 kcal	2
200-230 kcal	4
300-400 kcal	6
500 kcal	1
1000 kcal	1

Students presented with the second menu were asked how many calories they needed each day. As shown in Table 10, most students had an answer between 2000 and 2500. 30% answered that they had no idea

Table 10- most students need between 2000 and 2500 kcal a day

No idea	Less than 2000	2000-2500	3000
30%	9%	48%	13%

When the group presented with menu 3 was asked “do you know how many calories you have consumed today?” 78% answered that they had no idea. The remaining students answered 1600 kcal, 2500 kcal, 4000 kcal and 1800-2000 kcal.

4.8 SOBER STUDENTS CHOICE OF DRINKS

In total 13 of the students that took part in the study were sober. Some of them were interviewed immediately after they arrived at the bar, and some were in the bar to work, not to party. What they chose from the menus is similar to those given by students that were already drinking, as seen in Figure 5. The reasons given were also similar, and included: “Habit”, “Has the most beer in it”, “Tastes the best and cost as much” and “Less calories”.

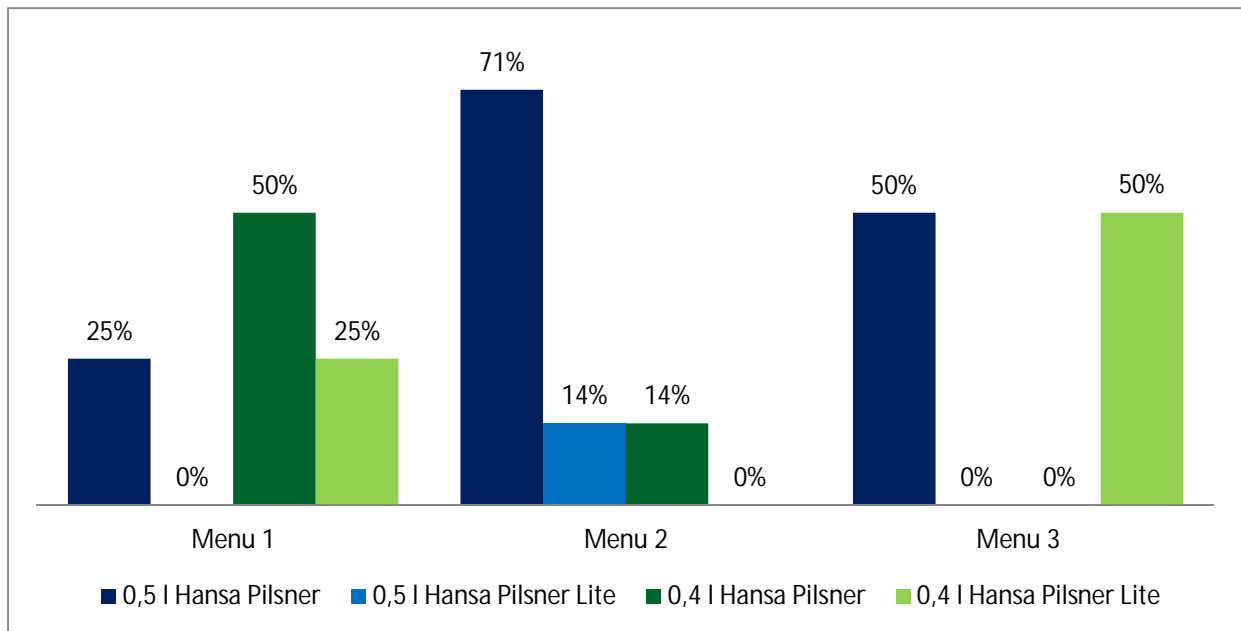


Figure 5 – The students that were not drinking, made the same choices as students that had been drinking

Some of the results from part one will be presented together with the results from part two. This applies where the same questions were asked in the bar and in the online questionnaire, and includes the following:

- 1) When I’m buying a soft drink I usually chose a diet drink (true/false)
- 2) I try to keep my overall sugar intake down (true/false)

5. DISCUSSION QUALITATIVE PART

Showing students different menus had an effect on what they would choose to drink. It is not consistent that the more nutritional information the menus displayed, the more students chose calorie-reduced beer and/or smaller serving size. There were in fact more students choosing the beer with the highest calorie content, in the group presented with a menu where calories were listed in the menu, than in the group who had no nutritional information displayed in their menus. Presenting students with the amount of work out needed to burn the calories from each beer resulted in more students choosing calorie-reduced beer, and fewer choosing the biggest size of the regular beer.

One could, with the assumption that students know little about calories, argue that the difference in calories were small in the students eyes. This was also mentioned by some students (ref. Table 4). Another attitude from the students that could explain why they did not seem to care about choosing a beer with fewer calories, are the comments listed in Table 8. Even the students that normally care about calories in what they eat and drink do not pay attention to calories at a party, where they are drinking alcohol-containing drinks. To investigate whether this is an attitude shared by more than the ones commenting it, the true/false-question “When I am out drinking, I do not pay attention to my calorie intake” was included in the questionnaire in the quantitative of the research.

Listing the calorie content in menu 2 seemed to have no effect on what the students wanted to drink. Menu 3, with both calorie content and information regarding the work out needed to compensate for the calories from each beer, had some interesting effects on the students. Compared to menu 2, where 9 percent chose a calorie reduced beer, 37 percent of the students in group three did the same. That the amount of students choosing the beer with the highest calorie content sank from 70 percent in group two to 47 percent in group three shows that the amount of work out is by far a bigger motivation for the students to make a different choice to consume fewer calories. From the students comments it seems like the majority of the students have no or little relation to the calorie concept. With this in mind it is not surprising that it is first when they get an example of energy use next to the energy source, that they consider making a different choice. This matches the only other study where not only calorie content, but also the amount of exercise needed to burn calories is displayed in menus [19]. That study showed that when it comes to ordering food at a diner, costumers who got the extra information ordered and ate less calorific food than other costumers. Unlike calories, minutes of exercise are something most consumers can relate to.

The students in the group presented with menu 1 and menu 2 who chose calorie-reduced beer, were conscious about calories, and for several of them choosing calorie reduced beer was a habit. Interestingly, it is only in the group presented with menu 3 that there are students basing their choice on what they had just been reading in the menu. Group three is the only group where male students choose calorie reduced beers. There is not a big increase in female students choosing a calorie reduced beer compared to group one and two. That male students

chose calorie-reduced beer when getting information on the calories is contrary to what Kypri et al though about what groups might change behavior if they knew the calorie content of what they were consuming, which they thought were weight-conscious young women[11].

When it comes to serving size, the majority of female students choose 0.4 liter, while the majority of the male students choose 0.5 liter. The fact that all students had to specify what size of beer they wanted, can explain why such a large amount (56%) of the students mentioned the size when explaining their choice.

22 percent of the interviewed students based their choice on price. This is an interesting result considering there was actually no difference in price in the presented menus. If there were an actual difference in price, the number of consumers basing their choice on price would probably be higher. When stimulating consumers to choose one product over another, adjusting the price seems an easy method, as price seems to be more of a factor consumers base their choice on than calorie content.

One fifth of the students mention taste when describing how they chose what to drink from the menu. This seems low, but in this study the only beers which differ in taste are the regular and the calorie reduced beer. This makes it difficult to conclude that taste is not an important factor students base their drinking choice on. This is further investigated in the quantitative part of this current research.

Calorie content was not the main reason for most of the students when choosing what to drink. 29 percent mentioned calories as a reason they based their drinking choice on. In the study they had to choose between regular and calorie reduced beer, and two out of four beers on the menu were calorie reduced types. In a real-life situation, with a menu with more drinking options, of which a small percentage is calorie-reduced, one can probably assume that calorie reduced drinks would have been considered less carefully than in the bar setting in this study. The number of students taking calorie content into consideration when deciding what to drink would most likely be lower than in this study.

When asked if drinking less or choosing a different drink would be the preferred way of consuming fewer calories, the group presented with menu 1 had a majority of students that would choose different drinks. More students would choose to drink less in the two groups who had menus with calorie content of beers listed. Assuming the students had little or no knowledge on calories in alcoholic beverages before doing the interview, the information provided to the groups presented with menu group 2 and 3, show that knowing more, would cause them choose drinking less to reduce their calories. It may seem that the students perceive the calorie difference between the different beers in the menu to be small, and that they therefore think drinking less is a more effective way of reducing their calorie intake. In addition when they know the calorie content of beers, they also know how many calories they can “save” on drinking less.

Most of the students (71%) do not want to know the calorie contents before choosing what to drink, as seen in Figure 4. The comments listed in Table 8 explain this; the students do not care about their calorie content when drinking. This is interesting when knowing that some actually would choose different drinks when given calorie information, especially when the information is given in a helpful way (related to amount of exercise).

When looking at girls who said they thought about calories when choosing (eight, and they all chose a calorie reduced beer), only half of them answered “true” when they were asked if they want to know the calorie content before choosing what to drink, three said “false”, and one student said “false, but it would influence my choice to see it”. This shows that the consumer’s wish is not the only thing that must be taken into consideration when discussing labeling of alcohol-containing bottles and menus with calorie content. They might be influenced by the information to change their drinking behavior, although they would rather not know, and make their choice based on other criteria. This is supported by the fact that the students drink less amounts, and that more chose calorie-reduced beer when they are presented with the menu with calorie information.

The sober students in the bar were asked the same questions as the ones drinking. There seemed to be no difference in the answers and attitudes towards drinking and calories in the group of sober students. This argues that the bar setting causes the sober students to have the same mind set as the ones drinking.

When asked about the number of calories in a 0.5 liter beer, most students overestimated or had no idea about calorie content of beer. It is not possible to conclude that only one fifth of students have the knowledge to estimate the calories in a beer after this result, since the number of students asked were few. The question was only asked group one, since the menus used in group two and three contained this information.

In the group presented with menu 3, 78 percent had no idea about their calorie intake the day of the interview. There is little need to discuss labeling bottles and menus with calorie content if most of the consumers have no knowledge on calories. To get better data, these and other questions about calories were included in the questionnaire used in the quantitative part of this research.

6. RESULTS QUANTITATIVE PART

6.1 PARTICIPANTS

In total, 133 students participated in this part of the research, 81 female and 51 male (one student did not answer the question about gender).

The participating students answered the questionnaire in March/April 2013. The age range was 19-36, average age was 23. With the exception of six foreign students, the participants were Norwegian. Figure 6 shows the age distribution of the students participating in the study and Table 11 shows what institute the students belonged to. The respondents were active, 95% work out on a regular basis.

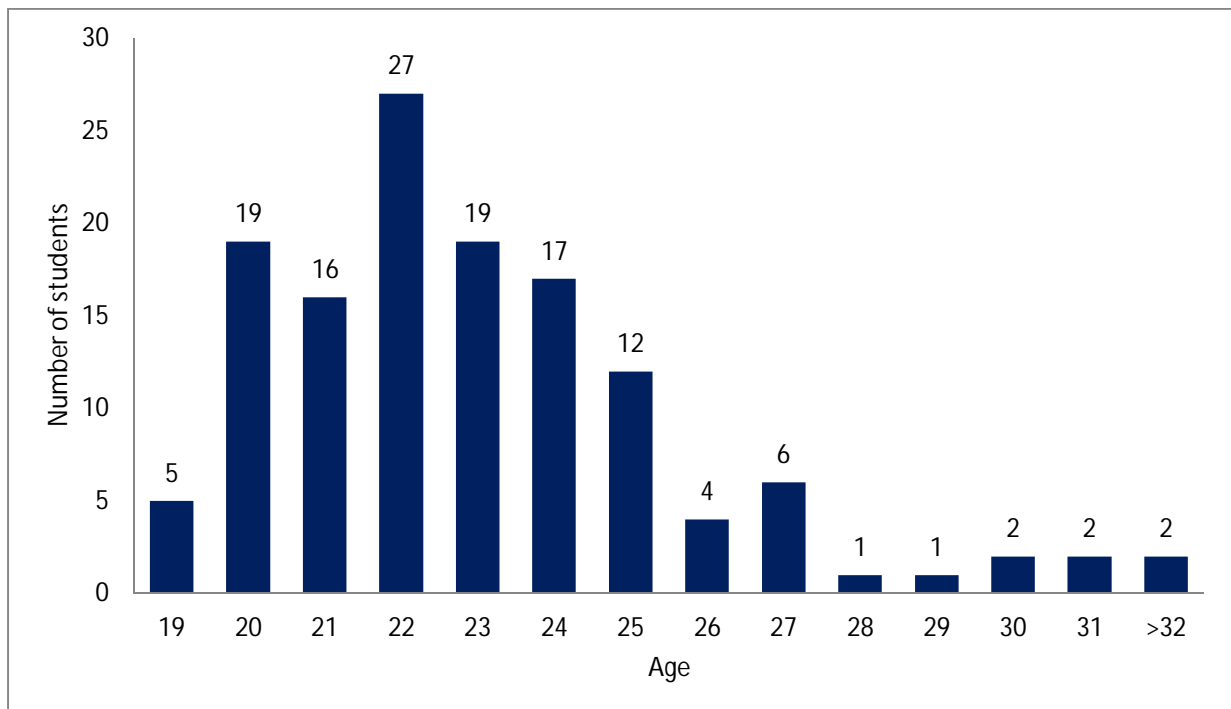


Figure 6- The students taking part in the study were mainly between 20 and 25 years old

Table 11- All institutes were represented with students participating in the study.

Dept. of Animal and Aqua cultural Sciences	9
Dept. of Chemistry, Biotechnology and Food Science	21
Dept. of International Environment and Development studies	1
UMB School of Economics and Business	10
Dept. of Ecology and Natural Resource Management	18
Dept. of Landscape Architecture and Spatial Planning	30
Dept. of Mathematical Sciences and Technology	31
Dept. of Plant and Environmental Sciences	13

The original questionnaire contained a large number of questions. The results for the majority of those questions are presented below. Some questions are presented in the appendix only, and a few questions were excluded from the final report due to their limited relevance.

6.2 NUTRITIONAL KNOWLEDGE

75% of the students considered themselves to be knowledgeable about nutrition and 94% of the students answered “very important” or “somewhat important” to the question “how important is it to you to eat healthy?”

The students’ nutritional knowledge is good, but varies. An overall score of nutritional knowledge for each student was calculated based on questions in the questionnaire. The distribution of the scores is shown in Figure 7. “Not sure” was listed as an option with all questions used for counting the scores. This alternative, along with incorrect answers, gave no points, so it was possible to get 0 as a score, although 10 was the lowest score obtained. The maximum score was 24 points. Mean score was 18.

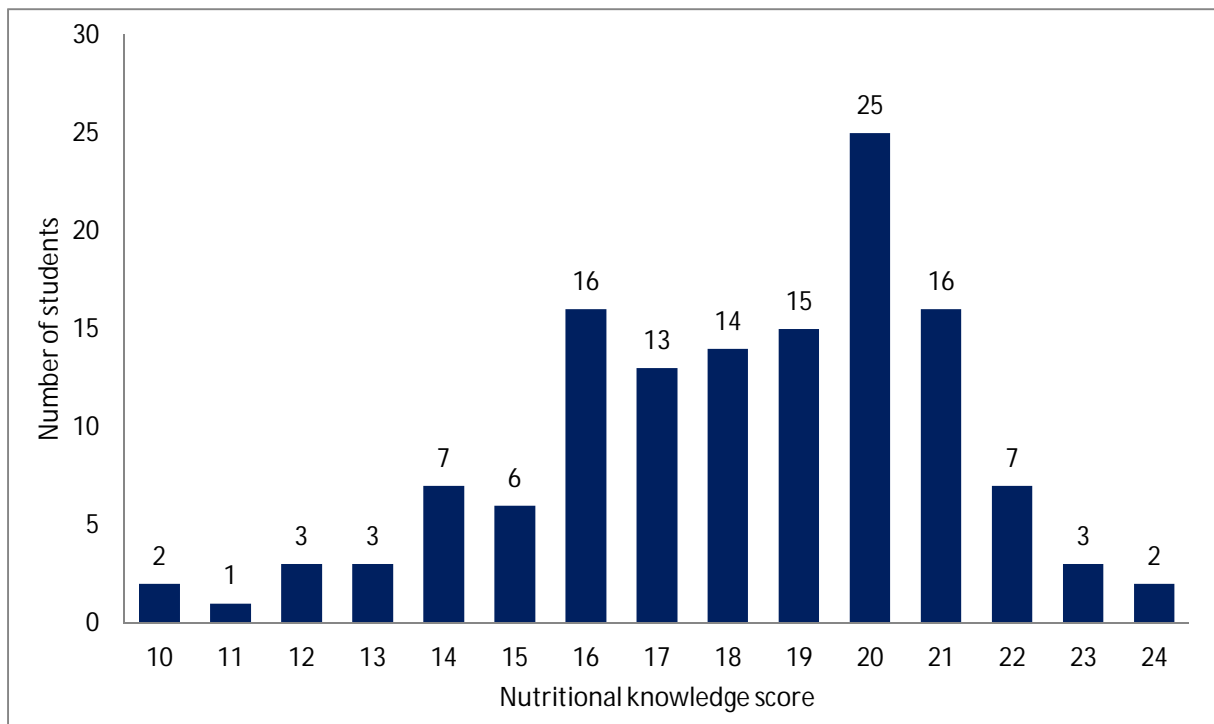


Figure 7 – a large number of students has good knowledge about nutrition

6.3 NUTRITION AND DIETARY INTAKE

The students interviewed in the bar and the students participating in the online questionnaire were asked their opinion about the statement “when I’m buying a soft drink I usually choose a diet drink”. Few students preferred diet soft drinks, as shown in Table 12. The students that answered something else than the given options “true” and “false” were excluded from the calculations.

Table 12: Most of the students did usually not buy diet soft drinks (P<0.001)

	At home	In the bar
True	26%	26%
False	74%	74%

The same students were asked their opinion about the statement “I try to keep my overall sugar intake down”. The majority of the students answered “true”, as shown in Table 13. However the percentage of students *not* trying to keep their sugar intake was double in the bar compared to at home. The students that answered something else than the given options “true” and “false” were excluded from the calculations.

Table 13: The majority of students try to keep their sugar intake down (P<0.005, z=-6,653)

	At home	In the bar
True	86%	71%
False	14%	29%

In the online questionnaire, the students had to estimate their calorie intake on a typical day, shown in Table 14, and on a day with consumption of alcohol, shown in Table 15. No alternatives were listed in the questionnaire so that students could freely write their estimate. The results were grouped in the tables below to increase readability. A number of students answered something else than a number, and was grouped together in a category called “other”. A group for the students having no idea about their calorie intake was also made.

Table 14 –Most students estimated that their calorie intake on a typical day was something between 2000 and 3000 kcal

No idea	Less than 2000	2000-3000	over 3000	other
19%	11%	45%	19%	6%

Table 15 – Most students estimated that their calorie intake on a day with consumption of alcohol was either less than 2000 kcal or over 3000 kcal

No idea	Less than 2000	2000-3000	over 3000	other
10%	38%	14%	34%	4%

Compared with the students estimate for a typical day, the number of students answering “2000-3000” is reduced from 45% to 14% in their estimates for a day with consumption of alcohol. An increase is seen in the neighboring columns representing “less than 2000” and “over 3000” calories.

53% of the students answered in the questionnaire that they were concerned about gaining weight, and 62% of those working out on a regular basis said that “loosing or maintain body weight” was one of the motivation factors.

As seen in Table 16, 53% of the students feel that they do not know enough about their daily caloric requirements to make reduced calorie choices when they choose what to eat and drink.

Table 16 – Half of the students do not know enough about their caloric requirements (P<0.001)

Yes, I know enough	41%
No, I do not know enough	53%
Other	6%

6.4 PROPENSITY TO CHANGE HABITS

The responses to “If you knew how much you would have to work out for each drink you had, could it make you choose different drinks or drink less?” are shown in Table 17. In Figure 8, all students saying that they would change their drinking behavior are gathered in the yes-column.

Table 17 – 26% does not know if they could change drinking behavior based on information on how to burn the calories from drinks (P<0.001)

Yes, drink less	11%
Yes, choose drinks with a lower calorie content	20%
Yes, both	16%
Maybe	26%
No	27%

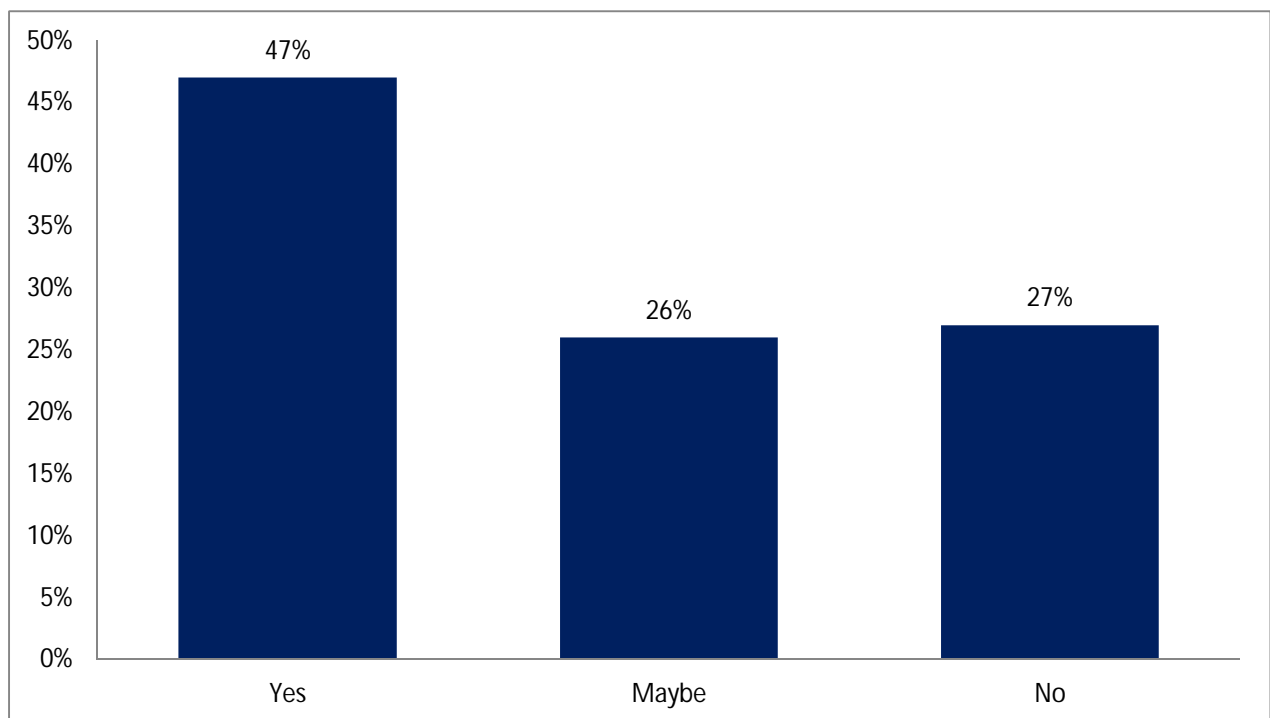


Figure 8 – Half of the students would be inclined to change drinking behavior if they got to know how much they would have to work out for each drink they had.

6.5 KNOWLEDGE ON CALORIES IN ALCOHOL-CONTAINING DRINKS

85% of the students consider alcohol to be fattening ($P < 0.001$).

A bottle (0.33 liter) of beer contains approximately 135 kcal [15]. The students gave their estimate of calorie content in a bottle of beer. The question was presented open, to avoid leading the students. The results were then grouped and presented in Table 18.

Table 18 – Answers between 125 and 140 were considered correct. Range: 14 – 1500. The vast majority overestimated the calorie contents of the presented beer ($P < 0.001$).

Mean: 187kcal

Too low	15%
Right	8%
Too high	61%
Other	16%

Students were also asked if a glass of red wine (0, 2 liter) contains the same amount of calories as a bottle of beer (0, 33 liter). As presented in Table 19, 73% answered falsely that the glass of beer has more calories than the glass of wine.

Table 19- 13% were able to identify that the beer had as many calories as the wine ($P < 0.001$)

Yes	13%
No, the beer has more calories	73%
No, the glass of wine has more calories	14%

6.6 FACTORS DETERMINING DRINKING CHOICE

The students ranked the factors, price, taste, calorie content and serving size by the importance it has to them when they choose what to drink. They marked the factors with the numbers 1-4. 1 identified the factor being most important to the student, 4 the lowest importance. Added together they resulted in the list in Table 20, with the lowest number being of highest importance to the students. Figure 9 shows percentage of students having the various factors as their first priority.

Table 20 – Taste is an important factor when students choose what they want to drink, while serving size is of little importance ($P < 0.001$)

Rank	Factor	Points
1	Taste	204
2	Price	296
3	Calorie content	390
4	Serving size	419

15% of the students had calorie content as the factor that was most important for them when choosing what to drink. Most students had calorie content as their third or fourth priority.

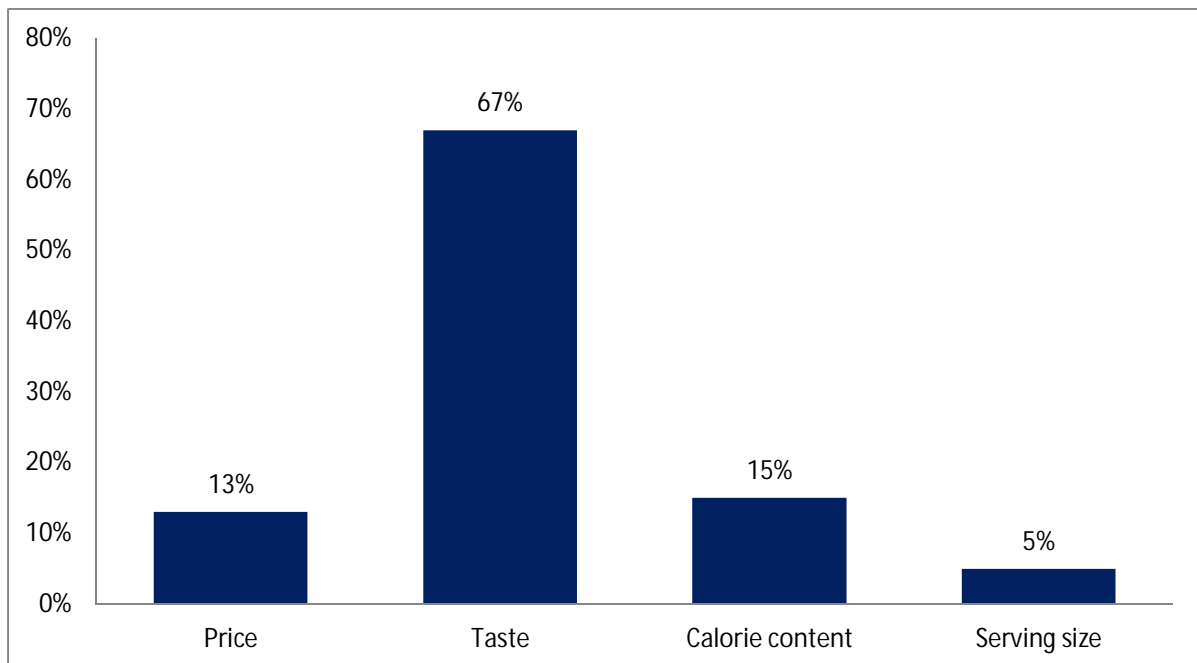


Figure 9-Most of the students make their drinking choice based on taste ($P < 0.001$)

The students were then asked what they think is the main factor when other people choose what to drink. The result, listed in Table 21, shows that most students think that other people make their choice based on taste. None of the students thinks that other people are basing their choice on calorie content of the drink.

Table 21- 70% of the students think that other people make their drinking choice based on taste (P<0.001)

Factor	Percent
Price	25%
Taste	70%
Calorie content	0%
Serving size	4%
Other	1.5%

6.7 CALORIE AWARENESS WHEN OUT DRINKING

As seen in Figure 10, most students (66%) do not pay attention to their calorie intake when they are out drinking. There was an additional 22% who claims they never pay attention to their calorie intake. 12% pay attention to their calorie intake when they are out drinking.

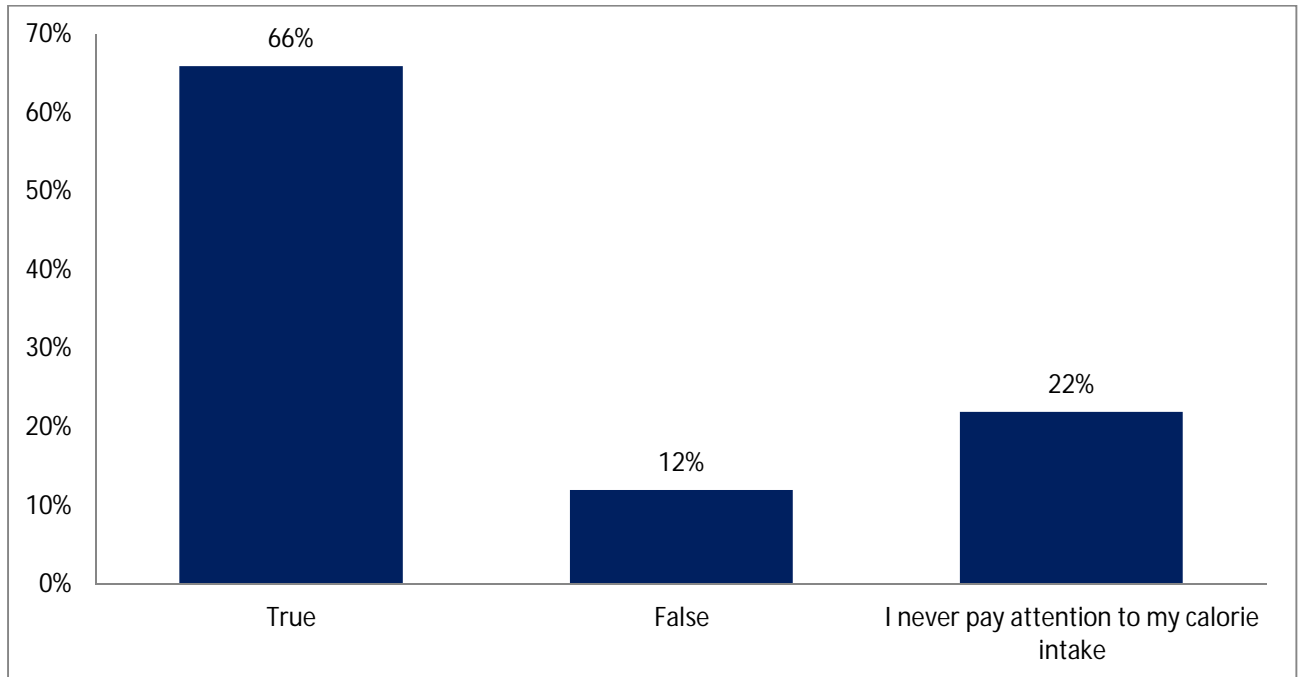


Figure 10 – 88% percent of students does not pay attention to their energy intake when they are out drinking ($P < 0.001$)

Presented with the statement "When drinking alcohol, I tend to snack more" 68% agreed, as shown in Table 22.

Table 22 - Students tend to snack more when they are drinking alcohol ($P < 0.001$)

True	68%
False	32%

As shown in Table 23, 17% of the students eat less food on days they drink alcohol. 72% eats the same amount or more food on days they consume alcohol, while 11% do not know.

Table 23 – Most students do not eat less on days they drink alcohol ($P < 0.001$)

Yes	17%
No	72%
I don't know	11%

6.8 NUTRITION FACT LABELS

The students were asked if they read the nutrition fact labels on grocery items. Their answers are shown in Figure 11. Only 10% claimed that they never read this kind of information. 10% said that they almost always read the nutrition fact labels.

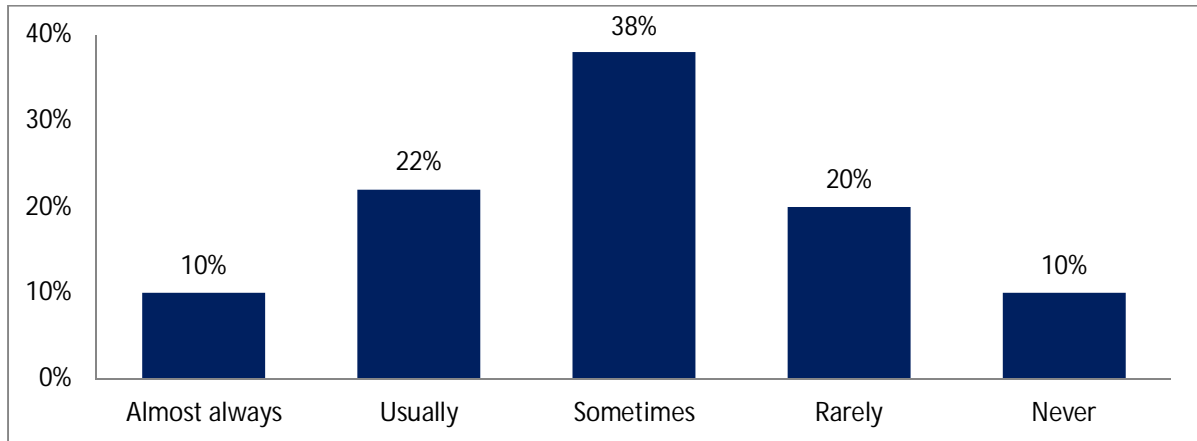


Figure 11 – Most students read the nutrition fact labels on grocery items sometimes ($P < 0.001$)

When looking at the students answering that they are very concerned about gaining weight, 60% said that they usually or almost always read the nutrition fact labels on grocery items.

Answers to the question “How often do you read about the nutritional value of food and/or drinks in, for example, magazines and internet?” are shown in Figure 12. 14% says they never read about nutritional value of food and drinks, while 41% does it a few times a year. As seen in the figure no one claims to read about nutrition daily, but 17% does it weekly.

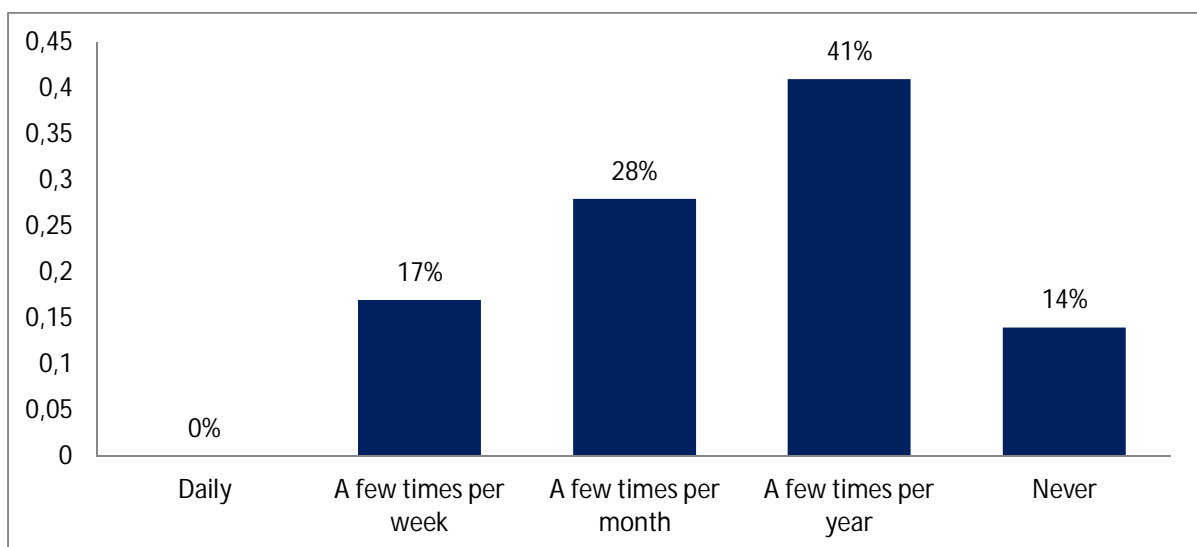


Figure 12 – Most students read about nutritional value of food a few times per year ($P < 0.001$)

The students were asked how useful the information on labels with calorie content on beer, wine and other alcohol-containing drinks would be for their drinking choice. Half of the students meant that this information would be somewhat or very useful, as shown in Figure 13. Students answering “other” were not taken into account when analyzing the results.

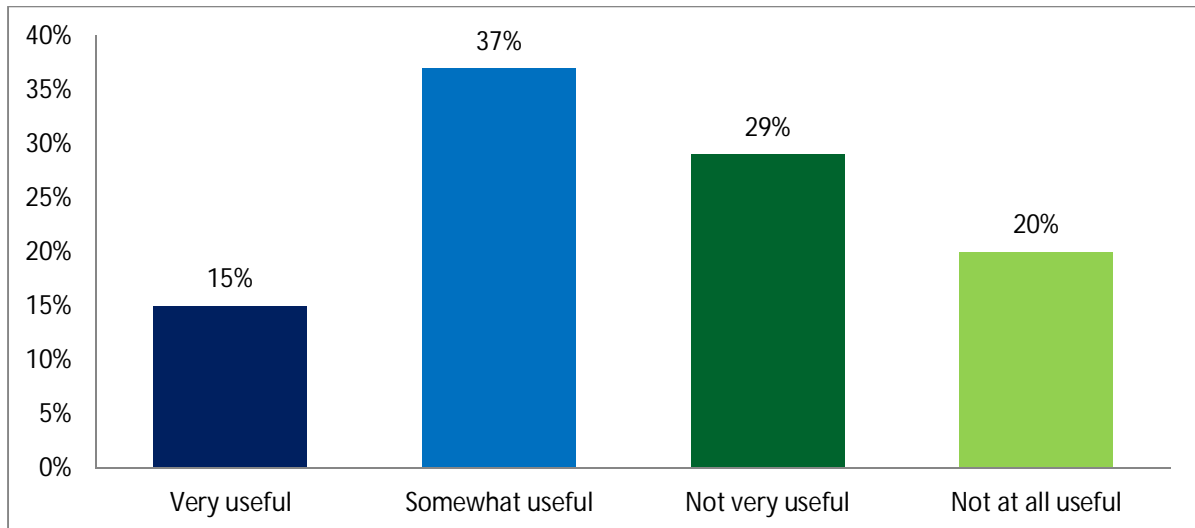


Figure 13- Labels with calorie content will be somewhat useful to most students drinking choice ($P < 0.001$)

In Figure 14 the students are grouped based on gender. It shows that there is a gender difference when it comes to how calorie information on alcohol-containing drinks is perceived.

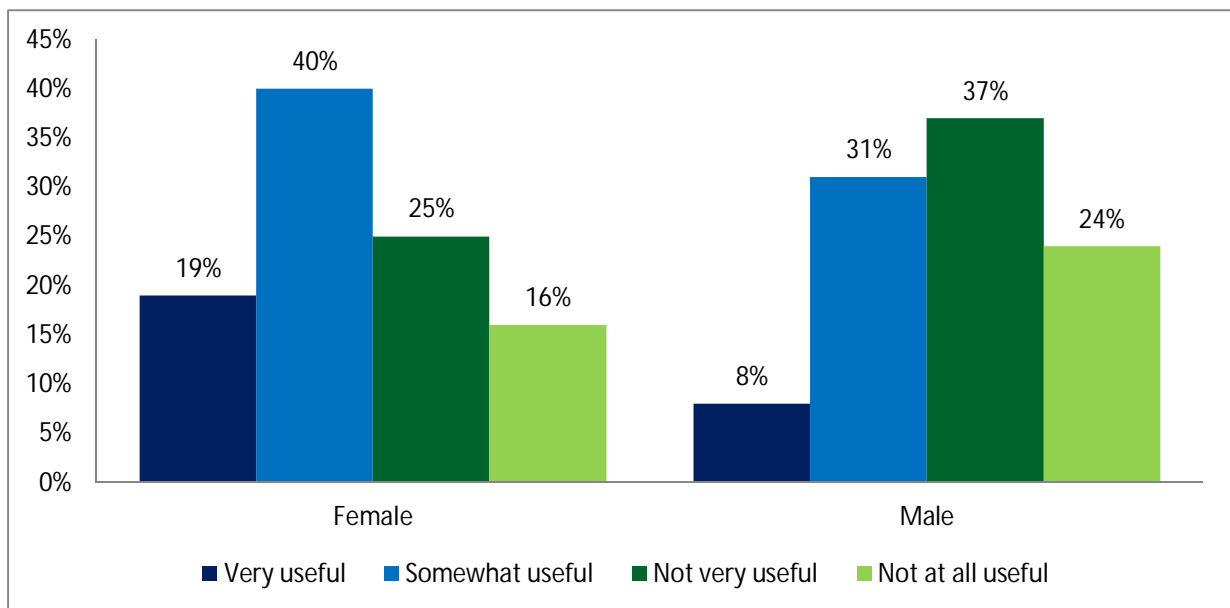


Figure 14 – To 59% of female students labels with calorie content on beer, wine and other alcohol-containing drinks would be very or somewhat useful. Most male students found such information not very useful.

The students were grouped based on how well they answered the nutritional knowledge questions. The students that had all or almost all questions right in a group called “Good nutritional knowledge” (n=12), the students that had the most wrong answers in a group called “poor nutritional knowledge” (n=22), and the rest (n=99) in the group “average nutritional knowledge”. Figure 15 shows how calorie information labels are perceived different in the different groups.

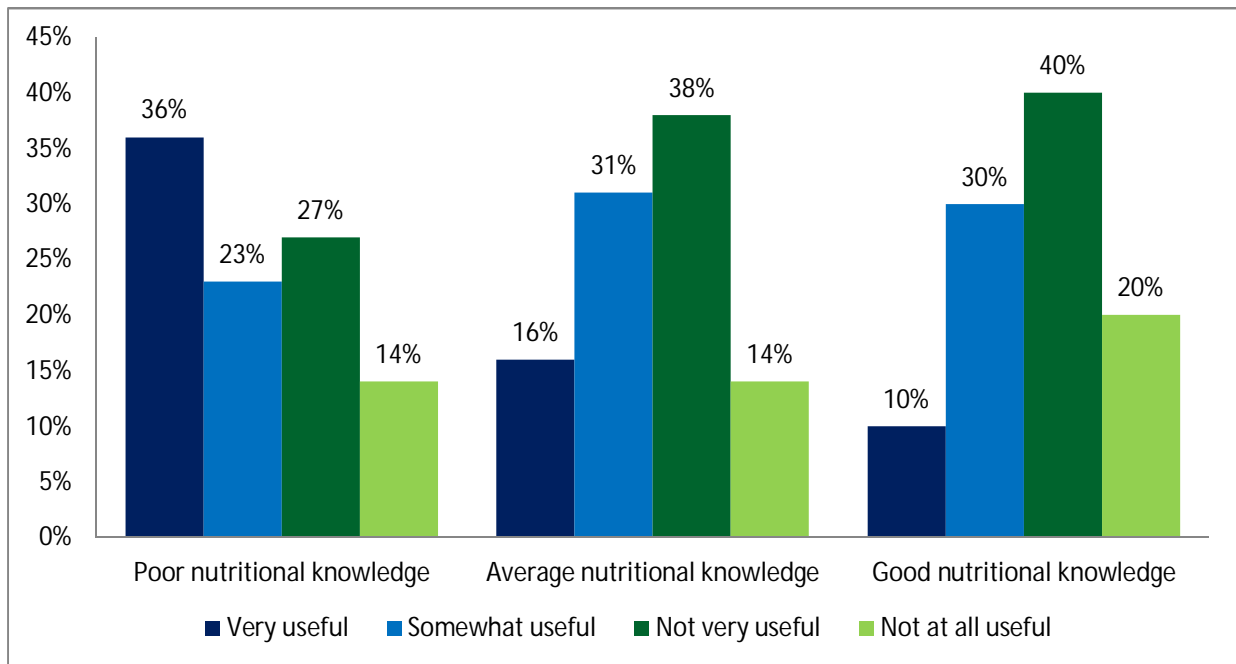


Figure 15 – Students with poor nutritional knowledge found the information on labels with calorie content on beer, wine and other alcohol-containing drinks more useful than students with average or good nutritional knowledge (p<0.05)

The students were asked about their opinions when it comes to labels with calorie content on bottles and menus. As seen in Table 24, 22% is under the impression that labels with calorie contents would lead to a reduced consumption of alcohol-containing beverages. A large group of student does not have an opinion on whether labeling would have an effect on alcohol consumption. 65% believe that labels with calorie content will make more people choose calorie reduced drinks.

Question	Yes	No	I don't know
In your opinion, will labels with calorie content lead to less consumption of alcohol containing beverages?	22%	51%	27%
In your opinion, will labels with calorie content make more people choose calorie reduced drinks?	65%	17%	18%

Table 24 – Labeling with calorie content will more likely change what people drink (P<0.001) than make them drink less (P<0.005).

Price and taste are more important factors than calorie content to the students. They were asked to choose between basing their choice on calories and price, and between low calorie and better in taste. The results are shown in Tables 25 and 26.

Table 25 – Price is more important than calories to the students ($P < 0.001$)

If you were in a restaurant or bar which had calories posted on the menu board next to the price for each item, would you be more likely to decide based on the price or to the calories?	
Pay attention to the price	71%
Pay attention to the calories	29%

Table 26

– Taste is more important than calories to the students ($P < 0.001$)

Could you choose a low calorie option of a given food or drink when you know the taste would not be like the standard meal/drink?	
Yes, could choose a low calorie option	31%
No, taste is more important to me when choosing what to eat/drink	69%

7. DISCUSSION QUANTITATIVE PART

Half of the students were concerned about gaining weight, and the majority of those working out on a regular basis said that losing or maintaining body weight was one of their motivation factors. Three quarters of the students claim to be knowledgeable about nutrition, and the nutritional knowledge questions are mainly answered correctly. When it comes to calories in alcohol-containing drinks however, the students showed little interest. They had generally little knowledge on the subject, and the majority claims that when out drinking, they do not care about the calorie content of alcohol-containing drinks.

When asked about their calorie intake on a normal day, 25% of the students chose not to answer the question. It seemed they had no idea about their calorie intake. Of those who answered, 60% estimated their calorie intake to be between 2000 kcal and 3000 kcal. The students who answered seemed to have a good idea about the number of calories they ate a day. It corresponds well with the results from the interviews; the ones answering the question seem to have a good idea of daily caloric requirements. In the bar 30% of the students had no idea about their recommended intake.

Although most of the students seemed to have a good indication of their daily caloric requirements and intake, they did not know much about calories in alcohol-containing drinks. Fewer than 10% of the students could identify the calorie content of a bottle of beer and 73% falsely stated that a small bottle of beer has more calories than a small wine glass.

When asked about their calorie intake on a day with consumption of alcohol, only a few students had an answer between 2000 kcal and 3000 kcal. The increase in number of students having an answer over 3000 kcal compared to a normal day, shows that the students do acknowledge that alcohol consumption leads to an increase in calorie intake. The increase in number of students giving an answer less than 2000 kcal gives the impression that the students misread the question to being calories from alcohol. That almost 30% gave an answer under 1000 kcal, compared to 0% when asking about a normal day, confirms this. When the students presented with menu 3 in the bar were asked how many calories they had consumed the day of the interview 78% answered that they had no idea. This again, confirms that the students have little knowledge of calorie content in alcohol-containing drinks and how it increases their total calorie intake, even though most of them are savvy on daily requirements and general nutritional knowledge. This is surprising considering their interest in not gaining weight. The assumption that consumers had little knowledge on calories in alcohol-containing beverages must be considered to be right.

A study by Klaus G. Grunert et al. (n=2940) aimed to measure UK consumers' level of nutrition knowledge. It showed that most respondents answer correctly when it comes to questions about expert recommendations, but ranking food items after calorie content was more difficult. The biggest mistake the respondents did was overestimating the calorie content for wine and beer [20]. This corresponds well with the finding in the current study.

Taking the students lack of knowledge into account, it is surprising that most of the students still state that they relate drinking to overweight. That 85% considers alcohol drinks to be fattening raises the question “is their lack of knowledge more related to them not wanting to know?” It seems they are satisfied with just knowing alcohol-containing beverages contains calories and is a factor that can contribute to weight gain, and not interested in the exact number of calories.

One could argue that as long as the consumers know that their daily calorie intake will increase when drinking alcohol, and that the calorie content of alcohol-containing drinks is high, their knowledge is good enough to change drinking behavior. On the other hand, lack of knowledge, and especially the different calorie content of drinks make them unable to choose a lower calorie option when drinking.

Since almost all students (94%) claim it is somewhat or very important to them to eat healthy, and half of them are concerned about gaining weight, it is difficult to understand why they do not acquire this information on their own.

The attitude of the majority of students is to not pay attention to calorie intake while out drinking. This can explain why that the students does not want to know, or is not interested in knowing the calorie content of drinks. Many of the students also agree that they snack more when they drink and that they do not eat less during a day when they intend to drink alcohol, which contributes to an even greater increase of calorie intake on days the students drink alcohol.

There were as many students concerned about gaining weight as there were students feeling that they do not know enough about their daily caloric requirements to make reduced calorie choices when they choose what to eat and drink. This indicates that, although the majority of students are not interested in knowing the calorie content on what they are about to drink, information about calorie content will be valuable to some of them.

When asked about sugar intake, both students at home and in the bar mostly answered that they try to keep it down. There is a slight difference in the percentages; more of the students in the bar said they did not try to keep their sugar intake down. This shows that the sugar intake awareness when out drinking might be reduced. Keeping in mind the limited interest in calories when out drinking, this is no surprise.

The preference for non-alcoholic drinks does not differ between the students that are out drinking and the students answering the online questionnaire. Only a few students prefer diet soda and nearly as few students would choose calorie reduced beer in the bar. The slightly higher number of students choosing diet soda than calorie reduced beer can be explained by the statement “When I am out drinking, I do not pay attention to my calorie intake” observed during the interviews in the qualitative part and confirmed by the vast majority in the quantitative part.

Taste is the main factor determining the students drinking choice. In the qualitative part of this current research the beers all had the same taste to give the students as few choices as possible, to determine the role of calorie content as a factor when choosing. Almost all students participating in the quantitative part of this research reports taste as their main factor when choosing what to drink. Calorie content as a main factor was the second largest, but the number of students is negligible compared to the large number that prioritized taste.

When considering what factors are important to other people, none of the students estimate that calorie content is a priority, which seems right, taken results from this study into consideration. More students think other people base their drinking choice on price than there are students actually basing their drink choice on price. This correspond also with what the students answered when they had to choose either to base their choice on calories or on price, and either on calories or on taste. The number of students basing their choice on calories is similar in both results; presumably they are the same students. That the number is slightly higher than when the students were asked to rank the factors is natural, as there are fewer options available for the students to choose from.

It cannot be expected that consumers will acquire information about calories in alcohol themselves, as most students only read about nutritional value of food and/or drinks a few times per year in magazines and internet, so labeling bottles and menus with calorie content could be a way of getting them more informed. Some of the results show that labels with calorie content could make more people choose calorie reduced drinks.

Since 30 percent rarely or never read the nutrition fact labels on food products, a large number of the population will not notice if alcohol-containing beverages display calorie content, unless it is presented in an easier way. Thorndike did a study where food items in a large hospital cafeteria were labeled with colors. The healthiest items were green, less healthy items were yellow, and the items with little or no nutritional value were red. The project led to an increase in sales of green items and decrease in sales of red items [21]. This indicates that showing consumers nutritional information in an easy, understandable way increases intake of more healthy choices. Most students in this current research claim to always or sometimes read nutrition labels. In conclusion, displaying calorie content in menus and on bottles may be a good idea, provided the information is easy to understand.

That most of the students overestimated the calories in beer is an indicator that labeling with calorie content may *not* be beneficial in terms of making consumers drink less or drinks with less calories. As discussed by My Bui et al, it will not be desirable to label drinks with calorie content if the number of calories listed is lower than what the consumers thought beforehand, as it can lead to increased consumption intentions [12]. When over 60% of the students in this study overestimated the calorie content of a bottle of beer, this is something that must be taken into consideration in the labeling discussion. It is not beneficial if the information labels instead of leading to an awareness of the large amount of calories in drinks, leads to increased consumption, since the calorie content is not as high as anticipated.

The effect of calorie information labels also depends on whether or not consumers want it. According to the students in this research, calorie information on labels on beer, wine and other alcohol-containing drinks would be somewhat useful to most of them. The group of females had a higher number of students answering that such labeling would be very useful and somewhat useful than male students, who mostly answered such labeling would be not very useful to their drinking choice.

Grouping the respondents after nutritional knowledge shows that there is the students with poor nutritional knowledge who would find this information most useful. 59 percent of the ones with poor nutritional knowledge say this information would be very or somewhat useful to their drinking choice compared to 40 percent in the group with good nutritional knowledge. This is similar to findings by Ellison et al, who studied the effects of calorie labels [22]. They found that calorie labels have the greatest impact on those who are least health conscious. That is another argument why the calories should be listed in a context, such as relative to daily requirement, keyhole or color coded. The least health conscious consumers will be more likely *not* to find calories listed as just a number useful, and will need the information to be given in an easier, understandable way. Ellison's study also revealed that, using a symbolic calorie label also reduced calorie intake of the most health conscious consumers.

That 22 percent think labeling would lead to a reduced consumption on alcohol and 65% think labels with calorie content would make more people choose calorie reduced drinks is promising with regard to such a system. Research has showed that consumers are actually willing to pay more for a product when the packaging has nutritional information on it [23]. The study was done with a box of cookies; if this also applies to alcohol containing beverages is not yet known.

The main findings in this study are contrary to a study by van Kleef, with focus groups in four countries. That study showed that calories are well-understood and that participants were generally positive about front-of-pack labels with calorie content. The participants were not as positive to labels with references to daily intake [24].

There might be a greater consensus to mark bottles in supermarkets with calorie information compared to menus in restaurants and bars. In April 2013 a leading Norwegian newspaper wrote about a suggestion from Jonas Gahr Støre, The Minister of Health and Care Services. He purposed listing calorie contents of meals in Norwegian restaurants. The internet article got 165 comments from consumers, most of them being negative to the suggestion [25]. That most of the students do not care about calories when they are out drinking points towards little effect of having calorie content in bar menus. This is also supported by part one this current research, where listing calories had no effect on making students chose smaller size and/or calorie-reduced beer.

Støre refers to New York, where calories have been listed in menus since 2008 [19] when suggesting this. Although some research shows that the listing of calories might have had an effect, overall consumption hardly changed in New York after the law was introduced, and only one in six claims to use the calorie information. This again points toward given the information in another way than just numbers. Color coded like in Thorndike's research, or as minutes of exercise, like in this study are two possible ways to give this information in an understandable way to most consumers.

Displaying the amount of exercise needed to burn calories from drinks in menus can make people consume less. Similar effects can be seen for food, as mentioned in the discussion of the qualitative results, and presented at the Experimental Biology 2013 meeting in Boston suggests [19]. In that study, like the current, three groups were provided with different menus. The group given information about exercise ordered and ate less calorific food than the two other groups. This was the first study to look at the effects of displaying exercise needed to burn calories from food.

Part one of the current study showed that listing not only calorie content, but how the students can burn them off, led to a bigger number choosing calorie reduced beer. That 45 percent meant it could make them drink less, choose different drinks or both, with an additional 26 percent saying "maybe" shows again that the students are more inclined to change behavior when the calories are related to something, like minutes of work out.

In conclusion, this research has identified that listing calories in menus could have an effect on what students choose to drink, but more so when how to burn the calories is displayed. Although most students do not think about calories when they are out drinking, seeing this in a menu could make them drink less or chose different drinks. Labeling with only calories could also lead to increased consumption intention, since calories in drinks seem to be easy to overestimate when guessing. More research must therefore be done before concluding that labels with calories will lead to decreased consumption, also with other age groups and nutritional knowledge levels. The study highlighted taste as the main factor when students chose what to drink and that although students see drinking of alcohol as a contributor to overweight it is not clear that they want to change drinking behavior to avoid weight gain.

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APPENDIX 1

-MENU-

0.5l Hansa Pilsner	54Kr
0.5l Hansa Pilsner Lite	54Kr
0.4l Hansa Pilsner	43Kr
0.4l Hansa Pilsner Lite	43Kr

-MENU-

0.5l Hansa Pilsner 205Kcal 54Kr

0.5l Hansa Pilsner Lite 140Kcal 54Kr

0.4l Hansa Pilsner 164Kcal 43Kr

0.4l Hansa Pilsner Lite 112Kcal 43Kr

-MENU-

0.5l Hansa Pilsner 205Kcal 54Kr

To burn of the calories from this beer you would have to run or swim for 18 minutes or walk fast for 46 minutes.

0.5l Hansa Pilsner Lite 140Kcal 54Kr

To burn of the calories from this beer you would have to run or swim for 12 minutes or walk fast for 31 minutes.

0.4l Hansa Pilsner 164Kcal 43Kr

To burn of the calories from this beer you would have to run or swim for 14 minutes or walk fast for 37 minutes.

0.4l Hansa Pilsner Lite 112Kcal 43Kr

To burn of the calories from this beer you would have to run or swim for 10 minutes or walk fast for 25 minutes.

APPENDIX 2

1. Age

Age	19	20	21	22	23	24	25	26	27	28	29	30	31	34	36
Number of students	5	19	16	27	19	17	12	4	6	1	1	2	2	1	1

2. Gender

Female	81
Male	51

3. Study (include institute and what year you are in)

Dept. of Animal and Aqua cultural Sciences	9
Dept. of Chemistry, Biotechnology and Food Science	21
Dept. of International Environment and Development studies	1
UMB School of Economics and Business	10
Dept. of Ecology and Natural Resource Management	18
Dept. of Landscape Architecture and Spatial Planning	30
Dept. of Mathematical Sciences and Technology	31
Dept. of Plant and Environmental Sciences	13

4. Country of birth

Norway	127
USA	1
Ukraine	1
France	1
Denmark	1
Australia	1
Hong Kong	1

5. Hometown/commune

-

6. Do you consider yourself to be knowledgeable about nutrition?

Yes	100
No	32

7. Do you think health experts recommend that people should be eating more, the same amount, or less of these foods? (Tick one box per food)

	More	Same	Less	Not sure
Vegetables	132	0	0	1
Sugary foods	1	1	131	0
Meat	4	49	74	5
Starchy foods	5	33	58	36
Fatty foods	4	10	115	3
High fiber foods	104	23	2	3
Fruit	118	15	0	0
Salty foods	0	9	123	0

8. Do you think these foods/drinks are high or low in added sugar? (Tick one box per food)

	High	Low	Not sure
Bananas	27	105	0
Unflavored yoghurt	44	75	14
Ice-cream	132	0	1
Orange juice	74	55	3
Tomato ketchup	120	8	3
Tinned fruit in natural juice	59	46	27

9. Which one of the following has the most calories for the same weight? (Tick one)

Sugar	54
Starchy foods	8
Fiber	2
Fat	59
Not sure	10

10. Do you think the following helps reduce the chances of getting certain kinds of cancer? (Answer each one)

Eating more fiber	72	33	27
Eating less sugar	92	23	17
Eating less fruit	1	123	8
Eating less salt	81	30	21
Eating more fruit and vegetables	109	16	8
Eating less preservatives/additives	99	11	21

11. Do you think the following can help prevent heart disease? (Answer each one)

	Yes	No	Not sure
Eating more fiber	72	35	24
Eating less saturated fat	121	3	8
Eating less salt	119	6	7
Eating more fruit and vegetables	112	12	8
Eating less preservatives/additives	83	19	28

12. Are you currently on a special diet, such as food allergy, low carb, vegetarian?

Yes	9
No	124

13. Please specify

Vegetarian	2 students
Gluten free diet	2 students
Trying to stay away from rice, bread, potatoes and pasta	1 student
Allergy for certain vegetables, such as tomato	1 student
Allergic to wheat and milk.	1 student
Lactose intolerant	1 student
allergy: wheat, milk, nuts	1 student

14. How important is it to you to eat healthy?

Very important	29
Somewhat important	96
Not that important	7
Not at all important	1

15. What does "healthy eating" mean to you? (Possible to choose multiple answers)

Low calorie	28
Low carbohydrate	20
Low fat	41
Low sodium	22
Whole grain	66
Eating fresh	81
Well-balanced	119
Organic foods	23
Natural foods	74
Other	5

16. When I'm buying a soft drink I usually choose a diet drink

True	31
False	90
Other	11

17. I try to keep my overall sugar intake down

True	108
False	17
Other	8

18. On a typical day, how many calories do you think that you are consuming?

No idea	under 2000	2000-3000	over 3000	other
24	14	57	24	7

19. How concerned are you about gaining weight?

Very concerned	15
Somewhat concerned	56
Not very concerned	47
Not at all concerned	15

20. Do you read the nutrition fact labels on grocery items?

Almost always	13
Usually	29
Sometimes	51
Rarely	27
Never	13

21. How often do you read about the nutritional value of food and/or drinks in, for example, magazines and internet?

Daily	0
A few times per week	23
A few times per month	37
A few times per year	54
Never	19

22. How often do you work out?

Never	8
0-2 times a week	66
3 or more times a week	59

23. If you do work out, is losing or maintaining body weight one of the motivation factors?

Yes	77
No	48
I do not work out	8

24. Do you consider alcohol-containing drinks to be fattening?

Yes	112
No	20

25. Range the following drinks from low to high calorie content using the numbers 1-6. 1 having the highest content, 6 the lowest:

Café latte	406
Red wine	473
Cola light	478
Vodka	501
Orange juice	496
Beer	418

26. Thinking about moderately active men, what do you think is the recommended daily number of calories? Moderate physical activity includes exercises such as fast walking or bicycling for about 30 minutes each day.

Less than 1500 kcal	0
1500-2000 kcal	2
2000-2500 kcal	34
2500-3000 kcal	54
3000-3500 kcal	27
3500 kcal or more	3
I don't know	13
Other	0

27. Now, thinking about **moderately** active women, what do you think is the recommended daily number of calories?

Less than 1500 kcal	1
1500-2000 kcal	31
2000-2500 kcal	63
2500-3000 kcal	22
3000-3500 kcal	2
3500 kcal or more	0
I don't know	14
Other	0

28. Now, thinking about inactive adults, what do you think is the recommended daily number of calories? Inactivity is defined as sitting or remaining inactive for most of the day with little or no exercise at your job or during your leisure time.

Less than 1500 kcal	20
1500-2000 kcal	64
2000-2500 kcal	31
2500-3000 kcal	2
3000-3500 kcal	1
3500 kcal or more	0
I don't know	14
Other	1

29. How many calories do you think there is in a bottle of beer (0, 33 liter)?

20	5-120
11	125-140
81	150-1500
21	other/ do not know

30. Does a glass of red wine (0, 2 liter) contain the same amount of calories as a bottle of beer (0, 33 liter)?

Yes	17
No, the beer has more calories	97
No, the glass of wine has more calories	18

31. Have you had alcohol-containing drinks in the last 30 days?

No	13
Yes, 1-2 times	41
Yes, 3-5 times	45
Yes, more than 5 times	33

32. What will you drink on a typical night out? Mark with number of units

Beer 0,33l	37
Beer 0.5l	60
Cider 0.5l	17
Cider, sugar reduced 0.5l	1
Glass of red wine (175 ml)	20
Bottle of red wine (750 ml)	13
Glass of white wine (175 ml)	11
Bottle of white wine (750 ml)	11
Drink (with 2cl spirits)	41
Shot (2cl)	28

33. On a day with consumption of alcohol, how many calories do you think that you are consuming?

no idea	under 2000	2000-3000	over 30000	other
13	48	17	42	5

34. Do you feel that you know enough about your daily caloric requirements to make reduced calorie choices when you choose what to eat and drink?

Yes, I know enough	54
No, I do not know enough	70
Other	9

35. If beer, wine and other alcohol-containing drinks were labelled with calorie content, how useful would that information be to your drinking choice?

Very useful	19
Somewhat useful	47
Not very useful	37
Not at all useful	25
Other	5

36. If you were in a restaurant or bar which had calories posted on the menu board next to the price for each item, would you be more likely to decide based on the price or to the calories?

Pay attention to the price	93
Pay attention to the calories	38

37. Could you choose a low calorie option of a given food or drink when you know the taste would not be like the standard meal/drink?

Yes, could choose a low calorie option	41
No, taste is more important to me when choosing what to eat/drink	90

38. What factors are more important to you when you choose what to drink? Range the following using the numbers 1-4. 1 having the highest importance to you, 4 the lowest

Price	296
Taste	204
Calorie content	390
Serving size	419

39. In your opinion, will labels with calorie content lead to less consumption of alcohol-containing beverages?

Yes	29
No	67
I don't know	35

40. In your opinion, will labels with calorie content make more people choose calorie reduced drinks?

Yes	87
No	22
I don't know	24

41. If you knew how much you would have to work out for each drink you had, could it make you choose different drinks or drink less?

Yes, drink less	14
Yes, choose drinks with a lower calorie content	27
Yes, both	21
Maybe	35
No	36

42. What do you think is the main factor when people choose what to drink?

Price	33
Taste	92
Calorie content	0
Serving size	5
Other	2

43. Do you eat less food on days that you drink alcohol?

Yes	22
No	95
I don't know	15

44. When drinking alcohol, I tend to snack more

True	88
False	42

45. When I am out drinking, I do not pay attention to my calorie intake

True	86
False	15
I never pay attention to my calorie intake	29