

# Beliefs and Concerns about Dairy Products in the Swiss Older Adult Population

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## Abstract

Various studies have shown that the public is aware of the importance of milk and milk products in human nutrition. Even so, older adults still do not consume the recommended amount of dairy products. This study aimed to evaluate the knowledge of older adults (50-81 years) about the nutritional value of dairy products as well as their beliefs about these products. The most common concerns about milk and dairy products were added sugar (60%), cheese substitute (55%), and artificial aroma (55%). A majority of respondents rated milk as a good supplier of calcium, believed that consumption of dairy products improves bone health in older age, and also believed that it is better to drink milk than to consume calcium supplements. On the other hand, iron, vitamin C, and vitamin D content were often overestimated. The majority of older adults also stated that milk contains a lot of fat and believed that consumption of full-fat dairy products increases body weight and adversely affects cholesterol level.

**Keywords:** Dairy products; Older adults; Concerns; Beliefs

## Introduction

Food studies generally indicate that health and nutritional value are among the most influential motives for the consumption of food products [1-3]. However, healthy eating is not understood or interpreted in the same way by all consumers. Factors that influence evaluation of the healthfulness of food vary from the very specific (like fat content or sodium content) to the more general (such as naturalness or freshness) [2]. These judgments are based on belief, which means that consumers may not actually experience healthful qualities directly, so increasing the importance of consumer attitudes in whether products are accepted or rejected [4,5]. One study in Switzerland has indicated that misconceptions about healthy eating exist in the general population, and these misconceptions are associated with decreased consumption of foods usually defined as healthy [6]. Separate studies in several countries have shown that the public is aware of the importance of milk and milk products, especially for their calcium content and positive effects on bone health [5,7-9]. Nevertheless, a range of studies around the world have shown that most people still do not meet the recommendations for dairy consumption [9-12]. This may be explained by negative health beliefs about the presumed high fat content of whole milk, and its relation to allergies, intolerances, or mucus [7,9]. The cost of dairy products may also be a contributing factor [9]. Finally, the importance of taste should not be underestimated [1,4].

Europe's population is ageing rapidly and a number of investigations have shown that age influences perceptions of the healthfulness of foods. Older age seems to increase health-related concerns and a willingness to try functional food [13-15]. On the other hand, a negative relationship has been found between age and nutritional knowledge in many European countries [6,16]. Additionally, new evidence about nutritional value that is incongruent with earlier findings may not be widely accepted, leading to confusion. It is therefore important to understand the motives of older adults for not consuming dairy, as well as their level of nutritional knowledge, to be better able to provide missing information or to correct prejudices about perceived negative effects of dairy products.

The aims of the present study are to establish what older Swiss people (50-81 years old) know about dairy products as part of a healthy

diet, and to try to account for some prejudices that may impact on their dairy consumption.

## Methods

### Respondents

Through a telephone recruiting interview conducted by LINK Institute (Lucerne, Switzerland), 726 Swiss participants were selected according to age and language region (German=50%, French=30%, Italian=20%). For statistical reasons, the proportion of Italian-speaking participants was deliberately over-represented. The target group was consumers aged between 50 and 81 years who were not living in a nursing home.

### Questionnaire

Data from the questionnaire (online or in written form), entitled Nutrition Survey for the Generation 50+ living in Switzerland, were collected in October and November of 2012. Respondents were asked about their usual dairy intake and their knowledge about these products. Description of study design and detailed results for dairy consumption habits are published elsewhere [17]. The present paper focuses on knowledge of the nutritional value of dairy products and concerns about these products.

Respondents' concerns about the content of fat, lactose, protein, artificial aromas, sugar, microorganisms and salt in milk and dairy products, along with their concerns about protein allergy and cheese substitute were measured on a 5-point scale, ranging from "not concerned at all" to "very concerned".

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One question measured respondents' knowledge about the content of nine nutrients (fat, lactose, protein, vitamin C, vitamin D, vitamin B12, total minerals, iron, calcium, phosphor, magnesium) in milk. A 6-point scale was proposed: "contains very little"/"contains little"/"neither"/"contains much"/"contains a lot" or "I do not know".

Further, respondents were questioned about the following specific statements about milk and dairy products using a 6-point scale ranging from "do not agree at all" to "do totally agree" and "I do not know": "Dairy are good value for money"; "It is better to drink milk than to swallow calcium complements"; "There are too many different types of milk on the market"; Dairy products help to keep strong bones during ageing"; "High consumption of dairy products increases bodyweight"; "Milk and dairy cause mucus production"; and "Full-fat dairy products cause an impaired cholesterol level".

Explanatory variables included socio-demographic categories such as gender as well as continuous variables like age, education level, height, and weight.

### Data analysis

Questionnaires were analyzed using Systat® Version 13.0, (Systat Software Inc., Richmond, CA, USA), and descriptive analyses were used to describe the dependent variables.

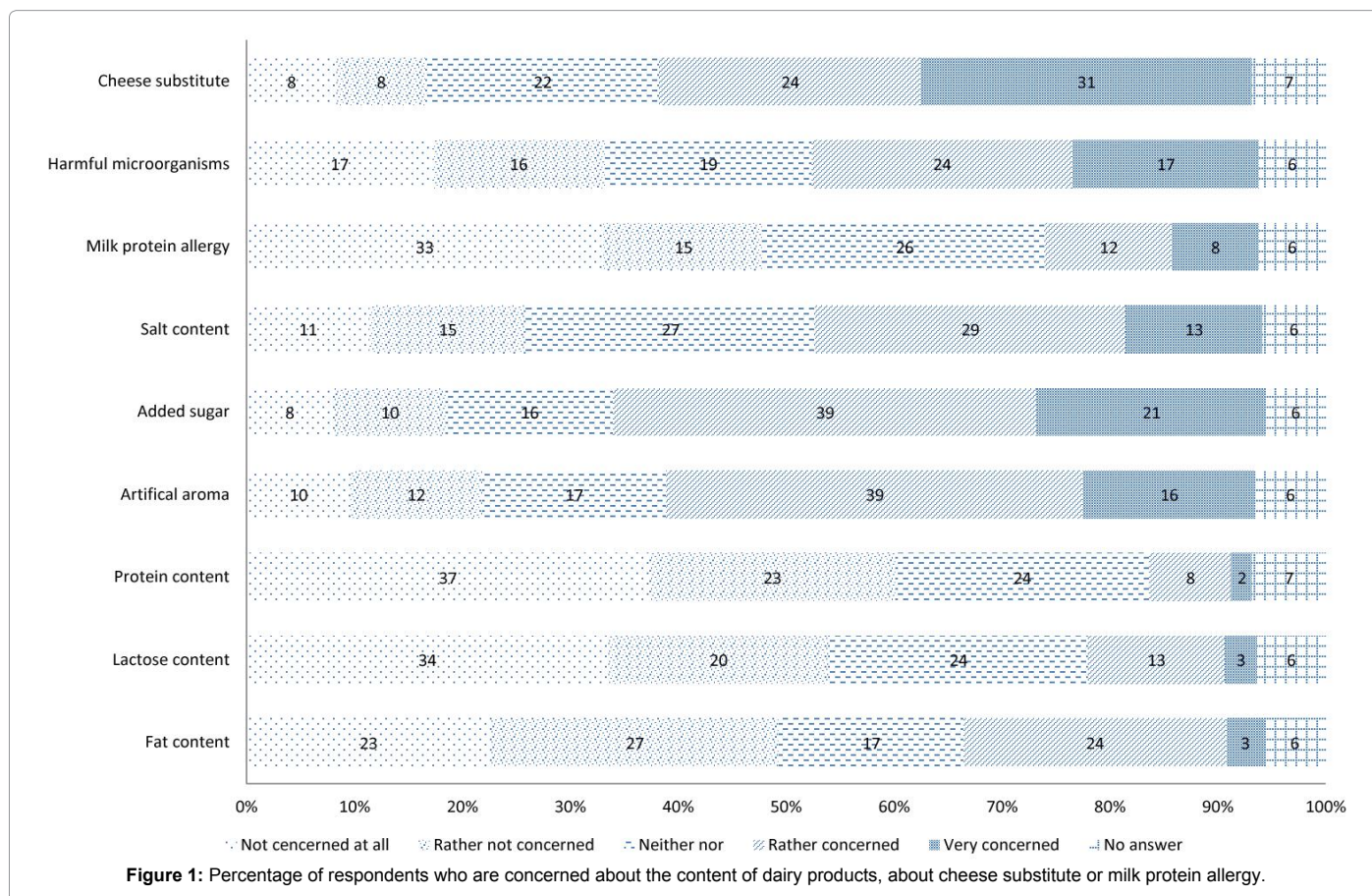
Differences ( $P < 0.05$ ) were analyzed using the Kruskal-Wallis Test, and pairwise comparisons were conducted using the Conover-Inman Test to detect significant differences between gender, spoken language (French, German, Italian), education level (low, medium, high), BMI

( $\leq 25$  or  $> 25$ ) and age (50-59, 60-69 and 70-81 years). Body mass index (BMI) was calculated as the ratio between weight (kg) and height squared ( $m^2$ ). Statements were converted to numerical values, with the lowest statement ("not concerned at all" or "contains very little" or "I do not agree at all") corresponding to 1 and the highest statement ("very concerned" or "contains a lot" or "agree totally") corresponding to 5. "I do not know" and missing answers were not taken into account for these tests.

### Results

Of the 632 valid questionnaires returned, 51% were from women and 49% were from men. In terms of educational attainment, 13% of respondents reported low, 44% reported medium, and 37% reported a high level of education. The age distribution was as follows: 50-59=40%, 60-69=50%, and  $>70=10\%$ . Older Swiss adults on average consumed 2.6 portions of dairy products per day as reported in a previous publication [17].

A majority of respondents were concerned about added sugar (60%), cheese substitute (55%), artificial aroma (55%), salt content (42%), and microorganisms (42%) in milk and dairy products. Fat content was a concern for 28% of respondents, 20% were concerned about protein allergy, 16% about milk sugar content, and 10% about protein content (Figure 1). As shown in Table 1, women were more concerned than men about cheese substitute, sugar content, artificial aroma, salt content, and microorganisms, but they were less concerned than men about protein content. Italian-speaking respondents were more concerned about cheese substitute, microorganisms, fat, and

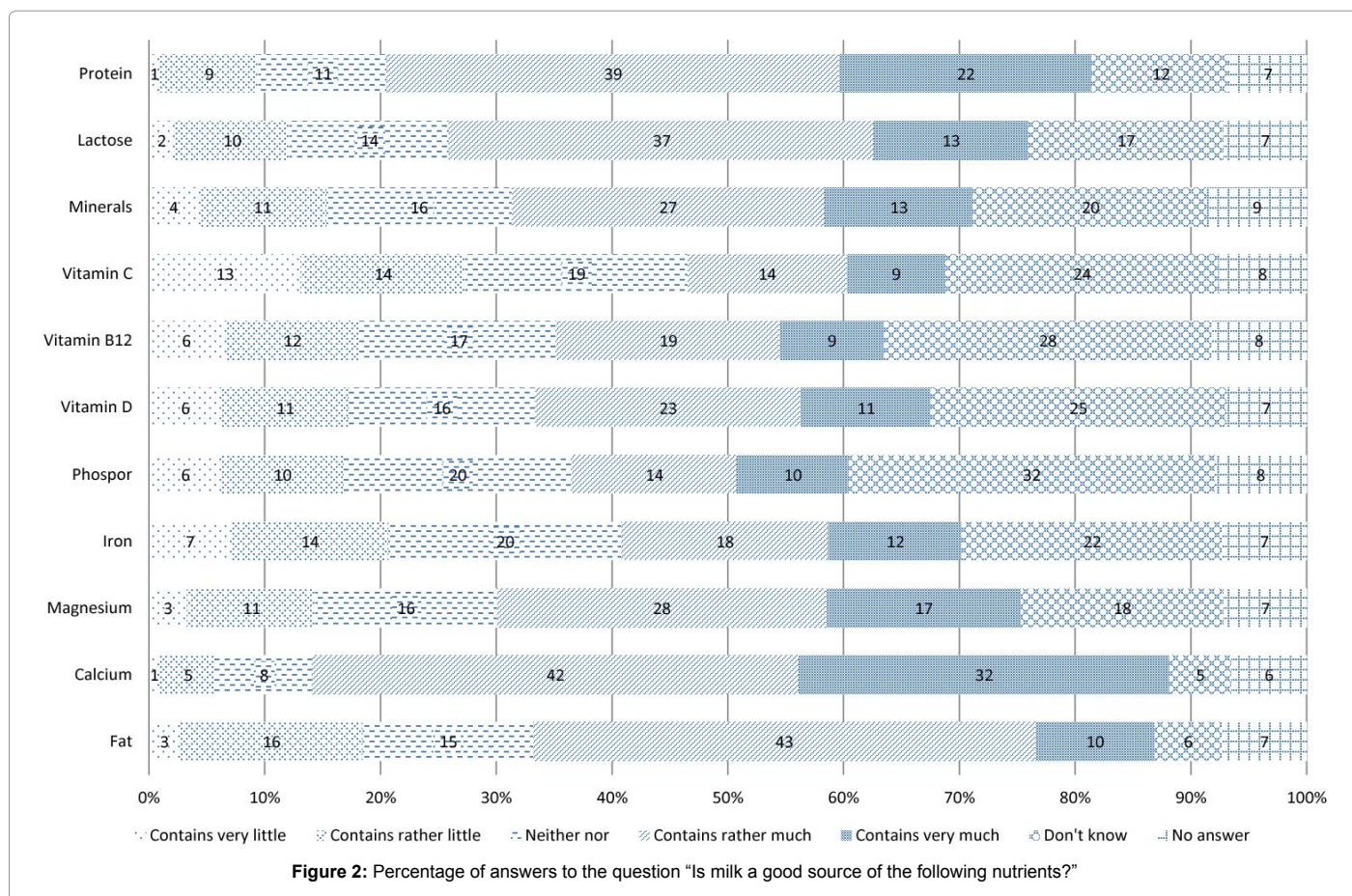




	Language						Gender			
	French		German		Italian		men		women	
Mean of concern about	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Fat content	2.70 <sup>b</sup>	1.20	2.39 <sup>a</sup>	1.17	2.86 <sup>c</sup>	1.28	2.57	1.23	2.57	1.20
Lactose content	2.49 <sup>b</sup>	1.20	2.17 <sup>a</sup>	1.11	2.15 <sup>a</sup>	1.27	2.29	1.16	2.24	1.18
Protein content	2.12 <sup>b</sup>	1.03	1.96 <sup>a</sup>	1.02	2.35 <sup>c</sup>	1.24	2.16 <sup>#</sup>	1.06	1.99	1.09
Artificial aroma	3.39	1.13	3.38	1.22	3.57	1.32	3.31	1.21	3.52 <sup>#</sup>	1.21
Sugar content	3.58	1.08	3.62	1.19	3.49	1.40	3.46	1.25	3.71 <sup>#</sup>	1.13
Salt content	3.38 <sup>b</sup>	1.10	2.96 <sup>a</sup>	1.19	3.44 <sup>b</sup>	1.30	3.03	1.25	3.33 <sup>#</sup>	1.15
Protein allergy	2.55	1.31	2.43	1.26	2.24	1.42	2.38	1.33	2.49	1.29
Microorganisms	3.13 <sup>b</sup>	1.33	2.86 <sup>a</sup>	1.35	3.67 <sup>c</sup>	1.38	2.96	1.42	3.22 <sup>#</sup>	1.32
Cheese substitute	3.41 <sup>a</sup>	1.21	3.60 <sup>b</sup>	1.30	4.22 <sup>c</sup>	1.11	3.49	1.32	3.81 <sup>#</sup>	1.19

1=not concerned at all; 3=neither concerned nor unconcerned; 5=very concerned  
<sup>a,b,c</sup> Mean values within a row with unlike superscript letters indicate significant (P<0.05) differences between languages,  
<sup>#</sup> Mean values are significantly (P<0.05) different between men and women

Table 1: Differences of concerns between French, German and Italian speaking respondents and between gender.



protein content than French- and German-speaking respondents, but less about lactose content than French-speaking respondents. German-speaking respondents were less concerned about salt content than those who were French or Italian speaking. Respondents with higher education levels were less concerned about milk protein allergies (low education Mean=2.77; medium education Mean=2.49; higher education Mean=2.28; P<0.05). Older people with a BMI less than 25 were less concerned about dairy fat (Mean=2.44) and dairy proteins (Mean=1.98) than respondents with a higher BMI (Mean=2.70 and 2.17, respectively; P<0.05).

The majority believed that dairy contains high or very high amounts of calcium (74%), and of protein (61%), fat (53%), and lactose (50%). Fewer expected dairy to be a good or very good provider of magnesium (45%), minerals (40%), vitamin D (34%), iron (29%), vitamin B12 (28%), phosphor (24%), or vitamin C (23%) as reported in Figure 2. In particular, Italian-speaking respondents indicated more often, and German-speaking less often, that dairy products are a good source of all these nutrients (P<0.01). Additionally, respondents with lower education levels more often believed that milk is a good source of vitamin C, iron, or fat (Table 2). With increasing age, more

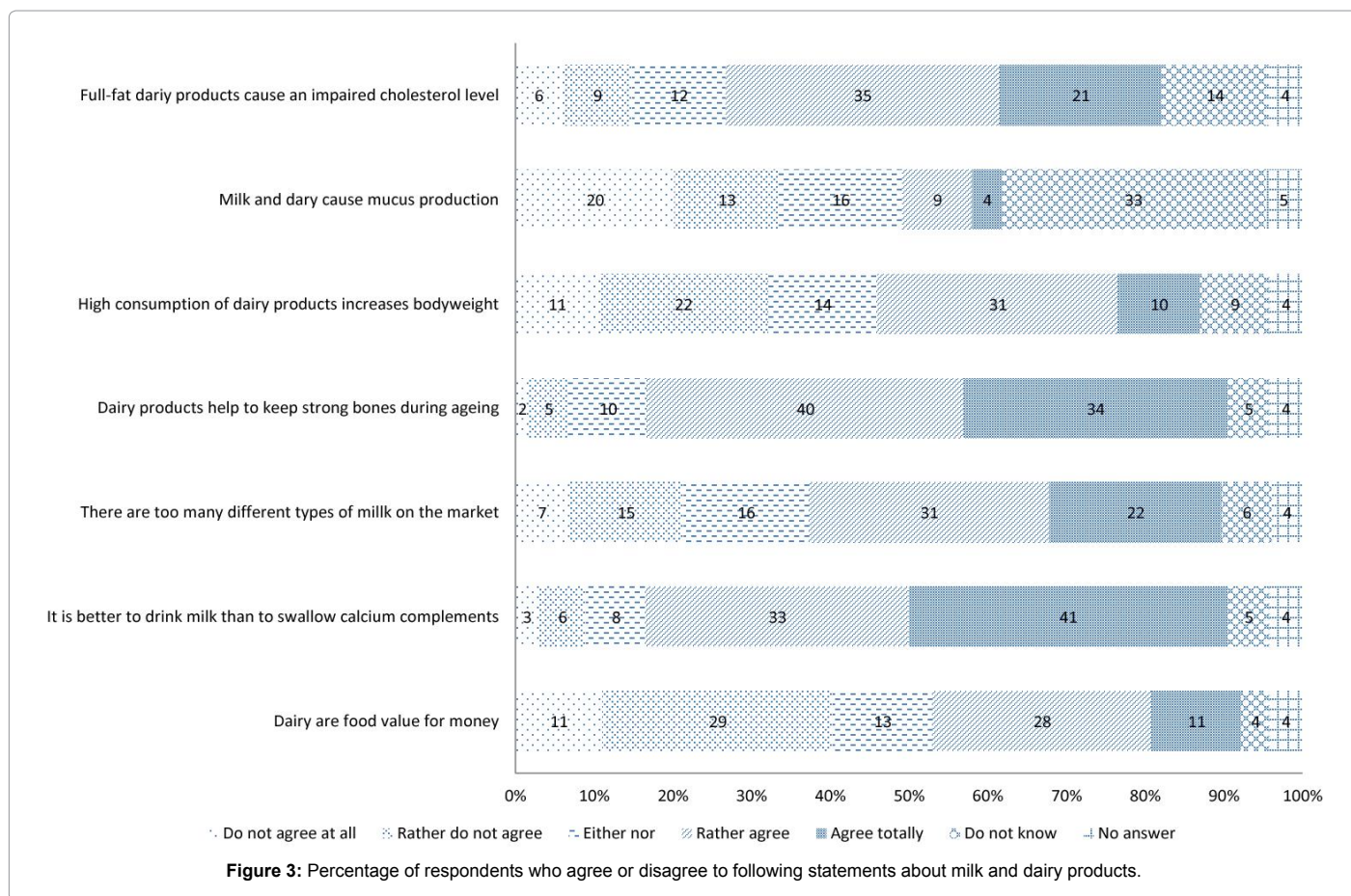
	Age						Level of education					
	50-59		60-69		70-81		Low		Medium		High	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Fat	3.20	0.99	3.46	1.04	3.52	1.04	3.80 <sup>y</sup>	0.96	3.36 <sup>x</sup>	1.05	3.54 <sup>x</sup>	0.99
Calcium	4.23 <sup>b</sup>	0.81	4.15 <sup>b</sup>	0.84	3.89 <sup>a</sup>	0.98	4.26	0.76	4.05	0.90	4.15	0.86
Magnesium	3.62	1.10	3.59	1.13	3.53	1.12	3.89	1.03	3.54	1.13	3.51	1.11
Iron	2.98 <sup>a</sup>	1.22	3.28 <sup>b</sup>	1.23	3.41 <sup>b</sup>	1.14	3.62 <sup>y</sup>	1.15	3.17 <sup>x</sup>	1.27	3.01 <sup>x</sup>	1.13
Phosphor	3.06	1.21	3.22	1.23	3.31	1.14	3.50	1.17	3.15	1.28	3.07	1.09
Vitamin D	3.27	1.23	3.37	1.24	3.34	1.09	3.65	1.19	3.25	1.28	3.24	1.10
Vitamin B12	3.13	1.20	3.26	1.25	3.22	1.12	3.53	1.21	3.17	1.30	3.11	1.06
Vitamin C	2.61 <sup>a</sup>	1.25	2.97 <sup>b</sup>	1.35	3.16 <sup>b</sup>	1.16	3.46 <sup>y</sup>	1.27	2.91 <sup>x</sup>	1.35	2.64 <sup>x</sup>	1.15
Minerals	3.46	1.13	3.49	1.14	3.46	1.13	3.73	1.10	3.43	1.23	3.41	1.03
Lactose	3.85 <sup>c</sup>	0.95	3.60 <sup>b</sup>	1.00	3.32 <sup>a</sup>	1.05	3.73	1.14	3.55	1.03	3.71	0.93
Protein	3.90	0.94	4.01	0.86	3.69	1.09	4.05	0.88	3.86	0.98	3.85	0.95

1=contains very little, 3=neither nor; 5=contains a lot; "I do not know" were not taken into account

<sup>a-c</sup>Mean values within a row with unlike superscript letters indicate significant (P<0.05) differences between age categories

<sup>x-z</sup>Mean values within a row with unlike superscript letters indicate significant (P<0.05) differences between level of education

**Table 2:** Mean values and standard deviations for the estimated nutrient's content of milk according to age or level of education.



respondents indicated that milk contains plenty of vitamin C or iron, while the opposite was observed for lactose and calcium content (Table 2). "Don't know" rates were higher for dairy products' content of phosphor (32%), vitamin B12 (28%), vitamin C (24%), iron (23%), and vitamin D (26%) than for fat (6%), calcium (5%), or proteins (12%) as reported in Figure 2.

As shown in Figure 3, about 74% of respondents agreed or

totally agreed that it is better to drink milk than to swallow calcium supplements, and that dairy products help to keep bones strong during ageing. Women (women Mean=4.19; men Mean=3.99; P<0.001) and older people without higher education agreed more with this statement (low education Mean=4.31; medium education Mean=4.07; higher education Mean=4.03; P<0.05). 55% of respondents believed that full-fat dairy products adversely affect cholesterol level. Among the 52% who indicated that there were too many different types of milk,



this was more often cited with increasing age (50-59 Mean=3.37; 60-69 Mean=3.55; 70-81 Mean=3.71;  $P<0.05$ ) and by German-speaking elderly (German Mean=3.63; French Mean=3.31, Italian Mean=3.54;  $P<0.05$ ). About 41% agreed that high consumption of dairy products increases body weight, a belief that was more often cited as education grade increased (low education Mean=2.70, medium education Mean=3.11, higher education Mean=3.21;  $P<0.05$ ). Asked if dairy is worth the money, 39% agreed while 13% believed that milk and dairy cause mucus production in the throat. Fewer men (Mean=2.24) than women (Mean=2.54) agreed with this statement ( $P<0.05$ ).

## Discussion

### Concerns about added sugar, cheese substitute and artificial aroma

When questioned about their concerns about dairy products, the most common answers were added sugar (60%), cheese substitute (55%), and artificial aroma (55%). In line with another Swiss study, women were more worried than men, with increased risk perception in relation to contaminants and additives [18]. This also reflects the generally accepted finding that women are more health-conscious [19,20]. This is also consistent with a study in which women consistently reported a higher mean importance score for disqualifying nutrients than men when selecting food [1].

According to one European study, most respondents believed they should try to avoid food and drink that is high in fat, sugars, or salt [16]. The concern reported in the present study about sugar content in dairy products aligns with these results. Remarkably, in the present study, a higher percentage of respondents were concerned about sugar in dairy products (60%) than were concerned about sugar content in food (53%, results not shown). A possible explanation may be that the flavored yoghurts currently on the market are perceived as too sweet, as indicated in a previous survey [21]. In a sensory trial, older Swiss people described yoghurt with 7% added sugar as slightly too sweet, even if sugar-reduced as compared to currently available yoghurts with 10% sugar [22].

The high level of concern about artificial aromas and cheese substitute may be explained by the fact that European consumers have been skeptical about new technologies and prefer natural products, and may therefore reject nontraditional or artificial products [4,23,24] as well as products they are not familiar with [25].

It was expected that a high percentage of respondents in the present study would be concerned about salt content, given that a majority of respondents from six European countries stated that health experts recommend consuming less salt, and because there is an actual federal campaign for salt reduction. In the UK, those aged 50–65 also reported more concern about salt (57%) as compared to the general population [26]. According to the present findings, Swiss middle-aged and older people are not particularly concerned about salt in dairy products, as only 13% of respondents indicated that they were very concerned about this ingredient. In this regard, women were more concerned than men, which align with a survey in the UK in which women reported greater concern than the rest of the population about salt in food [26].

Even if cheese, yoghurt, and milk are considered safe and healthy by respondents from all Swiss regions [17], there were some differences between the regions. Older Italian-speaking people expressed more concern about dairy products; the only exception was the very low level of concern about lactose. This may be explained by the finding that healthy nutrition is particularly important for Italian-speaking

respondents (unpublished results). On the other hand, Italian-speaking respondents more often believed that dairy products contain high or very high amounts of protein and fat, which might also explain their higher general concern about such products.

In general, older German-speaking adults tended to be less worried about dairy products, which correspond to another Swiss study conducted in 2011 in which German-speaking participants said they were less concerned about their food by comparison with French-speaking participants [27]. At the same time, German-speaking respondents were more skeptical about the level of nutrients contained in dairy products.

### Dairy products are good for bones and better than supplements

In most countries, a majority of consumers are well aware of calcium and its association with dairy, and they understand that calcium makes for strong bones [5,7,8]. This finding was confirmed by the present study, as 54% of those who rated milk as a good source of calcium believed that consumption of dairy products improves bone health in older age. In particular, women and retired people (>65) were more convinced by this than men and younger respondents. Laehteenmaeki [28] also found that claims about bone health and calcium were perceived more positively by women. This may be because women are more affected by osteoporosis, and as Dean et al., [29] have demonstrated, personal relevance has a strong influence on perceptions of benefit.

When asked whether drinking milk is better than taking calcium supplements, 41% of respondents totally agreed and 33% rather agreed. The situation is different in other parts of the world; in New Zealand, for example, almost half of older adults prefer to consume supplements than to drink milk [5]. In Switzerland, 72% of those who believe that dairy products improve bone health in older age were convinced that it is better to drink milk than to consume calcium supplements. In addition, 84% of those who rated milk to be a good supplier of calcium believed that it is better to drink milk than to consume calcium supplements, and they never drank milk supplemented with calcium (results not shown). These statements seem to indicate that middle-aged and elderly Swiss prefer natural food items to supplements, which is also in line with another study in Switzerland in which only 4.1% of respondents said that fruit can be fully replaced by vitamin and mineral supplements [6]. One explanation might be that they are questioning the need to boost the calcium content of a food item that is regarded as naturally rich in calcium. Indeed, Laehteenmaeki [28] has already noted that consumers may question the rationale of making healthy products even more wholesome.

### Overestimation of iron, vitamin C, and vitamin D content

About a quarter of older respondents wrongly believed that milk is a good or even very good source of iron and vitamin C (29% and 22%, respectively). In particular, French and Italian speakers believed that dairy products are good providers of vitamin C and iron. In fact, cow's milk does not contain appreciable amounts of either iron or vitamin C [30], but these misconceptions have already been noted in other countries. For example, one third of respondents in an Australian survey answered that milk could prevent anemia, and 49% of respondents in a New Zealand study agreed that milk is a good source of iron [7,9].

Milk was rated as a good or very good source of vitamin D by 35% of the respondents. In fact, milk and dairy products are normally low in vitamin D unless they are fortified [31]. Only in countries like Canada

and the USA, where dairy products are fortified with vitamin D, is milk the major source of vitamin D in the diet [30]. In Switzerland, there seems to be less demand for fortified milk, as 78% of our respondents declared that they never drink milk supplemented with vitamin D. Additionally, 13% of older adults said they never take any supplements (results not shown). This may be a problem, as intake of vitamin D is generally too low in Switzerland [10]. Indeed, most of the evidence suggests that adequate levels of both vitamin D and calcium are necessary to achieve significant reduction in non-vertebral fractures [30].

Earlier findings in different European countries showed an association between level of education and nutrition knowledge or ingredient awareness [16,18,32]. Results from studies in Switzerland and England also indicated that older people know less about nutrition [6,33], and both of these findings were confirmed in the present study. Indeed, respondents with a higher education level, as well as younger respondents, more often indicated correctly that dairy products do not contain much vitamin C or iron. In contrast, less educated older people were more likely to believe that dairy products are healthy [17], perhaps because of the misconception about nutrient content. Generally, "do not know" ratings for some nutrients like phosphorus, vitamin D, vitamin B12, vitamin C, and iron were also quite high (> 20%). Additionally, dairy products were not acknowledged as good sources of magnesium, phosphorus, vitamin B12, or minerals in general, indicating that there is still a need for enhanced information about the nutrient content of dairy products.

### Concerns about dairy fats still persist

Although a majority believed dairy products to be healthy and only 28% were concerned about fat content, it remains the case that 43% of respondents replied that fat content in milk is quite high, 10% rated it as very high, and 55% of respondents believed that full-fat dairy products adversely affect cholesterol level. In particular, 83% of older people who stated that milk contains a lot of fat believed that consumption of full-fat dairy products increases body weight, and 73% believed that it adversely affects cholesterol level. In fact, according to multiple studies, although dairy foods contribute to saturated fatty acids in the diet, other components in milk such as calcium and polyunsaturated fatty acids may reduce risk factors for coronary heart disease, and protein derivatives may impact appetite regulation [34,35]. In Switzerland, recommendations for the consumption of dairy products were amended in 2011, while advice favoring fat-reduced milk and dairy products was removed [36]. It seems likely, however, that this information has not yet been taken on board by the middle-aged and elderly.

Our study showed that older adults are not well informed about the nutrients of dairy products and that misconceptions about dairy fats are still prevalent. Websites on healthy eating, information provided by family and friends, and recommendations made by medical doctors—as well as nutrition tables—are among the available sources of information for consumers to help them choose healthy food [37]. According to our questionnaire, only a minority of older adults trust information on food packaging (35% trust; 2% trust very much). This suggests that improving nutrition labels may not be an effective means of informing this part of the population. As the most trusted source of health and diet information, according to another question in our questionnaire, is the physician (57% trust; 30% trust very much), it is very important that general medical practitioners have good knowledge of nutrition, and that they inform their patients properly about dairy nutrients.

### Strengths/Limitations

While most research excludes people over 65, the present study samples a population of Swiss people aged 50 to 81 years and living independently, providing important information about this age segment of the population. Additionally, this study was conducted in three languages to ensure results from the Italian-speaking population as well. Among the limitations of our study, Italian speakers had to be over-represented in order to attract enough returns for statistical analysis. As older adults who are not interested in health or food would probably not have answered our questionnaire, knowledge of health and nutrition may be overestimated.

### Conclusion

Although the majority of older Swiss people believe that dairy products are healthy, some misconceptions remain about fat and nutrient content. As suggested by Grunert et al. [16], while interest in healthy eating increases with age, this may not necessarily result in healthier choices if there is insufficient knowledge about the nutrient content of food. We therefore recommend increased communication and training in nutrition for physicians, as they are an important source of information for older adults. This should enhance awareness in the older population of the real nutritional value of dairy products and their part in a healthy diet.

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