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# Knowledge about nutrition and weight loss among fitness instructors: a cross-sectional study in Geneva, Switzerland

## Abstract

Many fitness centres offer weight loss programs and fitness instructors are often asked for nutritional advice. The aim of our study was to evaluate nutritional knowledge of instructors working in any of the 27 fitness centres of Geneva. A questionnaire containing closed- and open-ended questions was filled by 26 instructors working in the 19 participating centres. 96% gave nutritional advice and 50% established diet plans. Rates of correct answers were: 64% for the «right or wrong» questions, 51% for the closed-ended questions, 37% for the multiple choice questions, 27% for the open-ended questions, 4% for the consumption recommendations. 60% of instructors self-rated their nutritional knowledge as insufficient. Our findings point to potential erroneous nutritional advice to clients and argue in favour of better professional training of fitness personnel.

### Key words:

Nutrition; weight loss, fitness centre, health education, physical activity

## Résumé

De nombreux centres de fitness proposent des programmes de perte pondérale et les instructeurs sont souvent sollicités pour des conseils nutritionnels. Le but de notre étude était d'investiguer les connaissances nutritionnelles des instructeurs de fitness à Genève. Un auto-questionnaire comportant 52 questions a été rempli par 26 instructeurs employés dans 19 centres de fitness genevois. Nonante-six pourcent d'entre eux donnaient des conseils nutritionnels et 50% établissaient des plans alimentaires. Les taux de réponses correctes étaient: 64% pour les questions «vrai-faux», 51% pour les questions fermées, 37% pour les questions à choix multiples, 27% pour les questions ouvertes, 4% pour celles portant sur les recommandations de consommation. Soixante pourcent des instructeurs qualifiaient leurs propres connaissances nutritionnelles d'insuffisantes. Ces résultats indiquent la possibilité que des conseils erronés soient prodigués aux clients et justifieraient une meilleure formation des instructeurs de fitness.

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## Introduction

Fitness centres are increasingly popular. In Switzerland, fitness centre based exercise is in the top ten of Swiss' physical exercise practices, with 12% of the adult population practicing (Lamprecht and Stamm, 2000). This has a potential important health promotion effect. Fitness centres' clients vary in age, social and economic level, and physical condition. Their objectives include weight loss, increase of cardio-vascular training level, greater muscular strength, general wellness, improvement of body image, or a combination of the above (Lamprecht and Stamm, 2000; Brooks, 2001; Schneider, 2002). Fitness instructors are employed to supervise clients and provide training plans. They are also expected to give nutritional advice, especially as many fitness centres offer special programs for weight loss (Kaats et al., 1998; Hare et al., 2000). In many countries, including Switzerland, no standardised or minimal certification is necessary to work as a fitness instructor and training programs differ in content and duration. In the United-States, where a variety of degrees and diplomas is available (Malek et al., 2002; Elder et al., 2003), the lack of nutritional knowledge, as well as the absence of relationship between field experience and competency among fitness instructors, has been reported (Malek et al., 2002).

Bad nutrition practices can become a limiting factor in sports and exercise, and can also affect health negatively. For example,

rapid weight loss can lead to loss of lean body mass, increase the risk of weight regain and compromise endurance (Position of the ADA, 2000). Excessive protein intake, either through foods or supplements, may lead to health problems (Position of the ADA, 2002). Accurate and up to date nutrition counselling requires a good level of expertise (Position of the ADA, 2002). Research in this field is scarce, but led us to hypothesise that fitness instructors may lack the necessary knowledge for adequate, evidence based, dietetic counselling of their clients. The aim of our study, set in Geneva, Switzerland, was to document the level of nutritional knowledge and practices of dietetic counselling among fitness instructors. We expected our findings to support recommendations towards better standards of training and quality control.

## Methods

### Population

An observational, cross sectional study was conducted in the state of Geneva between October and December 2003. An informal, anonymous phone call was made to all 27 fitness centres censed in the state of Geneva at that time, to enquire if nutritional advice was included in the service; the answer was «yes» for each one. Then,

a formal explanation letter about our study was sent, requesting the centres for participation. It was followed by a phone call in order to ask for an appointment. Any instructor authorised to counsel clients at the fitness centre and willing to participate was included in the study. Nineteen fitness centres (70%) participated. Among the 62 instructors in these centres, 26 (42%) participated, 19 men and 7 women. Mean age was  $37 \pm 8$  (SD) years.

### Questionnaire development

As no existing questionnaire was available, an eight-page questionnaire in French was developed specifically for this study. After an introductory page with the instructions, the first part evaluated counselling practices: respondents were asked to answer to a series of statements on a Likert scale. The second part aimed at evaluating nutritional knowledge: the respondent had 1) to choose one or more answers to 9 statements (multiple choice questions), 2) to answer «true or false» to a series of 14 statements (true or false questions), 3) to organise food groups according to recommended relative quantities of consumption, 4) to answer to 3 open ended questions about micronutrients, weight loss and characteristic nutrients of food groups, 5) to explain their practice in 2 typical situations (one on increasing muscle mass, one on losing body weight). The last part of the questionnaire concerned demographic and personal information, duration and type of schooling. An open box offered space for comments.

The questionnaire was developed by the 3 investigators, based on state of the art nutritional recommendations for healthy or overweight adults and for athletes, and on the content of nutrition courses booklets distributed during some training programs for fitness instructors. Face validity and content was reviewed by nine persons with different kind of expertise: two independent dietitians with specific competences in sports and exercise, one sports and exercise scientist, one lecturer of the Department of nutrition and dietetics of the School of health of Geneva, and five dietetics trainees in their last year of pre-graduate training. A pre-test was performed in a population similar to that of the study ( $n=5$ ) but not participating and with no risk of contamination (fitness instructors living and working in another region of Switzerland than where the study took place).

### Questionnaire administration

The questionnaires were handed out by one of the authors (VM) in the participating fitness centres on one occasion. Verbal instructions were given at that time to the instructors willing to participate. For those who were not at work at that time, the documents were left with the person in charge. An informed consent form was to be signed and returned with the questionnaire. A pre-stamped envelope was given for each questionnaire. After two weeks without reply, phone calls were made to remind the instructors to participate.

As an incentive, a custom-made seventeen-page document answering in detail to each question of the questionnaire was proposed and mailed to all participants at the end of the study.

### Statistical analysis

Answers were coded as «incorrect» (-1) or «correct» (+1). Open ended questions were rated by 3 independent experts as «incorrect» (-1), or «correct» (+1). As the Cronbach alpha coefficients were higher than 0.7, the mean of the three experts was used. Qualitative variables were grouped and commented by themes. Descriptive analyses were performed with SPSS 9 (statistical package for social sciences, Chicago ILL). Scores were calculated for questions about a common topic. The topics were «proteins» (6 questions), «carbohydrates» (7 questions), «lipids» (4 questions), «hydration» (4 questions), «supplements» (5 questions). A global score was calculated by adding up the points obtained to each question.

Since the study was not of medical research nature, no formal approval of the local institutional board was necessary. Nevertheless,

the study complies fully with standard ethics of research involving human subjects. Informed oral and written consent was obtained; the subjects were free to accept to participate and could choose to stop collaboration at any time. The results were anonymous, and data could not be traced back to individuals.

## Results

Almost all instructors (96%) declared to regularly give nutritional advice to their clients. This happened most often in the training room (77%) in an informal way. Usually (92% of respondents), clients were asked if they had a medical condition. Seven instructors (27%) used written documents to counsel their clients. Thirteen (50%) instructors calculated nutritional plans for their clients. Eleven (42%) personalised the nutritional programs they proposed to their clients. Nineteen (73%) did not perform any follow-up of the recommendations they made. A majority (58%) encouraged the intake of nutritional supplements.

### Closed-ended questions

Rate of correct answers to the 24 closed-ended questions was 51%. The rates of correct answers were 37% for the multiple choice questions (Table 1), 64% for the «true or false» questions (Table 2), and 4% for the consumption frequencies of different food groups. Only one participant (4%) was able to organise food groups according to present-day consumption frequency recommendations: 1) «fruits and vegetables» or «starches»; 2) «starches» or «fruits and vegetables»; 3) «dairy products»; 4) «meat and protein products»; 5) «fats»; 6) «sweets». Most frequently, respondents thought that the most important quantity should be represented by meat and protein products. They often misplaced fats, dairy products and starches.

### Open-ended questions

Mean rate of correct answers to the 12 open ended questions was 27%. Detailed results for each question are presented in Figure 1. To the question: «To which vitamins and minerals do you pay particularly attention when dealing with your clients?», seven respondents answered «potassium», three «zinc», one «copper», one «protein and carbohydrates» and one «water». Expected answers were: «nothing», «magnesium», «iron», «calcium», «sodium». Accepted answers were: «vitamins of the group B» and «antioxidants».

To the question: «Which food items or food groups should be consumed less in order to avoid weight gain?», the most frequent answer was «Fats», followed by «Sweets» and «Starchy foods». «Red meat», «Dairy products», «Fruits» and «Salt» were also mentioned. Accepted answers were «Excessive consumption of: fats, sweets and/or alcoholic beverages».

Instructors were asked which nutrient characterised different food groups. For the food group «Meat, fish and eggs» the expected answer, «Protein», was cited 24 times, «Animal fats» was cited 4 times. For «Dairy products», the expected answer, «Calcium», was cited 4 times, far behind «Protein», cited 14 times and «Lip-

Theme of the question	n correct answers (n=26)
Weight loss	2 (8%)
Energetic nutrients	5 (19%)
Drinks during physical exercise	6 (23%)
Protein: quantitative recommendations	8 (31%)
Factors influencing energy requirements	10 (29%)
Utility of protein supplements	10 (29%)
Meat replacements	12 (46%)
Carbohydrates: quantitative recommendations	13 (50%)
Last meal before physical exercise	20 (77%)

Table 1: Frequencies of correct answers to the «multiple choice questions» among 26 fitness instructors in Geneva, Switzerland.

Statement (translated from French)	n correct answers (n=26)
Lipids should represent 30% of total energy intake (...) <sup>a</sup>	11 (46%)
Proteins are the main energy source for the muscle <sup>b</sup>	22 (88%)
Drinking while exercising reduces performance <sup>b</sup>	26 (100%)
Potatoes are a good source of carbohydrates <sup>a</sup>	21 (84%)
Fats are useless for our organism <sup>b</sup>	25 (96%)
It is strongly advised to avoid foods containing carbohydrates before practicing physical exercise <sup>b</sup>	17 (65%)
Vitamins and minerals are a good energy source <sup>b</sup>	16 (62%)
During strength training, consumption of energetic and isotonic drinks is better than consumption of water <sup>b</sup>	14 (54%)
Magnesium supplements are necessary for any person practicing regularly physical activity <sup>b</sup>	11 (42%)
Complex carbohydrates have a low glycaemic index <sup>b</sup>	8 (32%)
Vitamin supplements increase performance <sup>b</sup>	12 (46%)
Dehydration decreases performance <sup>a</sup>	25 (96%)
Consumption of drinks enriched in caffeine 30' before training increases strength and endurance <sup>a</sup>	15 (58%)
Carnitin increases the use of fat stores during intensive exercise <sup>b</sup>	8 (31%)

<sup>a</sup> Correct statement  
<sup>b</sup> Incorrect statement

Table 2: Frequencies of correct answers to the «true or false» questions among 26 fitness instructors in Geneva, Switzerland.

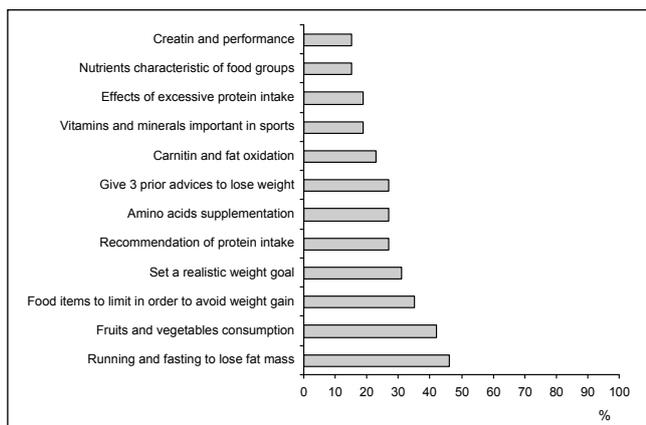


Figure 1: Proportion of correct answers to open ended questions about following themes among 26 fitness instructors in Geneva, Switzerland.

ids» (13 times); «Minerals» was cited once. For «Fruits», the two answers considered as correct, «Water» and «Fibre» were cited respectively 1 and 5 times. Respondents cited «Carbohydrates» 15 times, «Vitamins» 10 times, «Minerals» 4 times, «Trace elements» twice and «Protein» once. For «Cereals», the expected answer «Carbohydrates» was cited 18 times, «Fibres» 8 times, «Protein» 3 times, «Vitamins» twice and «Starches» once. For «Vegetables», the two answers considered as correct, «Water» and «Fibre», were cited respectively 0 and 6 times (Figure 2). Global scores (including closed- and open-ended questions).

On average, instructors reached a global score of  $15.5 \pm 5.6$ . Detailed results are presented in Table 3.

#### Examples of answers

A selection of typical answers is transcribed in extenso to illustrate both extreme levels of knowledge.

«Vegetables help to eliminate toxins and bad fats.»  
«Meat can be replaced by mushrooms or plain rice.»

Theme	Mean $\pm$ SD	Range	Max. possible
Proteins	$2.1 \pm 1.8$	-1 to 7	9
Carbohydrates	$4.6 \pm 1.9$	0 to 8	11
Lipids	$2.0 \pm 1.3$	-1 to 4	4
Hydration	$3.2 \pm 1.5$	1 to 6	6
Supplements	$0.4 \pm 2.5$	-4 to 4	5
Global	$15.5 \pm 5.6$	6 to 28	45

Table 3: Scores among 26 fitness instructors in Geneva, Switzerland.

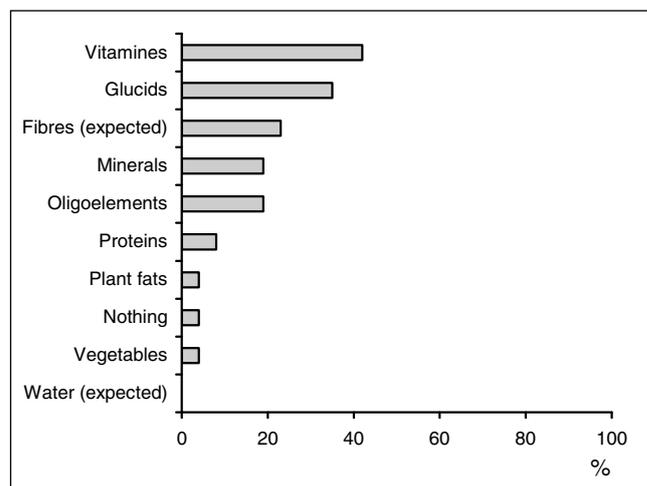


Figure 2: Proportion among 26 fitness instructors in Geneva, Switzerland, indicating specific nutrients characterising the food group «Vegetables».

«Meat is too rich in carbohydrates.»  
«Complements of amino acids are necessary to assimilate proteins, especially if one eats few fruits and vegetables.»  
«[Fat burning drinks] are manufactured with natural products, which absorb the fats consumed during the meal.»  
«Too much meat would be too rich in saturated fatty acids; it would be wiser to eat plenty of fish, rich in polyunsaturated fatty acids.»  
«Complements are not necessary [to gain muscle mass], the only efficient way is a health life and hard work.»  
«[I recommend] to eat a variety of foods and to avoid consumption of supplements, which are only useful to fill the wallet of the salesman.»  
«The problem with quick diets is that one loses 4 kg and re-gains 6.»

#### Training level and experience

Twenty-two respondents (85%) reported having followed a specific curriculum to become fitness instructor. Three (12%) had studied at university level, nineteen (73%) had followed various commercial fitness instructor courses. Four instructors (15%) had no instruction at all in the field of sports and fitness. Duration of the curricula was variable, between a few days or weeks to one year or more. Likewise, duration of nutrition courses was variable, anywhere between a few hours to several months. On average, fitness instructors had  $7.6 \pm 5.9$  years of practical experience at the time of the study. Twenty-four (92%) respondents judged nutritional knowledge as «necessary» in their practice. Fifteen (58%) considered their nutrition level as insufficient, two (8%) as «totally sufficient», and eight (31%) as «more or less sufficient» (missing = 1). Sixteen (62%) instructors said they kept themselves informed of the latest nutritional knowledge, through books (8), magazines (6), internet (5), courses and conferences (5), scientific press (2), television (2), friends (2), fitness magazines (1), professionals (doctors, dieticians, nutritionists) (1). One respondent stated: «This questionnaire was difficult for me and allowed me to realise that I have gaps in my knowledge.»

## Discussion

The aim of our study was to document the level of nutritional knowledge and practices of dietetic counselling among fitness instructors in the state of Geneva. Our first finding was that the level of nutritional knowledge of fitness instructors was poor. Our second finding was somewhat surprising: whereas most of the instructors gave nutritional advice to their clients, they were also aware of their lack of knowledge in nutrition.

Counselling approaches used by the instructors were inadequate. Half of the instructors calculated nutritional plans for their clients without individualisation. Almost three-quarter did not check if advices were understood or put into practice. Knowledge about «proteins», «carbohydrates» and «supplements» was particularly insufficient. Only one of the 26 instructors was able to state correctly the food frequencies recommendations. The answers to the open questions showed misconceptions about weight loss, use of amino acids supplements or nutrients characterising food groups.

There is a paucity of published results from similar inventories. Previously, Malek et al. (2002) raised awareness about the low level of knowledge among fitness trainers in the United States. Knowledge in five areas (nutrition, health screening, testing protocols, exercise prescription and general training) was assessed and compared to commonly used indicators of expertise (training and experience). Their study showed that knowledge was not related to certification with the exception of university level of training like a bachelor's degree in exercise science, or an ACSM or NSCA fitness instructor diploma. Experience was not related to knowledge. Inversely, Smith-Rockwell has shown that experience of 15 years or more was related to better scores of nutritional knowledge among coaches and athletic trainers in a North-American university (Smith-Rockwell et al., 2001).

Misconceptions about nutrition are common among coaches, trainers and other sports instructors (Grandjean, 1993; Smith-Rockwell et al., 2001), but also among athletes (Jacobson et al., 2001; Jonnalagadda et al., 2001; Rosenbloom et al., 2002). Similarly as in our study, proteins and the efficacy of nutritional supplements on performance were the themes that were most at risk of misconception and misuse (Sheppard et al., 2000; Jacobson et al., 2001; Jonnalagadda et al., 2001; Smith-Rockwell et al., 2001; Rosenbloom et al., 2002). In our study 58% of the instructors recommended the use of nutritional supplements. Well-controlled clinical studies have shown the inefficacy of these products (Position of the ADA, 2000), but there is no doubt that they are nevertheless frequently used, regardless of their inefficacy or even adverse effects, as reported by Burns et al (2004).

Past studies have shown that athletes rely mostly on their coaches or trainers for nutritional counselling (Jonnalagadda et al., 2001). In the general population, sources of nutritional advices are often TV or radio, magazines and newspapers, food packages, relatives or friends (de Almeida et al., 1997; Sheppard et al., 2000). Even though professionals are considered trustworthy by clients, they are less often the source for healthy eating advice than relatives or friends (Biloukha and Utermohlen, 2001). Professionals like fitness instructors are in a privileged position to give nutritional advice and as such are potential health promotion agents. It is therefore necessary that their knowledge is accurate. In a health promotion and public health perspective, it is paradoxical that in fitness centres few or no quality requirements are necessary for nutritional counselling, whereas the level of quality assurance has been steadily rising for health professionals.

Our study presents several limitations. First, the response rate was low. Whereas 70% of the fitness centres in Geneva participated, questionnaire return rate was 42%. This may have led to a selection bias. Our hypothesis is that the most knowledgeable instructors participated, and the ones who found the questionnaire difficult did not. This would have led to an overestimation of the level of nutritional knowledge of our study population, and thus would not change the direction of the outcome.

Another limitation is that the questionnaire, specifically created for this study, could not be validated against a gold standard, since

not available. As such, our questionnaire may have over or underestimated the knowledge level of the study population. Overall face and content validity was assured by nine professionals and students, active in the field of sports or nutrition. Pre-tests allowed us to rephrase ambiguous or confusing questions. The results of our study suggest that the questionnaire was difficult for the fitness instructors. As no other data existed, we based the questions on nutrition courses booklets distributed during some training programs for fitness instructors. Our questionnaire was constructed in order to cover a wide range of knowledge. Therefore, we assume that these results reflect a genuine lack of knowledge and several misconceptions about the topic of sports nutrition.

Finally, it is possible that some respondents helped each other, used books or other material to fill in the questionnaire. This would have led to an overestimation of their level of knowledge, and therefore would not change the direction of the outcome.

## Conclusions

The increase in fitness centres' popularity potentially has an important health promotion effect by raising the level of knowledge and understanding of the practicing public. The demand for nutritional advice is strong, and fitness instructors are well positioned to respond. The results of our study underline the weakness of nutritional counselling in the fitness industry, at least in Geneva. Therefore, it would be necessary to raise the standards for professionals working in health and wellness settings such as fitness centres. It will take a combination of political will and adequate training opportunities to achieve this goal. In several countries lack of formal training requirements for fitness personnel makes adequate counselling difficult. We argue in favour of a standardization of sufficient certification levels for fitness instructors. Formally trained dietitians should be encouraged to collaborate in the teaching curriculum, as well as in the fitness centres, to counsel the public.

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