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Clinical nutrition in primary care: an evaluation of resident physicians' attitudes and self-perceived proficiency

Running title: physician's attitudes regarding clinical nutrition

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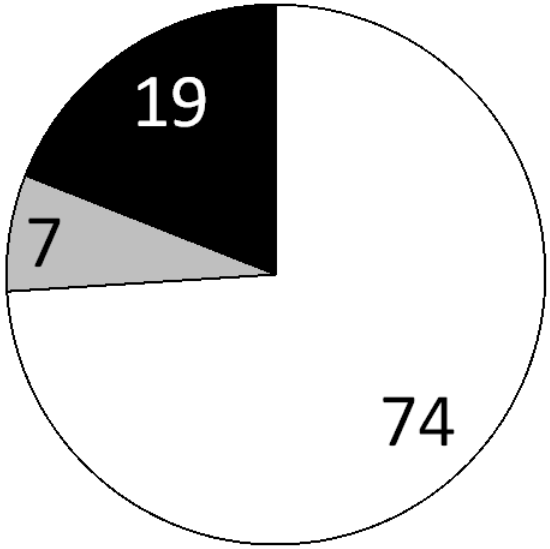
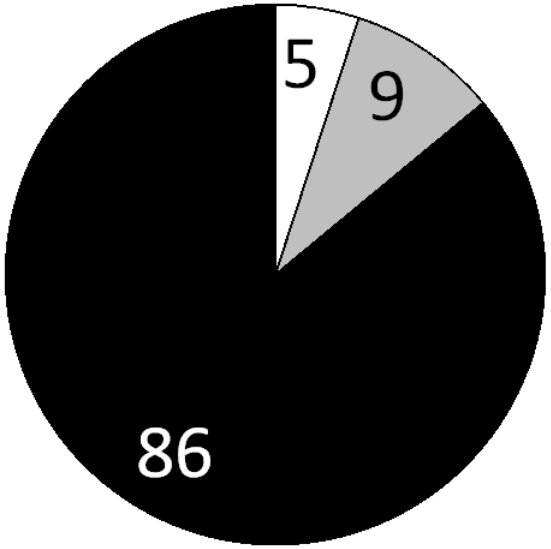
All physicians, regardless of specialty, should counsel high-risk patients about dietary change (%)



My training has adequately trained me to discuss nutrition issues with patients (%)



Agree No opinion Disagree

Abstract

Background & aims: There is little information regarding the impact of clinical nutrition training among medical residents. We aimed to evaluate the attitudes, self-perceived proficiency and knowledge of Swiss residents regarding clinical nutrition.

Methods: cross-sectional study conducted between June and September 2014 in two medical education facilities located in Lausanne, Switzerland. Attitudes, self-perceived proficiency and knowledge regarding clinical nutrition were assessed by questionnaire.

Results: of the 88 internal medicine residents queried, 44 (50% response rate, 25 women, mean age 34±4 years) answered the questionnaire. Three quarters of the residents were trained in Switzerland and one third reported receiving some training in clinical nutrition. Seven out of ten (70.5%) residents agreed that all doctors should know how to provide nutrition-based assessment, no matter what their specialty. Conversely, only one out of ten (11.4%) felt that physicians were adequately trained. No differences were found between genders or country of training regarding the answers provided.

Conclusion: residents in Lausanne perceive clinical nutrition in primary care as a priority but lack the confidence and training to effectively use clinical nutrition in their daily practice.

Keywords: clinical nutrition; cross-sectional study; knowledge; residents; Switzerland

Introduction

Nutrition in primary care is an effective and necessary preventive health care measure. In a study of the effects of nutrition counseling for overweight and obese patients, physicians who were using patient-centered and motivational nutrition counseling techniques were more successful in improving the fat and fiber intake scores and raising confidence to improve clinical nutrition of their patients [1]. Another study found that a computer-assisted intervention to improve physical activity and dietary behavior based in primary care setting was feasible and promising [2]. Surveys in both Switzerland and the US have found that the overwhelming majority of providers agree that preventive care should be a part of their daily practice, and that clinical nutrition is an important aspect of primary care [3, 4].

Despite the importance of nutrition in primary care, training in nutrition is often insufficient in most medical schools [5-7]. Also, the barriers to clinical nutrition in primary care are substantial, such as time restraints and challenges in patient motivation. In 1993, a survey found that fewer than 40 percent of US physicians regularly practiced at least 17 out of 50 nutrition-related “core competencies” [8]. Between 2000 and 2005, Healthy People and US Preventive Task Force of 2010 found in their midcourse review that the proportion of office visits that included clinical nutrition declined from 42 percent to 40 percent [4]. In Switzerland, the second-most cited barrier to clinical nutrition in primary care was the lack of training (second only to time restraints) [3]. In the US, lack of training was the most cited barrier [9, 10], and a study suggested that medical students' perception of the importance of clinical nutrition decreases during medical school [11]. Another study surveying US resident physicians found that those in the midst of their training felt that they were not receiving enough training in clinical nutrition [12].

Switzerland is a small European country with one of the best health systems worldwide [13]. The system is universal but administered on a local basis (cantons); Swiss citizens and established foreign residents must purchase individual health insurance coverage from local insurance companies. For persons covered by non-managed care insurance, services are provided of a fee-for-service basis by any primary care provider in the canton. Subjects covered by managed care insurance can opt for 1) health maintenance organizations; 2) networks of general practitioners with a contract with an insurer, and 3) a fee-for-service plan with a gate-keeping (i.e. phone consultant) system [14, 15]. Primary care is provided by doctors trained in general internal medicine. Since 2011, there is only a single specialist title for general internal medicine, including both general internal medicine physicians and family physicians. Still, no information was collected regarding perspectives and confidence levels of physicians toward clinical nutrition.

Thus, the aim of this study was to determine the state of clinical nutrition education and application of clinical nutrition in primary practice, by evaluating the attitudes and self-perceived proficiency of medical residents in Lausanne, Switzerland. In this study, we considered clinical nutrition as any nutritional care provided by clinicians, and nutritional counseling as a one component of clinical nutrition [16].

Materials and methods

Subjects

All internal medicine residents active at two medical educational facilities, the Policlinique médicale universitaire (PMU) and the Centre hospitalier universitaire vaudois (CHUV), were included. The list of residents was obtained from the human resources department

from each facility. The PMU provides consultations to ambulatory patients in general and specialized internal medicine and employs a total staff of 527, of which 149 are physicians (www.pmu-lausanne.ch). Only residents working in the general internal medicine ambulatory care clinic of the PMU, destined for the large majority to become primary care physicians, were included. The CHUV is one of the five Swiss university hospitals, with a total staff of 10,000 (www.chuv.ch); in 2014, 164 new physicians were trained at the CHUV.

Survey development

A questionnaire on attitudes and self-perceived proficiency about clinical nutrition was developed. The first section of the questionnaire collected demographic information, including information about time and place of medical school enrollment. No information regarding other training than medicine (i.e. biology, wellness, nutrition…) was collected. Similarly, no information regarding the type of clinical nutrition training in the medical curriculum (i.e. compulsory or optional, number of hours or ECTS) was collected.

The second section used a questionnaire developed by Cornuz *et al*, which evaluated Swiss general and internal medicine physicians' attitudes towards interventions for clinical nutrition, physical activity, and tobacco use and specific barriers in preventive medicine [3].

The third section included several items of the questionnaire used by Vetter *et al* [12]. This questionnaire combined the previously validated Nutrition in Patient care Survey (NIPS) [17] with another validated survey [18] to evaluate self-perceived proficiency in clinical nutrition in order to cover ten attitudinal and self-perceived proficiency sub-scales. For our study, questions addressing nine sub-scales of Vetter *et al*'s questionnaire were selectively chosen based on their relevance to the research question: 1) attitudes; 2) self-perceived proficiency; 3) knowledge and 4) previous training regarding nutrition. The result was a 63-question

115 questionnaire and possible responses were on a five point Likert scale: strongly disagree,
116 disagree, no opinion, agree, and strongly agree.

117 Additional questions assessed how frequently the participants assessed their patient's
118 weight history, current weight and height in their clinical practice. Answers were categorized
119 into "Never", "Seldom", "Frequently" and "Always".

120 The questionnaire was then translated into French and then reviewed by a sociologist at
121 the Pedagogical Unit at the University of Lausanne for improvements to question and response
122 wording. The complete version of the French questionnaire is available as a **supplementary file**.

123 The questionnaire was distributed, both online and in hardcopy, to internal medicine
124 residents at both the PMU and the CHUV. The residents were given three months to complete
125 and return the questionnaire, and reminders were issued by email and during medical staff
126 meetings. The questionnaires were anonymous and collected in specific drop-off boxes available
127 in the meeting rooms, so that no identification of the residents was possible.

128 *Statistical analysis*

129 Statistical analysis was conducted using Stata v.13.1 (Stata Corp, College Station, TX,
130 USA). For analysis, answers were grouped into "agree" and "disagree / other". This was done in
131 order to analyze the positive opinions of the participants relative to the others and to have
132 adequate group sizes to perform statistical analyses. Results were expressed as number of
133 responses (percentage) for categorical variables or as mean±standard deviation for continuous
134 variables. Bivariate analyses comparing between genders, location of training (Switzerland *vs.*
135 other countries) or previous training in clinical nutrition were performed using Fisher's exact
136 test. Statistical significance was considered for a two-sided p-value <0.05.

Ethical statement

The Ethics Commission of Canton Vaud (www.cer-vd.ch/) was contacted and no ethics approval was considered necessary as the survey was anonymous and did not include any information regarding the health status of the participants (decision of 20.06.2014).

Results

Sample characteristics

Thirty-seven residents from CHUV and 51 residents from PMU were invited to fill the survey, 44 (50%) of whom responded. Their socio-demographic characteristics were the following: 25 (57%) women, mean age 34±4 years; 34 (77%) had received their training in Switzerland, and their average practice was 7.5±2.8 years. Only fourteen residents (33%) reported previous exposure or education in clinical nutrition in medical school (e.g. courses, conferences, or concepts integrated into other courses, etc.), and only 3 (7%) reported the existence of an elective course in clinical nutrition in their curriculum.

The characteristics of the residents according to gender are summarized in **table 1**.

Barriers to nutritional counseling

Eighteen residents (41%) agreed to the statement that it was difficult to integrate preventive measures for nutritional counseling in daily practice. The most frequently cited barriers were lack of time and training, while insufficient compensation and intrusion into patient's privacy were the least cited (**Figure 1**). No differences were found regarding the answers between genders, location of training (Switzerland *vs.* other countries) or previous training in clinical nutrition (**supplementary table 1**).

Attitudes and self-perceived proficiency

The results regarding attitudes and self-perceived proficiency regarding clinical nutrition are summarized in **Table 2**. The majority (>80%) of responders agreed that patients need specific instructions about how to change their eating behavior; that physicians should assess each patient's fat, fiber, and fruit and vegetable intake as a preventive strategy, and advocate diet and activity balance to promote weight control; and that physicians should understand the definition of moderate alcohol consumption, as well as the role of dietary cholesterol and saturated fat in elevating blood cholesterol. Nobody agreed that nutrition counseling was not an effective use of their time and only a minority agreed that they were adequately trained to discuss nutrition issues with patients (**Table 2**). After grouping answers *disagree* and *no opinion*, no difference was found between responses to the questions “I am comfortable recommending dietary patterns for patients with type 2 diabetes mellitus” (considered as an indicator for clinical nutrition) and “I am comfortable in dietary counseling in routine daily practice” (considered as an indicator for dietary counseling), p=0.59 by Mc Nemar’s test.

No consistent differences were found regarding the answers between genders, location of training (Switzerland *vs.* other countries) or previous training in nutrition (**supplementary tables 2 to 4**). Men agreed more frequently than women to the statements “I am comfortable recommending dietary patterns for patients with type 2 diabetes mellitus” and “There is enough nutrition training for doctors”. Participants not trained in Switzerland agreed more frequently than participants trained in Switzerland to the statements “I feel comfortable assessing fluid needs based on activity level and health” and “My training has adequately trained me to discuss nutrition issues with patients”. No associations were found with previous training in nutrition.

Daily practice

When asked about their routine practice, 56% indicated that they "frequently or always" assessed their patient's weight history and 75% that they "frequently or always" assessed their patient's current weight and height. No differences were found between genders, location of training (Switzerland *vs.* other countries) or previous training in clinical nutrition (**supplementary table 5**).

Discussion

To our knowledge, this is one of the few European studies assessing attitudes, proficiency and practice of clinical nutrition among young physicians. Our results indicate that in Lausanne, residents in internal medicine perceive clinical nutrition in primary care as a priority but lack the confidence and training to effectively apply clinical nutrition in their daily practice.

Nutrition in medical education

Despite the importance of nutrition in disease prevention and management, nutrition education is insufficiently implemented in the medical curriculum. A survey conducted among English-speaking countries showed that all have nutrition-related curriculum guidelines for undergraduates, but that their scope and detail varies considerably [19]. A study published in 2010 showed that only one quarter (27%) of US medical schools provided the minimum amount of 25 hours training in nutrition [5]. A survey of 32 medical schools from 10 European countries showed a very heterogeneous provision of training in nutrition, three schools providing no training at all and four schools providing less than 25 hours of training [6]. A study conducted in an Irish university reported an average of 15 hours of training [20], and a survey among Japanese medical schools showed than one tenth (9%) did not provide any training in nutrition, and that only one sixth (16.4%) dedicated more than 5 hours of training in their curriculum [7]. Graduate

training also fails to compensate for this lack of training in medical schools: in the USA, only one quarter (26%) of graduate medical courses have a formal nutrition curriculum [21]. Interestingly, and contrary to high income countries, the number of hours dedicated to training in nutrition is considerably higher in low or middle income countries: 36 hours in Iran [22] and an average of 59 hours in countries of West Africa [23]. This lack of training can have serious consequences in the management of patients; for instance, in Italy, a study published in 2010 revealed that almost half (49%) of hospital structures had no nutrition professionals [24].

In this study, approximately one third (14/44) of respondents indicated having received some type of training on clinical nutrition. Still, this definition was rather generic, as the characteristics of the training were not collected. Hence, it is likely that some responders received only a minimal training regarding clinical nutrition. It is also unclear whether the three participants that mentioned the existence of an elective course actually took it.

Barriers to nutritional counseling

The residents surveyed in this study ranked barriers to nutrition counseling in almost the same relative order as the general practitioners in the previous study by Cornuz *et al* [3], with lack of time as the greatest and lack of training as the second most-cited barrier. However, there were notable differences in the distribution of responses for each barrier. For example, in our study, over 80% of residents identified time as a barrier, while only 55% of GPs did so in the previous study, which suggests that time dedicated to nutrition counseling is even less than the time necessary in clinical nutrition practice.

One of the most notable barriers *contra* clinical nutrition, as identified by the providers themselves, was insufficient training [10]. These findings are in agreement with the previous study by Cornuz *et al*, where half of primary care physicians responded that lack of training was

the second greatest barrier to preventive health strategies [3]. Similarly, in the US, a survey conducted in 1995 among primary care physicians reported that only 58% stated they had previously received clinical nutrition training, and 62% stated they lacked the knowledge necessary to counsel their patients in diet-related health care [25]. A 2010 review of Kushner *et al*'s 1995 study found that most educators, medical students, and physicians still agreed that the amount of training in clinical nutrition is inadequate [4]. Finally, a recent survey reported that the perceived relevance of nutrition counseling by US medical students has declined throughout medical school [9], indicating that clinical nutrition is not promoted throughout their education. Overall, our data suggests that current training in clinical nutrition is not meeting the needs of primary care practitioners in both the US and Switzerland.

Attitudes and self-perceived proficiency

Attitudes towards clinical nutrition and prevention were positive, a finding also reported by Cornuz [3], suggesting a general opinion within doctors irrespective of their age, years of practice or FMH certification. Most of the residents thought that nutrition counseling should be a skill that all physicians have and 88% disagreed or totally disagreed that nutrition counseling is a waste of time - the other 12% was *without opinion.* Furthermore, the majority of residents agreed that it is important to evaluate the intake of fat, fiber, fruit and vegetables for each patient in preventive care, although they were ambivalent on their knowledge on giving examples of portion sizes based on the nutritional pyramid. Also, the majority of residents (70.4%) found that the lack of training in clinical nutrition caused an obstacle to preventive practices, demonstrating insufficient confidence in their nutrition counseling skills. Future studies should better explore this aspect in order to inform training program directors on the aspects of counseling that should be specifically targeted.

Self-perceived proficiency was higher in this study than in Vetter *et al*'s study in New York, even though fewer Lausanne residents were exposed to clinical nutrition education in their medical education. For example, a greater proportion of Lausanne residents were confident in knowing the role of omega-3 and -6 acids in heart health (**Table 2**) [12]. Vetter *et al* point to the timing of clinical nutrition education in medical school curriculum. Clinical relevance is not optimal in preclinical years [12]. Further research is needed to determine how timing of clinical nutrition education in Switzerland compares to that of the US, and if this affects the attitudes and proficiency of residents and physicians. A study has also shown that increased self-perceived proficiency is correlated to an increased frequency of nutrition counseling in daily practice [26], which prompts further study in Switzerland as well as research into the correlation of optimized education in clinical nutrition and its application in practice.

Finally, although the responders were unanimous in stating that nutrition counseling not an ineffective use of time, one third (36%) considered lack of evidence for benefit and one sixth (17%) insufficient compensation as barriers to that practice. Possible explanations are the lack of postgraduate or continuous medical training on clinical nutrition, which would prevent general practitioners from receiving the evidence-based information on the effectiveness of dietary prevention and the possibility of separate billing of nutritional counseling time, and the fact that, at least in Switzerland, a general practitioner trained in clinical nutrition gets no financial compensation compared to a colleague devoid of such training.

Study limitations

Our study has several limitations worth acknowledging. Firstly, these results may not be generalizable, as the survey only included internal medicine residents in one city. Secondly, sample size was small and recruitment bias cannot be ruled out. Hence, it is likely that our

sample included motivated residents who were interested in the topic of clinical nutrition. Thus, our results regarding knowledge and self-reported proficiency in clinical nutrition might likely be overestimated and the real picture might be even bleaker. Thirdly, the questionnaire was not formally validated; still, the aim of the study was to have a first estimation of the attitudes and self-perceived proficiency of medical residents regarding clinical nutrition, not to create a validated instrument. Indeed, given the large cultural diversity of Switzerland (26 Cantons, 4 official languages), the validation of a questionnaire for the French-speaking part of Switzerland only would not be cost-effective. Finally, direct comparisons with the results of Vetter *et al* [12] are not sound; cultural or societal differences, as well as discrepancies in survey administration and translation, could have affected responses. For example, the food pyramid is highly advertised in the United States but it is not used as a guide in Switzerland, possibly accounting for half of the residents' ambivalence about portion sizes based on the food pyramid.

Possible interventions

Based on our findings, primary care training should promote a positive attitude and ideology regarding clinical nutrition [8]. Changes in nutrition training of medical students have been suggested in the US [27, 28] and in Portugal [29]. Provider training should address misconceptions about patient compliance and the effectiveness of nutrition counseling to promote providers' willingness to practice [1]. Conversely, to our knowledge, no such initiatives have been implemented in Switzerland. A first step would be the identification of areas where the residents feel that their training is inadequate, to further strengthen them in the medical curriculum. Further, for some items of the questionnaire, a significant (>20%) fraction of responders answered “no opinion”, suggesting that these items could be used for monitoring attitudes, proficiency and knowledge in clinical nutrition.

Conclusion

Residents in an academic general internal medicine center in the French part of Switzerland find that clinical nutrition education is insufficient. They had positive attitudes about the importance of nutrition in prevention in primary care, but expressed that they lacked the proficiency to counsel patients. Future studies should evaluate the effect of education of residents on nutrition counseling in order to properly prepare future physicians to face the rising epidemic of nutrition-based diseases.

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Statement of authorship

SH devised the study methodology and wrote the manuscript; RA devised the study methodology, collected the data and wrote the manuscript; PMV revised the study methodology, analyzed the data and wrote the manuscript. JC revised the manuscript for important intellectual content. All authors have seen and approved the manuscript.

Conflict of interest

The authors report no conflict of interest

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The funding source had no role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication.

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Figure legends

Figure 1: barriers perceived by residents in internal medicine regarding nutrition interventions.

Tables

Table 1: characteristics of the sample, according to gender.

	Man (n=19)	**Woman (n=25)**
Age (years)	34.3 ± 4.6	33.1 ± 2.9
Years of practice	8.1 ± 3.1	7.0 ± 2.5
Training in Switzerland (%)		
Yes	13 (68.4)	21 (84.0)
No	6 (31.6)	4 (16.0)
Previous training clinical nutrition (%)		
Yes	8 (42.1)	6 (24.0)
No	11 (57.9)	19 (76.0)

Results are expressed as average ± standard deviation or as number of responses (column percentage).

397 **Table 2**: Attitudes, self-perceived proficiency, knowledge and previous training in nutrition of residents in internal medicine.

Domains and items	Disagree	No opinion	Agree
Attitudes			
1. It is important to advocate diet and activity balance to promote weight control	0	0	100
2. Patients need specific instructions about how to change their eating behavior	2	7	90
3. It is important that I assess each patient's fat, fiber, and fruit and vegetable intake as a preventive strategy	7	10	83
4. All physicians, regardless of specialty, should counsel high-risk patients about dietary change	19	7	74
5. My patient education efforts will be effective in increasing patients' compliance with nutrition recommendations	5	21	74
6. Nutritional assessment and counseling should be included in any routine appointment	37	2	61
7. It is important that I address the importance of diet whenever I care for a patient	68	23	9
8. Nutrition counseling is not an effective use of my time	88	12	0
Self-perceived proficiency			
1. I am comfortable recommending dietary patterns for patients with type 2 diabetes mellitus	27	7	66
2. I am comfortable in dietary counseling in routine daily practice	34	7	59
3. I am comfortable providing examples of serving sizes of each category of the Swiss dietary pyramid	50	2	48
4. I feel comfortable assessing fluid needs based on activity level and health	48	14	38
5. I am comfortable providing nutrition strategies for patients losing weight due to chronic illness	59	5	36
Knowledge			
1. I am knowledgeable about the definition of moderate alcohol consumption	5	0	95
2. I am knowledgeable about the role of dietary cholesterol and saturated fat in elevating blood cholesterol	14	7	80
3. I am knowledgeable about the role of omega-3 and omega-6 fatty acids in heart health	45	14	41
4. I am knowledgeable about the role of genetics, diet, and pharmacology in weight loss regimens	57	7	36
Previous training			
1. I apply what I learned in nutrition	52	34	14
2. There is enough nutrition training for doctors	75	14	11
3. My training has adequately trained me to discuss nutrition issues with patients	86	9	5

Results are expressed as percentage of responses.

Supplementary tables

Supplementary table 1: factors associated with barriers perceived by residents in internal medicine regarding nutrition interventions.

	Lack of time	Lack of training	Lack of patient interest	Lack of evidence for benefit	Insufficient compensation	Intrusion in patient's privacy
Gender						
Man (n=19)	15 (79.0)	12 (63.2)	8 (42.1)	9 (47.4)	2 (10.5)	1 (5.6)
Woman (n=24)	22 (88.0)	19 (76.0)	14 (56.0)	7 (28.0)	5 (22.7)	5 (20.0)
P-value	0.443	0.507	0.543	0.220	0.419	0.375
Training in Switzerland						
Yes (n=34)	30 (88.2)	26 (76.5)	17 (50.0)	15 (44.1)	6 (19.4)	5 (15.2)
No (n=10)	7 (70.0)	5 (50.0)	5 (50.0)	1 (10.0)	1 (10.0)	1 (10.0)
P-value	0.322	0.131	1.000	0.067	0.660	1.000
Previous training clinical nutrition						
Yes (n=14)	12 (85.7)	8 (57.1)	6 (42.9)	5 (35.7)	1 (8.3)	1 (7.1)
No (n=30)	25 (83.3)	23 (76.7)	16 (53.3)	11 (36.7)	6 (20.7)	5 (17.2)
P-value	1.000	0.288	0.747	1.000	0.651	0.645

Results are expressed as number of positive answers and (row percentage). Between-group comparisons by Fisher's exact test (two-sided)

Supplementary table 2: factors associated with attitudes, self-perceived proficiency, knowledge and previous training in nutrition of residents in internal medicine: gender.

	Men (n=19)		Women (n=25)		
Domains and items	**Disagree/No opinion**	**Agree**	**Disagree/No opinion**	**Agree**	**P-value**
Attitudes					
1. It is important to advocate…	(0)	17 (100) §	(0)	25 (100)	NA
2. Patients need specific…	2 (11.8)	15 (88.2) §	2 (8.0)	23 (92.0)	1.000
3. It is important that I assess…	3 (17.7)	14 (82.4) §	4 (16.0)	21 (84.0)	1.000
4. All physicians…	6 (35.3)	11 (64.7) §	5 (20.0)	20 (80.0)	0.305
5. My patient education..	4 (23.5)	13 (76.5) §	7 (28.0)	18 (72.0)	1.000
6. Nutritional assessment…	10 (58.8)	7 (41.2) §	6 (25.0)	18 (75.0)	0.050
7. It is important that I address…	16 (84.2)	3 (15.8)	24 (96.0)	1 (4.0)	0.300
8. Nutrition counseling is not …	17 (100)	(0)	25 (100)	(0)	1.000
Self-perceived proficiency					
1. … recommending dietary patterns	3 (15.8)	16 (84.2)	13 (52.0)	12 (48.0)	**0.025**
2. …in dietary counseling in routine …	4 (23.5)	13 (76.5) §	13 (54.2)	11 (45.8) ¦	0.062
3. …providing examples of serving…	9 (47.4)	10 (52.6)	14 (56.0)	11 (44.0)	0.761
4. …assessing fluid needs …	10 (58.8)	7 (41.2) §	16 (64.0)	9 (36.0)	0.757
5. …providing nutrition strategies …	11 (57.9)	8 (42.1)	17 (68.0)	8 (32.0)	0.540
Knowledge					
1. …definition of moderate alcohol…	0 (0)	19 (100)	2 (8.0)	23 (92.0)	0.498
2. …role of dietary cholesterol …	3 (15.8)	16 (84.2)	6 (24.0)	19 (76.0)	0.710
3. …role of omega-3 and omega-6…	12 (63.2)	7 (36.8)	14 (56.0)	11 (44.0)	0.760

4. …role of genetics…	11 (64.7)	6 (35.3) §	16 (64.0)	9 (36.0)	1.000
Previous training					
1. I apply what I learned in nutrition	14 (73.7)	5 (26.3)	24 (96.0)	1 (4.0)	0.07
2. There is enough nutrition training …	14 (73.7)	5 (26.3)	25 (100)	0 (0)	**0.011**
3. My training has adequately trained...	18 (94.7)	1 (5.3)	24 (96.0)	1 (4.0)	1.000

Results are expressed as number of answers and (column percentage). For the complete statement of each item, please consult table 1.

Between-group comparisons by Fisher's exact test (two-sided); NA, not assessable. § two answers missing; ¦ one answer missing

Supplementary table 3: factors associated with attitudes, self-perceived proficiency, knowledge and previous training in nutrition of residents in internal medicine: training in Switzerland

Training in Switzerland	**Yes (n=34)**		**No (n=10)**		
Domains and items	**Disagree/No opinion**	**Agree**	**Disagree/No opinion**	**Agree**	**P-value**
Attitudes					
1. It is important to advocate…	(0)	32 (100) §	(0)	10 (100)	NA
2. Patients need specific…	1 (3.1)	31 (96.9) §	3 (30.0)	7 (70.0)	0.036
3. It is important that I assess…	4 (12.5)	28 (87.5) §	3 (30.0)	7 (70.0)	0.328
4. All physicians…	9 (28.1)	23 (71.9) §	2 (20.0)	8 (80.0)	1.000
5. My patient education..	6 (18.8)	26 (81.3) §	5 (50.0)	5 (50.0)	0.094
6. Nutritional assessment…	11 (34.4)	21 (65.6) §	5 (55.6)	4 (44.4)	0.276
7. It is important that I address…	31 (91.2)	3 (8.8)	9 (90.0)	1 (10.0)	1.000
8. Nutrition counseling is not …	32 (100)	(0) §	10 (100)	(0)	NA
Self-perceived proficiency					
1. … recommending dietary patterns	15 (44.1)	19 (55.9)	1 (10.0)	9 (90.0)	0.067
2. …in dietary counseling in routine …	15 (48.4)	16 (51.6) ¦	2 (20.0)	8 (80.0)	0.152
3. …providing examples of serving…	19 (55.9)	15 (44.1)	4 (40.0)	6 (60.0)	0.481
4. …assessing fluid needs …	25 (78.1)	7 (21.9) §	1 (10.0)	9 (90.0)	**<0.001**
5. …providing nutrition strategies …	24 (70.6)	10 (29.4)	4 (40.0)	6 (60.0)	0.133
Knowledge					
1. …definition of moderate alcohol…	2 (5.9)	32 (94.1)	0 (0)	10 (100)	1.000
2. …role of dietary cholesterol …	8 (23.5)	26 (76.5)	1 (10.0)	9 (90.0)	0.659
3. …role of omega-3 and omega-6…	21 (61.8)	13 (38.2)	5 (50.0)	5 (50.0)	0.716

4. …role of genetics…	22 (68.8)	10 (31.3)	5 (50.0)	5 (50.0)	0.451
Previous training					
1. I apply what I learned in nutrition	30 (88.2)	4 (11.8)	8 (80.0)	2 (20.0)	0.606
2. There is enough nutrition training …	31 (91.2)	3 (8.8)	8 (80.0)	2 (20.0)	0.317
3. My training has adequately trained...	34 (100)	0 (0)	8 (80.0)	2 (20.0)	**0.048**

412 Results are expressed as number of answers and (column percentage). For the complete statement of each item, please consult table 1.

413 Between-group comparisons by Fisher's exact test (two-sided); NA, not assessable. § two answers missing; ¦ three answers missing

414

Supplementary table 4: factors associated with attitudes, self-perceived proficiency, knowledge and previous training in nutrition of residents in internal medicine: previous medical training in clinical nutrition.

Training in clinical nutrition	Yes (n=14)		No (n=30)		
Domains and items	Disagree/No opinion	Agree	Disagree/No opinion	Agree	P-value
Attitudes					
1. It is important to advocate…	(0)	14 (100)	(0)	28 (100) §	NA
2. Patients need specific…	0 (0)	14 (100)	4 (14.3)	24 (85.7) §	0.283
3. It is important that I assess…	3 (21.4)	11 (78.6)	4 (14.3)	24 (85.7) §	0.668
4. All physicians…	4 (28.6)	10 (71.4)	7 (25.0)	21 (75.0) §	1.000
5. My patient education..	3 (21.4)	11 (78.6)	8 (28.6)	20 (71.4) §	0.723
6. Nutritional assessment…	6 (46.2)	7 (53.9)	10 (35.7)	18 (64.3) §	0.732
7. It is important that I address…	11 (78.6)	3 (21.4)	29 (96.7)	1 (3.3)	0.088
8. Nutrition counseling is not …	14 (100)	(0)	28 (100)	(0) §	NA
Self-perceived proficiency					
1. … recommending dietary patterns	4 (28.6)	10 (71.4)	12 (40)	18 (60.0) §	0.521
2. …in dietary counseling in routine …	4 (28.6)	10 (71.4)	13 (48.2)	14 (51.9) ¦	0.321
3. …providing examples of serving…	6 (42.9)	8 (57.1)	17 (56.7)	13 (43.3)	0.521
4. …assessing fluid needs …	8 (57.1)	6 (42.9)	18 (64.3)	10 (35.7)	0.742
5. …providing nutrition strategies …	9 (64.3)	5 (35.7)	19 (63.3)	11 (36.7)	1.000
Knowledge					
1. …definition of moderate alcohol…	1 (7.1)	13 (92.9)	1 (3.3)	29 (96.7)	0.540
2. …role of dietary cholesterol …	2 (14.3)	12 (85.7)	7 (23.3)	23 (76.7)	0.695
3. …role of omega-3 and omega-6…	8 (57.1)	6 (42.9)	18 (60)	12 (40.0)	1.000

4. …role of genetics…	7 (50.0)	7 (50.0)	20 (71.4)	8 (28.6)	0.193
Previous training					
1. I apply what I learned in nutrition	10 (71.4)	4 (28.6)	28 (93.3)	2 (6.7)	0.071
2. There is enough nutrition training …	11 (78.6)	3 (21.4)	28 (93.3)	2 (6.7)	0.307
3. My training has adequately trained...	13 (92.9)	1 (7.1)	29 (96.7)	1 (3.3)	0.540

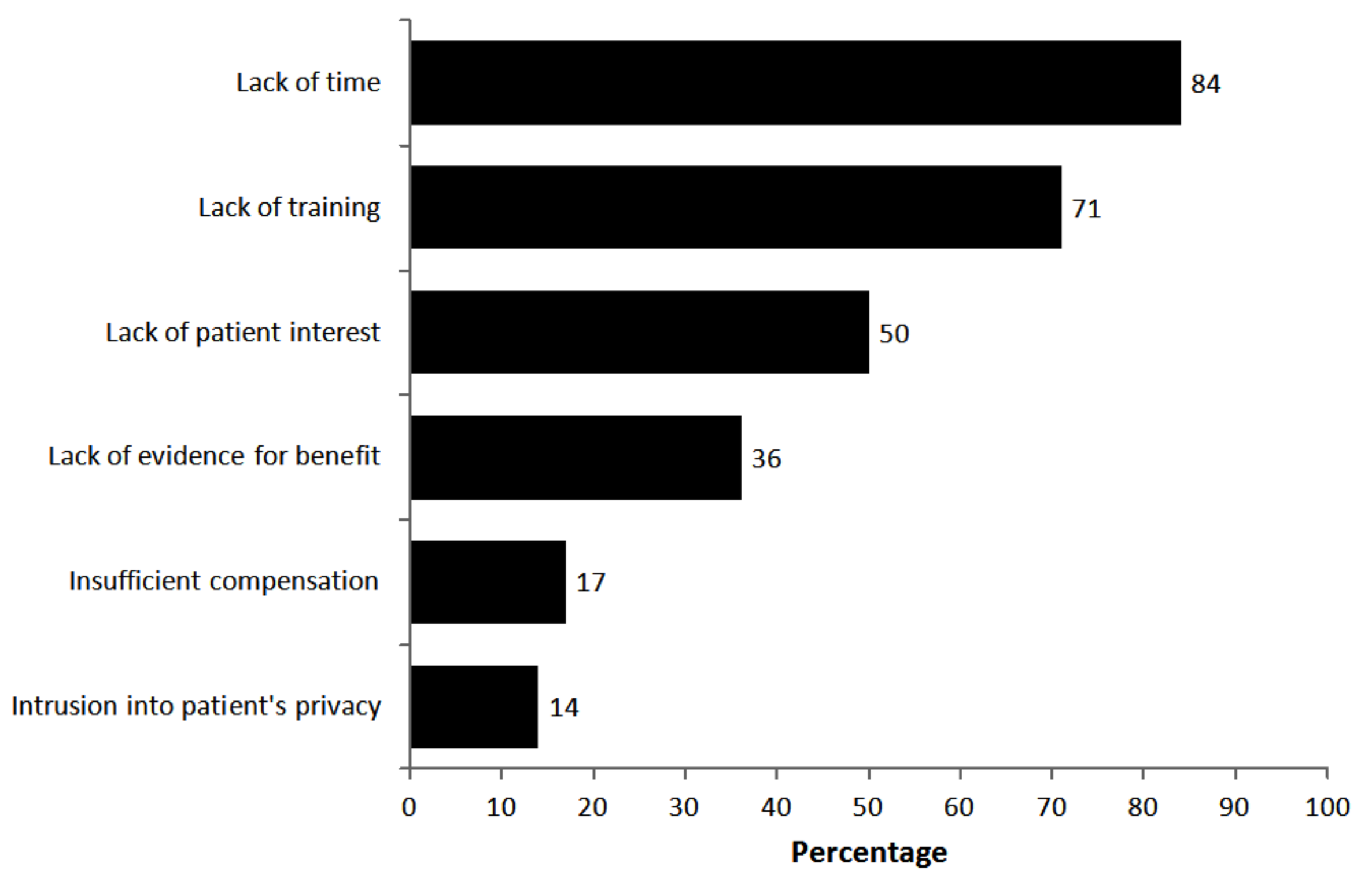
Results are expressed as number of answers and (column percentage). For the complete statement of each item, please consult table 1.

Between-group comparisons by Fisher's exact test (two-sided); NA, not assessable. § two answers missing; ¦ three answers missing

Supplementary table 5: factors associated with recording of weight history or current weight.

	Weight history		Current weight	
Domains and items	**Never or seldom**	**Frequently or always**	**Never or seldom**	**Frequently or always**
Gender				
Man (n=19)	4 (21.0)	15 (79.0)	4 (21.0)	15 (79.0)
Woman (n=24)	7 (28.0)	18 (72.0)	7 (28.0)	18 (72.0)
P-value	0.731		0.731	
Training in Switzerland				
Yes (n=34)	10 (29.4)	24 (70.6)	8 (23.5)	26 (76.5)
No (n=10)	1 (10.0)	9 (90.0)	3 (30.0)	7 (70.0)
P-value	0.408		0.692	
Previous training clinical nutrition				
Yes (n=14)	3 (21.4)	11 (78.6)	3 (21.4)	11 (78.6)
No (n=30)	8 (26.7)	22 (73.3)	8 (26.7)	22 (73.3)
P-value	1.000		1.000	

Results are expressed as number of positive answers and (row percentage). Between-group comparisons by Fisher's exact test (two-sided)


Lack of time
84
Lack of training
71
Lack of patient interest
50
Lack of evidence for benefit
36
Insufficient compensation
17
Intrusion into patient's privacy
14
0
10
20
30
40
50
60
70
80
90
100
Percentage

La nutrition clinique dans les soins primaires et en prévention

Vous êtes: ☐ un homme ☐ une femme

Quelle est votre **année** de naissance ? _____

Quelle est votre année de diplôme de médecin ? _____

Où avez-vous fait vos études de médecine ? _____

Ou travaillez-vous actuellement ☐ PMU ☐ Service de Médecine Interne, CHUV

☐ IUMSP ☐ Autre : _____

Au CHUV ou à la PMU

	Toujours	**Souvent**	**Parfois**	**Jamais**	**Pas applicable**
Intégrez-vous les données du KONDRUP (sur SOARIAN, CHUV uniquement) dans votre prise en charge ?	☐	☐	☐	☐	☐
Intégrez-vous les données de TRACES (sur SOARIAN, CHUV uniquement) dans votre prise en charge ?	☐	☐	☐	☐	☐
Demandez-vous aux patient·e·s les variations du poids durant les dernières semaines avant l'hospitalisation ou la consultation ?	☐	☐	☐	☐	☐
Demandez-vous le poids du/de la patient·e ?	☐	☐	☐	☐	☐
Demandez-vous la taille du/de la patient·e ?	☐	☐	☐	☐	☐

Considérez-vous que la prévention fasse partie de vos tâches de médecin ?

Oui	**Plutôt oui**	**Plutôt non**	**Non**	**Pas d'avis**
☐	☐	☐	☐	☐

Est-il difficile pour vous d'intégrer des interventions de prévention dans les domaines suivants ?

	Oui	**Plutôt oui**	**Plutôt non**	**Non**	**Pas d'avis**
Tabac	☐	☐	☐	☐	☐
Nutrition	☐	☐	☐	☐	☐
Activité physique	☐	☐	☐	☐	☐

Selon votre expérience, les éléments suivants constituent-ils des obstacles à une intervention préventive dans le domaine ***du tabac*** ?

	Oui	**Plutôt oui**	**Plutôt non**	**Non**	**Pas d'avis**
Le manque de formation	☐	☐	☐	☐	☐
Le manque de temps	☐	☐	☐	☐	☐
le manque de confiance dans l'efficacité de ces interventions	☐	☐	☐	☐	☐
Le manque d'intérêt chez le/la patient·e	☐	☐	☐	☐	☐
Il s'agit souvent de conseils qui interfèrent avec la sphère privée du/de la patient·e	☐	☐	☐	☐	☐
L'absence d'incitation financière	☐	☐	☐	☐	☐
Autre : _____	☐	☐	☐	☐	☐

Selon votre expérience, les éléments suivants constituent-ils des obstacles à une intervention préventive dans le domaine de ***l'activité physique*** ?

	Oui	**Plutôt oui**	**Plutôt non**	**Non**	**Pas d'avis**
Le manque de formation	☐	☐	☐	☐	☐
Le manque de temps	☐	☐	☐	☐	☐
le manque de confiance dans l'efficacité de ces interventions	☐	☐	☐	☐	☐
Le manque d'intérêt chez le/la patient·e	☐	☐	☐	☐	☐
Il s'agit souvent de conseils qui interfèrent avec la sphère privée du/de la patient·e	☐	☐	☐	☐	☐
L'absence d'incitation financière	☐	☐	☐	☐	☐
Autre : _____	☐	☐	☐	☐	☐

Selon votre expérience, les éléments suivants constituent-ils des obstacles à une intervention préventive dans le domaine de ***la nutrition*** ?

	Oui	**Plutôt oui**	**Plutôt non**	**Non**	**Pas d'avis**
Le manque de formation	☐	☐	☐	☐	☐
Le manque de temps	☐	☐	☐	☐	☐
le manque de confiance dans l'efficacité de ces interventions	☐	☐	☐	☐	☐
Le manque d'intérêt chez le/la patient·e	☐	☐	☐	☐	☐
Il s'agit souvent de conseils qui interfèrent avec la sphère privée du/de la patient·e	☐	☐	☐	☐	☐
L'absence d'incitation financière	☐	☐	☐	☐	☐
Autre : _____	☐	☐	☐	☐	☐

Formation

	Oui	Non
Avez-vous eu une quelconque formation **en prévention du tabac** pendant vos études de médecine (cours ou conférences sur les conseils à l'arrêt du tabac, concepts intégrés dans des cours, etc.) ?	☐	☐
Si **oui**, indiquez : _____		
Un cours à option en **prévention du tabagisme** était-il offert durant vos études de médecine ?	☐	☐
Si **oui**, l'avez-vous suivi ?	☐	☐

	Oui	Non
Avez-vous eu une quelconque formation en **conseils à l'activité physique** pendant vos études de médecine (cours ou conférences sur les conseils à **l'activité physique**, concepts intégrés dans des cours, etc.) ?	☐	☐
Si **oui**, indiquez : _____		
Un cours à option en **conseils à l'activité physique** était-il offert durant vos études de médecine ?	☐	☐
Si **oui**, l'avez-vous suivi ?	☐	☐

	Oui	Non
Avez-vous eu une quelconque formation **en nutrition** pendant vos études de médecine (cours ou conférences sur **la nutrition**, concepts intégrés dans des cours, etc.) ?	☐	☐
Si **oui**, indiquez : _____		
Un cours à option **en nutrition** était-il offert durant vos études de médecine ?	☐	☐
Si **oui**, l'avez-vous suivi ?	☐	☐

Dans mon exercice quotidien…

	Totalement en désaccord	En désaccord	Sans opinion	D'accord	Totalement d'accord
Les évaluations nutritionnelles et les conseils nutritionnels devraient être inclus dans chaque consultation de routine.	☐	☐	☐	☐	☐
Les patient·e·s ont besoin d'instructions spécifiques sur la manière de changer leur comportement alimentaire.	☐	☐	☐	☐	☐
Tous les médecins, quelle que soit leur spécialité, devraient savoir donner des conseils nutritionnels	☐	☐	☐	☐	☐
Mon éducation des patients sera efficace si j'augmente leur adhésion aux recommandations nutritionnelles.	☐	☐	☐	☐	☐
Donner des conseils nutritionnels aux patient·e·s est une perte de temps	☐	☐	☐	☐	☐
Dans une optique de prévention, il est important d'évaluer les apports en matières grasses, fibres, fruits et légumes de chaque patient·e.	☐	☐	☐	☐	☐
Il est important de conseiller un équilibre entre alimentation et activité physique pour favoriser le contrôle du poids.	☐	☐	☐	☐	☐
Je me sens à l'aise pour fournir des conseils nutritionnels dans le cadre des soins de routine.	☐	☐	☐	☐	☐
Je me sens à l'aise pour évaluer les besoins hydriques de chaque patient·e selon son niveau d'activité et sa santé.	☐	☐	☐	☐	☐
Je sais comment calculer l'indice de masse corporelle (IMC) et le rapport taille/hanche	☐	☐	☐	☐	☐
Je connais le rôle de la génétique, de l'alimentation et des médicaments dans les régimes pour perdre du poids.	☐	☐	☐	☐	☐

	Totalement en désaccord	En désaccord	Sans opinion	D'accord	Totalement d'accord
Je me sens à l’aise pour donner des exemples de portions de chaque catégorie de la pyramide alimentaire (viande, céréales, légumes, etc.).	☐	☐	☐	☐	☐
Je connais le rôle des acides gras oméga-3 et oméga-6 dans la prévention cardiovasculaire.	☐	☐	☐	☐	☐
Je connais la définition d’une consommation modérée d’alcool et son rôle dans la santé et la maladie.	☐	☐	☐	☐	☐
Je suis à l’aise pour fournir des stratégies alimentaires à des patient·e·s perdant du poids à cause d’une maladie chronique.	☐	☐	☐	☐	☐
Je suis à l’aise pour donner des recommandations alimentaires à des patient·e·s ayant un diabète non insulinodépendant (type 2).	☐	☐	☐	☐	☐
Je connais le rôle du cholestérol alimentaire et des graisses saturées dans l’augmentation des lipides sanguins.	☐	☐	☐	☐	☐
Je me sens à l’aise de discuter des bénéfices de l’exercice physique pour la santé et le bien-être.	☐	☐	☐	☐	☐
Je me sens préparé·e et compétent·e à faire des évaluations nutritionnelles et à fournir des conseils nutritionnels appropriés.	☐	☐	☐	☐	☐
Je pense que mes études m’ont préparé·e à faire des évaluations nutritionnelles et à fournir des conseils nutritionnels appropriés dans le cadre des soins médicaux courants et liés à l’alimentation.	☐	☐	☐	☐	☐
Il y a assez de formation en nutrition pour les médecins.	☐	☐	☐	☐	☐
J’applique dans ma pratique quotidienne ce que j’ai appris sur la nutrition durant mes études.	☐	☐	☐	☐	☐

MERCI POUR VOTRE PARTICIPATION !