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## In search of a health education model: teachers' conceptions in four Mediterranean countries

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**Abstract:** School programs are defined to promote the health of the pupils and to develop their competencies so that they can adopt behaviors favorable to their health. With the European project FP6 Biohead-Citizen (2004–2007), we analyzed the conceptions of teachers as regards health education, in France, Lebanon, Morocco and Tunisia, in reference to the biomedical model and the social health model. These four countries were selected because their school curricula represented different models of health education. Lebanon and Tunisia addressed health education with the biomedical model. In Morocco, the curriculum was also primarily based on the biomedical model and enclosed a few instructions issued from the social health model. In France, the health education curriculum declared an approach based on the health promotion model. Our study was based on multivariate statistical analyses of questionnaires filled out by 2537 in-service and pre-service teachers. Our analysis showed that the conceptions of the teachers concerning health education were not structured and related to a specific model. We also found that the dominating factors of influence on the choices expressed with regards to health education were, among different sociocultural variables, the religion, the home country, and, to a lesser extent, the level of training. Thus, the conceptions of the teachers were not integrated into comprehensive approaches but related to individual characteristics. Consequently health education implementation would require thorough training for pre-service and in-service teachers and should also explicitly take into account their conceptions and values. (*Global Health Promotion*, 2011; 18(4): 5–15)

**Keywords:** biomedical model, in-service and pre-service teachers, France, Lebanon, Morocco, principal component analysis, social health model, Tunisia

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## Introduction

Health education is a major component of the missions assigned to the educational system. It contributes equally to disease prevention and health promotion (1) and must take into account the social context (2,3). In school programs, health education is part of the curriculum and was initially based on a biomedical model, putting emphasis on disease and their prevention. This model assumed that, for every disease, a primary biological cause existed. Health education within the biomedical model delivered knowledge which often increased the students' feelings of powerlessness (4) and did not consider social and psychological factors as potential causes of disease. Thus, the biomedical model had little substance to deal with the prevention of chronic disease by changing health beliefs, attitudes, and behaviors. To address this problem, an expansion of the biomedical model incorporating psychosocial factors was proposed (5). The biopsychosocial or social health model maintained that biological, psychological, and social factors were all important determinants of health, within the broad sense of health: physical, mental, emotional, social, spiritual, and sexual, as well as societal and environmental health (1,6). Education curricula based on the social health model consider the impact of sociological and psychological factors on health. More recently, health education integrated into a health promotion model has been developed. This health promotion approach addresses not only the transmission of knowledge, prevention and sociopsychological skills, but also the need for political and social action including a wider role of the school community, the physical environment of the school, whole school policies, and the role of parents, as well as people's personal involvement in building their own health future (7).

The aim of the European FP6 research project entitled *Biohead-Citizen* (2004–2007) (8) was to characterize the conceptions of pre-service and in-service teachers in 19 countries on a variety of issues related to biological sciences, to enhance the quality of education in Europe. In this part of the project, we analyzed the conceptions of pre-service and in-service teachers from four countries, France, Lebanon, Morocco, and Tunisia, on health education, and evaluated the influence of sociocultural factors on these conceptions. These four countries were

selected because their education policies all stressed the importance of health education and their school curricula represented different models of health education. Lebanon (9) and Tunisia (10) strictly addressed health education with the biomedical model. Health was considered as the absence of disease and health education was based on prevention and adopting healthy behavior to prevent risks and outbreaks of disease. Teaching was based on scientific and clinical knowledge and put forward the causal links between 'unhealthy' behavior and health problems. In addition, in Lebanon, the school textbooks only stressed prohibited behavior. In Morocco (11), the health education curriculum was also primarily based on the biomedical model. However, over the last ten years, it has included, without naming them, a few instructions from the social health model, such as the development of individual psychosocial skills. In these three countries, Lebanon, Tunisia, and Morocco, health education was exclusively part of biology teaching. In France (12), the health education curriculum endorsed an approach based on the health promotion model. It included, on the one hand, instructions from the biomedical model, such as the development of knowledge and healthy behavior and, on the other hand, psychosocial skills from the health promotion model. Thus, the stress was put on the development of features which have an attitudinal component such as self-esteem, respect for others, solidarity, autonomy and responsibility, and all the members of the school were involved, especially its teachers and health professionals. However, health education was taught only in the biology and physical education classes, and neither the school's role in the community nor the role of the parents were taken into account. This overview of the four national curricula showed that they all used the biomedical model to some extent, if not exclusively like in Tunisia and Lebanon. The health promotion model was not used and, although endorsed by the French curriculum, was not a factual health promotion model but rather a social health model. Consequently, we could only compare two health education curricula: one based on the biomedical model, and one based on the social health model. In all countries, health education was primarily taught in biology classes and this carried a risk that the teaching emphasized biology facts rather than social and psychological elements.

**Table 1.** Information on sampled individuals throughout the four countries.

		<i>Absolute frequency (n)</i>	<i>Relative frequency</i>
Gender	Masculine	755	29,8%
	Feminine	1782	70,2%
Level of training	Secondary	134	5,3%
	Bac* or high school +1 or 2	353	13,9%
	Bac* or high school +3 or 4	1692	66,7%
	Bac* or high school +5 or 6	331	13,0%
	More	27	1,1%
Religion	Agnostic	389	15,3%
	Christian	523	20,6%
	Muslim	1524	60,1%
	Other	101	4,0%
Country	France	732	28,9%
	Lebanon	722	28,5%
	Tunisia	753	29,7%
	Morocco	330	13,0%

\*The *Bac* is an examination at the end of high school (French diploma) corresponding to the validation of high school studies.

Moreover, it has been shown that, besides the health models they refer to, health curricula interact with the ideologies and values of society (13). In the educational system, these ideologies and values are often taken for granted and not exposed explicitly in the curriculum (13). Even when these values are clearly exposed, nothing is known about the teachers' personal values, although these clearly influence their conceptions (13).

In this study, by means of a questionnaire, we investigated the conceptions of teachers regarding health education. We analyzed the influence of different sociocultural factors on these conceptions using multivariate statistical analysis.

## Material and methods

### *Scope of the research*

We investigated the conceptions related to health education of 2537 pre- and in-service teachers in four countries participating in the Biohead-Citizen (8) research project on science education, namely France (n = 732), Lebanon (n = 722), Morocco (n = 330), and Tunisia (n = 753), by means of a questionnaire. More specifically, we considered 17 questions related to health and health education and

quantified the answers using quantitative hierarchical Likert scales. A specific section of the questionnaire gathered information on demographics (age, gender) and sociocultural background (professional profile, academic education level, religion and country of residence, see Table 1).

In each participating country, we applied the questionnaire to a balanced sample of in-service teachers (In) and pre-service teachers (Pre), practicing in primary schools (P), or teaching biology (B) or the national language (L) in secondary schools, and this yielded six sampling groups (InP, PreP, InB, InL, PreB, PreL). Teachers teaching their national language were included in the sample as a means of identifying possible specifics of the conceptions of the biology teachers, apart from the sociocultural factors shared by both groups. Teachers filled in the questionnaire anonymously in a specially dedicated room within their school or after a teaching class at the university, in the presence of project research fellows.

### *Characterizing conceptions related to health and health education*

The Biohead-Citizen questionnaire, represented by 148 questions, investigated the teachers' conceptions

**Table 2.** The six questions of Topic 1

<i>Biomedical model</i>	<i>Question</i>	<i>Social health model</i>
1-Not suffering from any serious disease. 4-Having my body components working well. 6-Having no need to see a doctor, for treatment. I don't agree	A63-Health can be seen in several perspectives. In the list below, tick the three expressions that you think are the most strongly associated with your personal view of health: B1-Health Education at school improves pupil behavior.	2-Feeling at peace with myself. 3-Enjoying my life without feeling too much stress. 5-Being in good condition to be socially active.
I agree	B15-It is chiefly up to the school nurse and doctor to provide health education.	I don't agree
I agree	B21-Health education at school must be restricted to providing scientific information (diet, sleeping cycle, drug risk).	I don't agree
I don't agree	B26-Health education at school mainly involves developing the personal skills of pupils such as self esteem or stress management.	I agree
I agree	B27-It is exclusively the family's responsibility to deal with health education.	I don't agree

of science education. The original English version was translated into each national language and, after validation of the translation, was tested before being used in each participating country (8). Among the 148 questions, 17 (denoted as A12, A15, A37, A52, A60, A63, B1, B2, B12, B15, B16, B21, B22, B23, B25, B26 and B27) were related to conceptions about health and health education. These were designed to characterize teachers' conceptions in terms of four topics.

### *Topic 1: Identifying the health education model used by the teachers*

Topic 1 aims at identifying a biomedical model or a social health model, by means of six questions (Table 2). This topic included, on the one hand, the analysis of the teachers' conceptions about their personal health according to the two models, expressed by question A63 with six items. Among

these six items, three belonged to the biomedical model and the other three belonged to the social health model. On the other hand, we investigated teachers' conceptions on health education in reference to the biomedical health model (8,14).

### *Topic 2: Teachers' political and social preferences*

Topic 2 included 4 questions:

- A15 — One priority of the government must be to guarantee resources for health protection of the poor.
- A37 — Religion and politics should be separated.
- A52 — It is acceptable for poor people not to have access to the same quality of health care as rich people.
- B23 — Schools must take public health policies into account.

### *Topic 3: Teachers' personal opinions on problems related to health education*

Topic 3 included 2 questions:

- A60 — There are several kinds of behaviors that can help to decrease the spread of HIV/AIDS world-wide. In your view, what is the behavior you find most relevant to be considered in school sexual education? (Tick only one of the four boxes, among which: 'to have sex only within a stable relationship, not have several sexual partners' and 'to have safer sex, for instance by using a condom in sexual intercourse').
- B22 — Teachers should not be obliged to teach health education if they do not feel confident.

### *Topic 4: Nutrition and health*

Topic 4 included 5 questions which investigated whether the teachers made links between food and health. B2, B12, B16 and B25 referred to the choice of a Mediterranean diet emphasizing fresh fruit and vegetables, olive oil as the principal source of fat, and fish consumed in low to moderate amounts (15):

- B2 — I would like to eat fish more often.
- B12 — I would like to eat more fruit.
- B16 — I should use olive oil more often in my food.
- B25 — I should eat more fresh vegetables.
- A12 — Genetically modified plants will help to reduce famine in the world.

### **Statistical analysis**

All questions, except A60 and A63 were coded from 1 (I agree) to 4 (I don't agree). A60 was coded from 1 (To have sex only within a stable relationship) to 4 (To have safer sex, for instance by using a condom in sexual intercourse). A63 proposed 0 to 3 choices within the social health model among six propositions. We performed the Principal Component Analysis (PCA) of the questionnaire data using the Varimax transformation and the Kaiser normalization. Pearson's correlations between all questions were calculated. Using between-class analyses, we investigated and tested the significance of variations among sociocultural groups of interests, using instrumental variables such as age, gender,

country, etc. (for details see 16). We used the ade4 package from R statistical software (17).

### **Results**

#### *Principal Component Analysis (PCA)*

From the Principal Component Analysis, we identified five main principal components representing 44% of the overall variance of the 17 questions. Table 3 shows the structure of these five components (saturation over or equal to 0.30). By our codes, a positive score in a component indicates disagreement with the question and a negative score indicates agreement.

Among the 17 questions, A12 (GMO and world famine) was associated with component 1, but had a saturation of less than 0.30 and, consequently, was not considered any further in the analysis.

**Component 1** explained 14.9% of the variance of the answers and contained four questions among which two were items from Topic 1 (Table 2) on the biomedical/social health models: B1 (health education improves pupil behavior) and B26 (health education develops the personal skills of pupils). A60 concerned health education and HIV/AIDS, and A37 concerned the separation between religion and politics. It appeared that teachers' conceptions on the role of health education were closely associated with opinions about politics and religion. PCA scores indicated that those teachers who thought that health education played a role in the students' behavior and capacities were in favor of links between religion and government and thought that stable sexual relationships were the best way to protect yourself from HIV/AIDS.

**Component 2** explained 9.1% of the variance and contained the four questions about 'food choices' (B2, B12, B25, B16) based on the consumption of fruit, vegetables, fish and olive oil (15). This component was very close to Topic 4 investigating the link between nutrition and health. The scores indicated that the teachers did not want to change anything to their diets. Interestingly, none of the questions in this component was correlated with a conception related to health education.

**Component 3** explained 7.5% of the variance and contained three questions (B15, B21, B27) included in Topic 1 (Table 2) and investigating the biomedical/social health models regarding their contents and the professionals in charge. The scores indicated

**Table 3.** Principal component analysis of the 17 questions related to health education (HE).

<i>Questions</i>	<i>Components</i>				
	<i>C1</i>	<i>C2</i>	<i>C3</i>	<i>C4</i>	<i>C5</i>
A60-Spread of HIV/AIDS	0.719				
A37-Separation religion/politics	-0.627				
B26-HE and pupil skills	0.572				0.323
B1-HE and pupil behavior	0.490			0.355	
A12-GMO and world famine	X				
B12-Nutrition and fruit		0.706			
B25-Nutrition and vegetables		0.696			
B16-Nutrition and olive oil		0.631			
B2-Nutrition and fish		0.626			
B15-HE and health professionals			0.646		
B21-HE and scientific knowledge			0.632		
B27-HE and family's responsibility			0.581		
B23-Application of public health policies				0.659	
A15-Health insurance policies				0.572	
A52-Rich/poor health care quality differences				-0.447	
A63-Biomedical/Social health models					-0.718
B22-Freedom for teaching HE	0.323				0.511
<i>% explained variance</i>	14.9	9.1	7.5	6.4	6.1
<i>% explained cumulated variance</i>	14.9	24.0	31.5	37.9	44.0

that those teachers who thought that health education was under the exclusive responsibility of the family (B27) also thought that it should be taught mainly by the medical professionals within the school (B15), and be limited to scientific information (B21). These last two conceptions were included in the biomedical model.

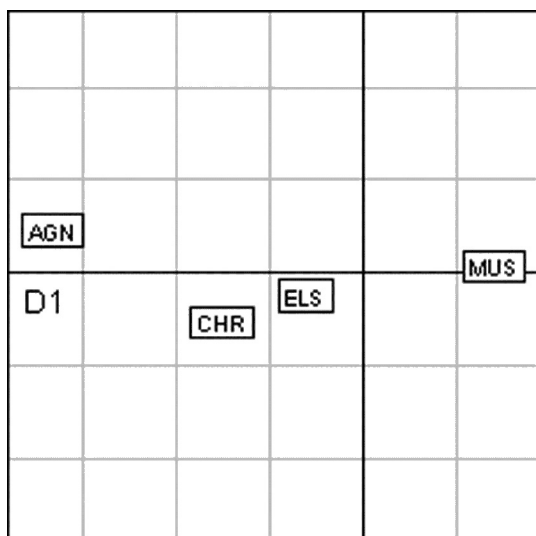
**Component 4** explained 6.4 % of the variance and contained three questions (B23, A15, A52) concerning the policies about health and health education. The scores indicated that the teachers who estimated that the government should consider minimal resources for the poor as regard health (A15), did not accept that the poor do not have access to the same health care as the rich (A52), and also thought that schools should apply public health policies (B23). This component made it possible to identify the teachers' choices about social policy.

**Component 5** explained 6.1% of the variance and contained two questions, A63 (biomedical/social health models) and B22 (liberty for teaching health education [HE]). Question A63 made it

possible to identify the model, either biomedical or social health, supported by the teachers regarding their own health. The scores indicated that those in favor of the social health model thought that teachers should teach health education only if they felt confident enough to do so. On the other hand, those in favor of a biomedical approach thought all teachers could be asked to teach health education. With this component, we noted that the teachers' personal choices of a health model (A63) were not associated with any conception of a health model with regard to health education.

This analysis mainly brought to light that the five components identified by PCA did not closely match the four topics on which our questionnaire was based. The five questions in Topic 1 especially (Table 2), investigating the teachers' choice of biomedical or social health model in health education were distributed in the two components 1 and 3. In addition, the analysis showed that the teachers' conceptions about health and health education were



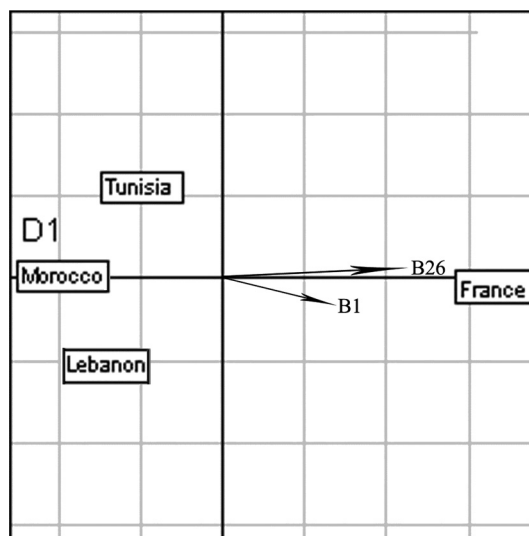


**Figure 1.** Between-class analysis of the 17 questions with regard to the religion of the teachers. We show the position of groups of individuals, which are labeled with regard to their religion (or absence), according to the most differentiating component (D1). This highlights on D1 an overall contrast between agnostics and Muslims.  
AGN: agnostic, CHR: Christian, ELS: other religions, MUS: Muslim.

intertwined with opinions on religion and politics. This observation is detailed below with between-class analyses identifying the influence of sociocultural factors (professional profile, level of training, religion, country), and demographics (gender, age) on the conceptions.

### Between-class analyses of the sociocultural and demographic factors

In order to identify the main factors of influence on the teachers' conceptions, we carried out between-class analyses on the 17 questions of the questionnaire. However, here we will only describe their influence on the six questions in Topic 1 (Table 2) whose aim was to characterize the teachers' conceptions with regard to the health models. We noted that age and gender were not differentiating factors for this Topic 1. By contrast, the sociocultural factors, religion, country of

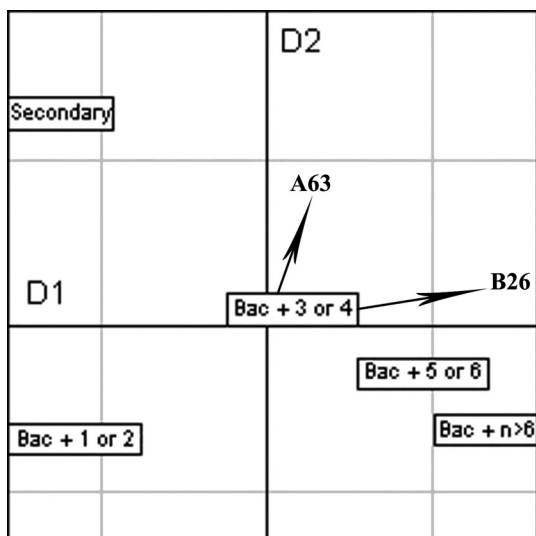


**Figure 2.** Between-class analysis of the 17 questions with regard to the teachers' home country. We show the position of the teachers of the four countries, according to the most differentiating component (D1). This highlights on D1 an overall contrast between France and the other countries. We see that questions B1 (agreement with: health education improves pupil behavior) and B26 (agreement with: health education develops the personal skills of pupils) are discriminating. Scores in agreement are situated on the right hand side of D1, those in disagreement on the left hand side.

residence, professional profile and level of training, did differentiate and the Monte Carlo tests on between-class analyses of the answers according to these four factors were significant ( $P < 0.001$ ).

Questions B1 (health education improves pupils' behavior) and B26 (health education develops the pupils' personal skills) were influenced by religion (Figure 1) and the country of residence (Figure 2). The Monte Carlo tests of between-class analyses of the answers showed that agnostics and/or French, more than Muslims, Lebanese, Moroccan, and Tunisian, thought that health education improved the students' behavior (religion: Pearson's  $r = -0.23$ ; country:  $r = 0.28$ ) and developed the pupils' skills (religion:  $r = -0.37$ ; country:  $r = 0.47$ ). This could suggest that agnostics and French were closer to the social health model, but the other three questions in

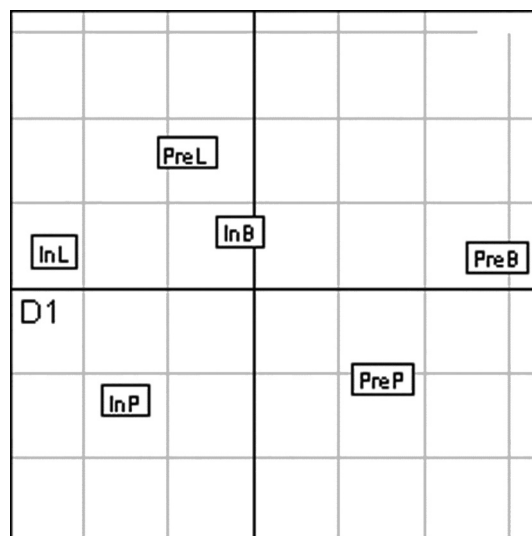




**Figure 3.** Between-class analysis of the 17 questions with regard to the length of the training of the teachers. We show the position of groups of individuals, which are labeled with regard to their training, according to the most differentiating components (D1, D2). This highlights on D1 an overall contrast between shorter and longer training and, on D2, the specific group constituted by the individuals having only attended secondary school. B26 (agreement with: health education develops the personal skills of pupils) is a highly discriminating question on D1; A63 (towards the social health model) is slightly discriminating on D1. Scores in agreement are situated on the right hand side of D1, those in disagreement on the left hand side. Bac: examination at the end of high school (French diploma) corresponding to the validation of high school studies.

Topic 1, B15 (role of the school nurse and doctor in health education), B21 (content of health education) and B27 (exclusive responsibility of the family for health education) were not differentiated by religion and country thus showing inconsistency in the groups' choices. It should be noted that religion and country of residence are not independent variables.

Question B26 (health education develops the pupils' personal skills) was also influenced by the teachers' level of training (Figure 3). The Monte Carlo test on the between-class analysis of the answers according to groups of teachers with



**Figure 4.** Between-class analysis of the 17 questions with regard to the professional profiles of the teachers. We show the position of groups of individuals (pre-service, in-service, primary school, secondary school, national language, biology) according to the most differentiating component (D1). D1 highlights the difference between the pre-service biology and primary school teachers situated on the right hand side, and the in-service teachers, situated on the left hand side. InB: in-service biology teacher, InL: in-service language teacher, InP: in-service primary school teacher, PreB: pre-service biology teacher, PreL: pre-service language teacher, PreP: pre-service primary school teacher.

different learning durations showed that the longer the teachers' training, the more they thought that health education developed pupils' skills ( $r = 0.16$ ).

Question B27 (exclusive responsibility of the family for health education) was influenced by the professional profile (Figure 4). The Monte-Carlo test on the between-class analysis according to the six professional profiles clearly separated pre-service biology and pre-service primary teachers from the other four categories and showed that they would be more favorable to policies in which health education were not entirely dependent on the family's responsibility (Pearson's  $r = -0.15$ , Figure 4). It thus appeared that these younger professionals could be more sensitive to current policies on health education

than the in-service teachers. This hypothesis is supported by the observation that the national language teachers were grouped together with the in-service teachers on the graph (Figure 4). The in-service teachers and the national language teachers, the latter not having had health education training, would thus be further removed from a comprehensive health education model than the pre-service teachers.

Question A63 (personal health model: the analysis showed that the personal preferences for a biomedical or social health model depended, although only slightly, on only one sociocultural variable, the level of training (Figure 3). Teachers with only high school training were more in favor of the biomedical model (Pearson's  $r = 0.07$ ).

## Discussion

In this study, we investigated the conceptions of teachers and future teachers regarding health education in four Mediterranean countries, France, Lebanon, Morocco, and Tunisia, with a questionnaire consisting of 17 questions. We explored four main topics: the health and health education models (biomedical or social health), the political and social options, the personal choices in health education, and nutritional choices. Moreover, we probed the influence of different sociocultural factors on the expressed conceptions. Two main results were obtained.

Firstly, we observed that the principal component analysis (PCA) of these 17 questions identified five main components which did not correspond to the four topics of investigation we had defined. Topic 1 especially, on the conceptions related to the biomedical and social health models (health as the absence of disease, the role of the class teacher, responsibility of the family and the contents of teaching) was only represented by the three questions in component 3. This finding showed that the teachers' conceptions of health education were not structured and clearly not related to a defined model. However, we cannot rule out a shortcoming of this analysis due to the formulation of these questions which may have seemed ambiguous. For example, question B21 'Health education at school must be restricted to providing scientific information', although insisting on the *restricted to* may have overlooked the fact that scientific knowledge is included in the social health model. Similarly,

question B26 'Health education at school mainly involves developing pupils' personal skills such as self-esteem or stress management' may have narrowed the field of health education to only include behavior. Another potential limitation of this study is that it was conceived as part of an investigation on biological science education, which is revealed in the title Biohead-Citizen, and this carried a risk of narrowing the focus of health education to the extent that the attitudinal and social dimensions of health education in schools could be seen as peripheral rather than central to the teaching.

Our second main finding was that the most important factors influencing the choices in health education were sociocultural variables, the principal ones being religion and country of residence. French teachers, more than Lebanese, Moroccan, and Tunisian teachers, thought that health education improved the behavior of students and developed pupils' skills. These conceptions are included in the social health model which might suggest that the French curriculum (12), based on the health promotion model, would have had an impact on French teachers. However, our analysis also showed that agnostics, more than Muslims, thought that health education could positively develop pupils' personal skills and behavior. Country of residence and religion are not independent variables. Statistics for the entire Biohead-Citizen sample showed that over 50% of French teachers declared themselves agnostics whereas over 50% of the Lebanese, Moroccan, and Tunisian teachers declared themselves to be Muslims (18). Consequently, it cannot be ruled out that the conceptions favoring features of the social health model may have been influenced either by religion, or its absence, or by the country of residence. This question should be investigated more thoroughly. It would also be interesting to clarify whether teachers consider that health education could interfere with their religious beliefs. In any case, these observations are in agreement with other studies showing that the sociocultural factors and personal values have a dominating influence in the considerations on health education (13).

Interestingly, we also found that the teachers with the higher levels of training thought that health education improved pupils' skills and their conceptions were the closest, to a limited extent, to the social health model. This last finding stressed the major role of training to develop the competencies

of the teachers in health education. The learning objectives should take into account, not only the specifics of a health model principles and values, but also develop the teachers' ability to apply the acquired knowledge in practice whilst being attentive to their own personal values.

In conclusion, this cross-country analysis of the teachers' conceptions showed that, despite three different curricula embodying a strict biomedical model (Lebanon and Tunisia), a biomedical model with sociopsychological skills (Morocco), and a social health model (France), the teachers' conceptions were not integrated into comprehensive approaches, but related to individual characteristics. Moreover, the teachers' choices of social health model with regard to their personal health were not correlated with any of the characteristics forming the specificity of this model in health education. These two findings show that the teachers in these four countries, both pre-service and in-service, did not have an explicit working model for health education, a difficulty which has already been depicted in France (19,20).

These findings point out the need for specific training in health education. In France, a recent study has shown that, among all the European countries, France belongs to the group offering the lowest number of master's level health promotion programs (21).

It thus appears that, in spite of international planning guidelines for developing school programs in health education (1,14) and recommendations in specific countries such as France (22), the current implementation of health education in the four countries we analyzed relied mainly on personal values leaving each one to interpret the official guidelines. It may also be that the values supported by these guidelines confronted the teachers' personal values, thus causing a conflict of values and making it difficult to choose a particular model (19,23). In order to set up an effective health education model, it would thus be necessary to make clear, not only the values considered as common social norms (24), but also to give each person the possibility to clarify his own personal values (25). Our study highlights the fact that developing school health initiatives which go beyond a biomedical approach would require thorough training, not only for pre-service (26,27) but also for in-service teachers.

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