What Should Be Educated to the Students at Schools of Public Health in Health Informatics ? [1]

Seongwoo Choi[a], Byung-chul Chun[b], Douckho Hwang[c], Jeongeun Kim[d], Yu-jeong Moon[b]

[a]Department of Medical Informatics, Medical College and School of Public Health, Gachon University, Korea
[b]Department of Preventive Medicine, Medical College and Department of Epidemiology and Health Informatics, School of Public Health, Korea University, Korea
[c]Department of Anatomy, Medical College, Seoul National University, Korea
[d]School of Public Health, Yonsei University, Korea

Abstract

This paper described the results of two surveys, one for the present state of education and training in health informatics at the schools of public health(SPHs) , and the other for the professional consensus on the learning outcomes of health informatics education at SPHs in Korea. Less than 50% of SPHs had health informatics courses and only one SPH had the academic degree program in health informatics. The contents provided by each SPHs were quite different from one another. According to the survey results of the experts, public health informatics, hospital information system, and computer-based health record, database, health/medical terminology system, security/confidentiality of data, consumer health informatics were relatively more important subcategories.

Keywords:

Medical Informatics; Education, Health informatics, Public Heatlh, Public Heatlh Informatics, Curriculum Development, School of Public Heatlh, Delphi method

Introduction

Advances in information technology will have far reaching and major effects on education and training in the field of health informatics [1]. The technology necessary for effective, Innovative application of information technology to public health practice is available today at very reasonable costs[2]. Health informatics education has been recently introduced to the schools of public health (SPHs) in Korea. Actually, It is fairly new discipline to most SPHs. But the educational need in health informatics has been rapidly increasing by the recent widely adapted practical application of health informatics and its principles to public health area. But there were neither consensus nor common learning objects of the informtical competency to be achieved by the students at SPHs. We did 2-step approach. First, we surveyed the SPHs in Korea to find out what and how much health informatics have been taught to the students at SPHs in regular curriculum. Second, we made a delphi survey of the essential contents of the learning outcome in health informatics discipline and of their priority.

Materials and Methods

Survey of SPHs: What is the Current Situation of the Health Informatics Education at SPHs?

We surveyed of the SPHs to figure out the current situation of the health informatics at SPHs. The subjects to be surveyed were all 20 SPHs which registered to the Korean Association of Deans of School of Public Heatlth in 2002. The primary corresponding replier of this questionnaire was the dean of each SPH. The questionnaire, developed by the KOSMI Education Committee, included the questions of the current health informatics education contents and curriculum. The questionnaires were sent by mail in Nov 2002. If there were no answer, we sent the questionnaire at least 3 times until March 2003.

Survey of the Experts, A Delphi Method: What Should Be Educated To the Students at SPHs in Health Informatics ?

Authors selected the delphi panelists(experts) from the list of health informatics professionals who have worked for SPHs. The selection criteria were who had the at least 1 year professional experience in health informatics education to the students at SPHs. There were total 5 experts who qualified the criteria.
The questionnaire consisted with the questions to ask the opinions of the curriculum and learning outcomes of the health informatics education at SPHs.
We categorized health informatics area into 4 fields; they were Principles of general informatics, Basic health informatics, Clinical health informatics and Public/Social aspects of health informatics. There were some sub-categories in each field as the specific subjects of health informatics. We had made the panels check the degree of need (5 Likert scale) and relative importance of the sub-categories(time allocation to each sub-categories, continuous scale). The first round of the survey were done from March 2003 to June 2003 and second round from June to August 2003.

Statistical Analysis

We counted the frequencies in nominal scale answers and calculated the means and standard deviations in case of continuous scale. The coefficients of variance were calculated to measure the stability of delphi survey.

Results

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Results of the Survey of SPHs

Of 20 SPHs, 12 SPHs(60.0%) replied back the questionnaire. And 6 of them(50.0%) had at least one regular education curriculum for health informatics, the other 6 SPHs had none.

Only one had the master and doctoral courses majoring in health informatics. This SPH established department of health and medical informatics in 1999 and had 18 master degree students in 2002. There were 12 who had completed master-degree took health informatics as his/her major. There were 2 full-time staffs in this department and 8 independent subjects in health informatics field.

The other 5 SPHs had no academic degree program in health informatics but had independent regular subjects in this field. Of 5 SPHs, 3 SPHs had 3 regular subjects in health informatics field, and one had 2 subjects. The name of the subjects were listed table 1. Every subjects had 2 or 3 academic points- one academic point means one hour class/week for 1 semester (usually 16 weeks in Korea). We have surveyed the curriculums of each subject and found the learning contents were very variable from one another, even in same lecture name.

Table 1. Lists of the health informatics lecture subjects at SPHs.

- Clinical decision making and health information data-mining
- Computer Programming for healthcare workers
- Database in health
- e-health care
- Health informatics (2 SPHs)
- Health informatics management
- Medical informatics(2 SPHs)
- Occupational health informatics management
- Overview of health informatics
- Seminars in medical informatics

Among these 5 SPHs, one had the plan to set up the academic degree program majoring in health informatics within 3 years, others not.

The 6 SPHs which had no any health informatics subjects in their curriculum, answered the reason why not (table 2). The most common reason answered were the lack of professional lecturers(6/9 = 66.7%). Among these 6 SPHs, 3(50.0%) had the plan to take part in education of health informatics within 3 years.

Table 2. Why no subjects in health informatics?(6 SPHs, multiple answers)

- Lack of professional lecturer in health informatics (66.7%)
- No educational need in Health informatics (22.2%)
- No opinion (11.1%)

Results of the Delphi Survey

Educational need by sub-categories

Table 3. Educational need of each sub-category

Field	Sub-category	Mean*(SD)	CV**
General Informatics	principles of informatics	1.80(0.84)	0.47
	information theory	1.80(1.30)	0.72
	Network/Internet	1.80(0.45)	0.25
	Database	1.40(0.55)	0.39
	System design and analysis	2.75(1.26)	0.46
Basic Health Informatics	History and Concept of health informatics	1.20(0.45)	0.38
	Health/Medical Terminology and vocabulary system	1.00(0.00)	0.00
	Standard of health informatics	1.50(0.58)	0.39
	medical reasoning and decision making	1.80(0.84)	0.47
	decision support system	2.20(0.45)	0.20
	information retrieval and Evidence-based healthcare	2.20(0.45)	0.20
	bioinformatics	2.60(0.55)	0.21
	Computer-assisted education	2.40(0.55)	0.23
Clinical Health informatics	Hospital Information System	1.20(0.45)	0.38
	Computer-based Health Records	1.20(0.45)	0.38
	Clinical information system	2.40(0.89)	0.37
	Health Multimedia	2.40(0.89)	0.37
	Telehealth	2.20(0.84)	0.38
	bio-engineering	3.00(0.00)	0.00
Public/Social Aspect of Informatics	Consumer Health Informatics	1.80(0.84)	0.47
	Public Health Informatics	1.20(0.45)	0.38
	Security/confidentiality of data	1.00(0.00)	0.00
	ethical and social effect of health informatics	1.80(0.45)	0.25
	Informatical aspects of Healthcare management and marketing	2.33(1.15)	0.49

* 5 Likert scale : 1=most needed, 2=usually needed, 3=neutral, 4=usually unneeded, 5=never needed

**coefficient of variance(SD/Mean)

Table 3 showed the result of the results of survey on educational need of each sub-category. This is the 2nd round results. All CVs are under 0.5 except one subcategory, so we did not need further round.

Health/medical terminology and vocabulary system, and the security/confidentiality of health data/system were marked most needed subject by all 5 panelists without exception. Public health informatics, history/concept of health informatics, hospital information system and computer-based health records were also very needed subjects by the panelists (mean=1.20).

Table 4. Relative importance of the sub-categories

Field	Sub-category	Mean*(SD)
General Informatics	principles of informatics	1.40(0.55)
	information theory	1.60(1.14)
	Network/Internet	1.45(0.57)
	Database	2.20(0.84)
	System design and analysis	0.30(0.67)
Basic Health Informatics	History and Concept of health informatics	1.05(0.20)
	Health/Medical Terminology and vocabulary system	1.70(0.45)
	Standard of health informatics	0.60(0.65)
	medical reasoning and decision making	1.45(0.51)
	decision support system	1.10(0.22)
	information retrieval and Evidence-based healthcare	1.10(0.55)
	bioinformatics	0.90(0.22)
	Computer-assisted education	0.80(0.76)
Clinical Health informatics	Hospital Information System	2.60(0.89)
	Computer-based Health Records	2.50(0.50)
	Clinical information system	0.95(0.80)
	Health Multimedia	0.65(0.42)
	Telehealth	0.85(0.34)
	bio-engineering	0.55(0.37)
Public/Social Aspect of Informatics	Consumer Health Informatics	1.60(0.82)
	Public Health Informatics	2.70(1.99)
	Security/confidentiality of data	1.60(0.65)
	ethical and social effect of health informatics	1.00(0.35)
	Informatical aspects of Healthcare management and marketing	0.30(0.45)

* Mean 1 = 1 hour-class/semester, if all of the sub-categories were taught as a single subject in a semester (32 hour-class, in usual in Korea)

But the means of bio-engineering (3.0), system design and analysis(2.75), bio-informatics (2.60) were exceed 2.5, it means they were least needed subjects at SPH in health informatics. Decision support system, evidence-based healthcare, computer-assisted education, clinical information system, multimedia, telehealth, and informational aspects of health care management and marketing were also categorized as relatively unneeded subjects in this study (mean > 2.0).

Relative importance of sub-categories

Table 4 showed the summary of relative importance of sub-categories, which were the answer to the question 'if you should make a single subject which consisted with the needed sub-categories according to your opinion, how much time would you allocate to each sub-category?'
Public health informatics (2.70), hospital information system(2.60), computer-based health records(2.50) and database(2.20) were the sub-categories exceeded 2.0. But the means of system desing and analysis, informational aspects of healthcare management and marketing(0.3), bio-engineering(0.55), standard of health informatics(0.6), computer-assisted education(0.8) and bioinformatics(0.9) sub-categories were marked less than 1.0.

Health informatics education program

The health information education program at SPHs should be consisted of at least 3 independent subjects, according to the survey results. The most common recommended independent subject was database.

Conclusions

Actually, less than 50% of SPHs had health informatics courses and only one SPH had the academic degree program in health informatics. The contents provided by each SPHs were quite different from one another.
According to the survey results of the experts, public health informatics, hospital information system, and computer-based health record, database, health/medical terminology system, security/confidentiality of data, consumer health informatics were relatively more important subcategories. These results roughly answered the question 'what should be educated at SPHs in health informatics?'.

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Address for Correspondence

Byung-chul Chun MD, MPH, PhD.

Department of Preventive Medicine, Korea University, Medical College, Anamdong 5 Ga, Sungbuk Gu, Seoul 136-705, Korea

e-mail : chun@korea.ac.kr