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Development of a global health bachelor curriculum in China: a Delphi study

Li Guan,[1,2] Pan Gao,[1,2] SuYang Liu,[1,2] YiSi Liu,[1,2] XiangYu Li,[1,2] FeiFei Liu,[1,2] ZongFu Mao,[1,2] YuanAn Lu,[3] Hao Xiang[1,2]

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LG and PG contributed equally.

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[1]Department of Global Health, School of Health Sciences, Wuhan University, Wuhan, China
[2]Global Health Institute, Wuhan University, Wuhan, China
[3]Department of Public Health Sciences, University of Hawaii at Manoa, Honolulu, Hawaii, USA

Correspondence to
Dr Hao Xiang;
xianghao@whu.edu.cn

ABSTRACT

Objective This study aimed to establish the first global health bachelor curriculum in China.

Design The Delphi methodology was used to determine expert consensus on which courses should be included in the global health bachelor curriculum. A literature review and a workshop proceeding were performed to generate courses. Then a two-round Delphi process was conducted with 28 invited experts from universities, health administrative departments and non-governmental organisations to rate courses using a 5-point Likert scale. Additionally, the experts could alter, add or delete courses as appropriate. Consensus was predefined as a mean score of 4 or above and the percent agreement (proportion of panel members scoring 'very important' or 'important') no less than 75%.

Results The responses in the two-round Delphi process were 85.7% and 70.8%, respectively. In the first round, 12 courses did not meet the inclusion criteria and were removed. Based on the participants' comments, 32 courses were included in round 2. In the second round, the consensus was reached on 31 courses which were selected as the final curriculum. These courses were categorised into five modules, including General Knowledge, Methodology, Global Health Issues, Intercultural Communication, and Health Policy and Programme Management.

Conclusion This study established the first global health bachelor curriculum in China. It will provide guidance for other educational institutions to develop similar programmes or curricula in the future.

Strengths and limitations of this study

- This is the first study to develop a global health bachelor curriculum in China.
- This study take advantage of the Delphi methodology to gather expert opinions and consensus on the curriculum.
- A pilot survey was completed by faculty members at Wuhan University to explore the readability and feasibility of the questionnaire.
- A limitation of the study is that all of the international panel members were from the USA with no experts from other foreign countries.

INTRODUCTION

With the rapid development of the global economy, more and more Chinese go abroad to study, work and travel, while more and more foreigners are visiting China for the same reasons. Health issues and health inequality have quickly become the challenges for China and other countries.[1] Today, it is clear that infectious diseases have no borders and can spread readily from one country to another.[2 3] Many global health (GH) issues and major diseases can only be effectively controlled and resolved through international collaboration.[2] A competent GH workforce with sufficient training and expertise is needed to improve and maintain local and GH.[4 5] Therefore, GH education in universities has become a new focus and has attracted widespread attention throughout the world.[6]

Over the past few years, GH education has increasingly been recognised and included in the curriculum in most western countries. From 2011 to 2014, nearly 95% of the publications related to GH education originated from North America and European countries.[7] Conversely, only 2.9% emanated from Asia.[7] The gap in the quantity of studies on GH education between high-income and middle-income countries is obvious. In addition, bachelor programmes in GH are mainly concentrated in high-income countries, including the USA, UK and Canada.[6 7] For example, the Blizard Institute of Queen Mary University of London offers a Bachelor of Science (BS) degree in GH to help students develop an understanding of a range of public health issues at the global level.[8] In the USA, the University of Southern California provides a BS programme in GH composing of courses in the basic sciences, international relations, health promotion and disease prevention.[9] Such programmes, however, are rare in middle-income countries. There is

an urgent need to establish and develop GH education programmes in these middle-income countries.

As China has moved from an aid-receiving country to an aid-providing country, there is an increasing demand for Chinese health professionals with knowledge and competency in GH.[10] Over the past few years, Peking University, Fudan University and Wuhan University have established GH Departments and research centres to train GH professionals and promote China's involvement in GH activities worldwide.[11] The GH programmes can provide Chinese health professionals to go abroad to help the developing world and also educate international students to help their own countries to address health issues and health inequalities. In addition, these programmes can help China establish a better healthcare system and provide evidence for future health policy-making to address health issues and health inequalities domestically. Nowadays, studies focusing on curriculum development for GH education in China are very limited.

This paper examines a Delphi process for developing the first GH bachelor curriculum in China. The curriculum was developed and reviewed by international GH experts. The results of this study may be helpful to educators and students in other institutions interested in developing GH education and training programmes in China and other countries.

METHODS

We employed the Delphi method to develop a GH bachelor curriculum. The Delphi method is an iterative process to gather and provide information by using a series of questionnaires to determine the degree to which experts agree about the issue discussed.[12] There were three phases in this study.

Phase I

Generation of the initial draft and questionnaire

Three members of the writing team (LG, PG and SYL) undertook a web search to identify available curricula related to GH bachelor programmes in February 2013. Curricula from four universities (Arizona State, Georgetown, Kent State and Southern California) were selected. A literature review was then conducted via Google and PubMed using the search terms 'name of school'+'global health', 'global health program', 'bachelor of global health or international health'. Six articles that are highly relevant to GH education were retrieved.[13–18]

In March 2013, during a workshop on GH bachelor education, we held a brainstorming exercise to generate ideas on the potential courses to be included in the GH bachelor curriculum. To guide the workshop discussion, we adopted a widely cited GH definition: "GH is an area for study, research, and practice that places a priority on improving health and achieving equality in health for all people worldwide. GH emphasizes transnational health issues, determinates and solutions; involves many disciplines within and beyond the health sciences and promotes interdisciplinary collaboration; and is a synthesis of population-based prevention with individual-level clinical care'.[19] Nine GH educators, 12 public health educators and 10 multidisciplinary experts from Peking University, Fudan University and Wuhan University were invited. The courses that were generated were discussed in depth and categorised into six modules, including General Knowledge, Interdisciplinary Knowledge, Methodology, Global Health Issues, Intercultural Communication, and Health Policy and Programme Management.

According to the collected information above, we generated an initial draft of GH bachelor curriculum composed of 52 courses in six modules. We designed a questionnaire for experts to review and determine which courses should be included in the curriculum. Each course was described with course name, learning objectives and a short description of the course content.

Phase II

Pilot survey

Before the formal investigation, five faculty members at Wuhan University were invited to complete a pilot survey to explore the readability and feasibility of the questionnaire. Based on their feedback, the first version of questionnaire was developed for the Delphi study.

Recruitment of members in the Delphi study

The inclusion criteria of Delphi panel members were defined before recruitment. The candidates were selected from universities, health administrative departments and non-governmental organisations. They should have GH experience in terms of teaching, research or working for the international health organisations. Limited by time and budget, we recruited 28 panel members according to the recommendations for Delphi studies.[20]

Phase III

Delphi round 1

In the first round, all 28 panel members were sent an email with the questionnaire and the informed consent form. They were invited to rate the 52 courses on a 5-point Likert scale[21] from 1 (not important) to 5 (very important). In addition, they were asked to alter, add or delete courses as appropriate. The mean, SD and percent agreement (scoring 'very important' or 'important') were calculated for each course. Complete data were collected from 24 of 28 panel members, and the results were used to revise the questionnaire and establish a second version.

Delphi round 2

The survey process for round 2 followed that of round 1. The 24 panel members who had participated in round 1 were invited to re-rate the selected courses. They were sent the second version of questionnaire, and 17 of them responded. Based on Diamond *et al*,[20] Delbecq *et al*[22] and Ludwig,[23] this number is sufficient to conduct subsequent data analysis.

Data analysis

All statistical analyses were performed using IBM SPSS Statistics V.19.0 to generate descriptive statistics. The importance for each course was determined by the mean score. The percent agreement of each course was the proportion of panel members rating the course as 'very important' and 'important'. There have been no universally accepted criteria for consensus in a Delphi study.[12] Miller indicated that if a certain percentage of the votes fall into a predefined range, consensus can be achieved.[24] In this study, we define that a mean score is of 4.0 or above and the percent agreement is no less than 75%, the consensus is reached.[20 25]

Patients and public involvement

This study has not involved any patient. We consider the participants in the Delphi study as part of the public involvement. There was no participant involved in developing the questionnaire or designing or conducting the study. We did not seek advice from the participants to interpret the results of the study. No plans have been conceived to disseminate the results to the study participants.

RESULTS

Demographics of the Delphi panel members

In round 1, 24 (85.7%) of the 28 invited experts participated. In round 2, 17 (70.8%) of the 24 responded. Delphi panel members had different academic background and expertise, and worked in the following areas: nutrition, physiology, epidemiology, environmental health and health policy. Five panel members from American universities (Duke, Florida, Hawaii and Tennessee) had been associated with Chinese universities and were familiar with Chinese GH education. Most participants were less than 50 years old, with more than 5 years of GH experience. There are no significant differences in the distributions of gender (Fisher's exact test p=1.000), age (Fisher's exact test p=0.433), global health experience (Fisher's exact test p=1.000) and organisation (Pearson χ^2 p=0.680) between the participants of the first and second rounds. The detailed demographic characteristics of the Delphi panel are shown in table 1.

Table 1 Demographics of the Delphi panel members

Characteristics	Round 1 (n=24)	Round 2 (n=17)
Gender, n (%)		
Male	18 (75.0)	12 (70.6)
Female	6 (25.0)	5 (29.4)
Age (years), n (%)		
<50	18 (75.0)	15 (88.2)
≥50	6 (25.0)	2 (11.8)
Global health experience (years), n (%)		
<5	6 (25.0)	5 (29.4)
≥5	18 (75.0)	12 (70.6)
Organisation, n (%)		
University	14 (58.3)	11 (64.7)
Other institutions*	10 (41.7)	6 (35.3)

*Health administrative departments and non-governmental organisations.

Delphi round 1

Of the 52 courses rated by panel members, 12 courses did not meet the inclusion criteria and were removed (table 2). One course (International Health Project Management) was added based on the recommendations of four panel members. Six courses were renamed (table 3). In addition, Social Anthropology and Medical Anthropology were combined to form a course called Culture Anthropology. Principles and Application of geographic information system (GIS), Global Burden of Disease, and Behaviour, Psychology and Health were incorporated into Research Methods in Global Health, Epidemiology and Mental Health, respectively. The course of Race, Culture and Health was incorporated into Health Social Determinants, which was then integrated into Introduction to Global Health. Comparative Health Systems, Introduction to Global Health Organisations and Global Health Promotion were incorporated into Global Health Governance. Following feedback, the Interdisciplinary Knowledge module was incorporated into the module of General Knowledge. Introduction to Global Health was moved from the module of Global Health Issues to the module of General Knowledge. As a result, the revised curriculum contained five modules and 32 courses.

Delphi round 2

In the second round, 32 courses were rated by 17 participants. The results of the second round are listed in table 4. Organisational Behaviour did not meet the inclusion criteria and was removed. Finally, consensus was reached on five modules and 31 courses.

DISCUSSION

This study established the first recommended GH bachelor curriculum in China. Through a two-round Delphi study, panel members reached consensus on 31 courses in five modules, which are to train students to gain essential knowledge and various skills to serve and practice in GH field. We believe that the curriculum will provide students with a strong background in understanding and addressing GH issues and prepare students to become health professionals with international competencies.

The module of General Knowledge comprises interdisciplinary courses covering psychological, social, economic and philosophical dimensions. It is well accepted that interdisciplinary knowledge is critical for GH undergraduates to recognise social, political and economic factors of disease and understand the current and emerging GH issues from different perspectives.[19 26–28] Most GH

Table 2 Course scores in round 1

Module	Course	Mean±SD	Agreement (%)
General Knowledge	Preventive Medicine	4.63±1.01	92
	Introduction to Ethics	4.29±0.62	92
	Introduction to Clinical Medicine	4.17±0.82	83
	Probability and Statistics	4.00±0.98	71*
	Pathogenic Organisms	3.87±1.06†	67*
	Basis of Computer Engineering	3.79±0.98†	71*
	Medical History	3.54±1.06†	58*
	Physiology	3.43±1.12†	46*
	Human Anatomy	3.22±1.13†	42*
	Biochemistry	3.09±0.90†	25*
	Advanced Mathematics	3.04±1.04†	21*
Interdisciplinary Knowledge	Introduction to Sociology	4.38±0.71	88
	Global Health Economics	4.38±0.82	88
	Social Psychology	4.17±0.82	83
	Medical Anthropology	4.13±0.74	79
	Social Anthropology	4.09±0.73	75
	Race, Culture and Health	4.09±0.73	75
	Organisational Behaviour	4.08±0.72	79
	Behaviour, Psychology and Health	4.00±0.67	79
	Introduction to Eastern and Western Philosophy	4.00±0.67	79
Methodology	Epidemiology	5.00±0.00	100
	Biostatistics	4.75±0.68	96
	Research Methods in Global Health	4.73±0.46	100
	Literature Review	4.35±0.78	88
	Common Statistical Software	4.33±0.70	96
	Principles and Application of GIS	4.24±0.77	79
Global Health Issues	Environment and Health	4.71±0.55	96
	Social Determinants of Health	4.67±0.70	96
	Introduction to Global Health	4.67±0.56	96
	Global Burden of Disease	4.65±0.57	92
	Non-Communicable Diseases	4.63±0.58	96
	Food and Nutrition Security	4.63±0.58	96
	Communicable Diseases	4.58±0.65	92
	Maternal and Child Health	4.58±0.65	92
	Case Studies in Global Health	4.48±0.59	92
	Global Health and Ageing	4.43±0.73	92
	Global Mental Health	4.30±0.82	83
Intercultural Communication	Health Professional English	4.71±0.55	96
	International Law	4.30±0.82	83
	Intercultural Communication	4.26±0.86	79
	Modern International Relationship	4.13±0.74	79
	International Political Economy	4.13±0.74	79
	Major World Religions	3.54±0.78†	46*
	The Second Language (French)	3.42±0.83†	58*
	Global History	3.33±0.96†	38*

Continued

Table 2 Continued

Module	Course	Mean±SD	Agreement (%)
Health Policy and Programme Management	Global Health Internship	4.42±0.72	88
	Comparative Health Systems	4.42±0.72	88
	Global Health Diplomacy Practice	4.35±0.98	79
	Global Health Management	4.26±0.86	79
	Introduction to Global Health Organisations	4.26±0.75	75
	Global Health Promotion	4.24±0.77	79
	Hygienic Managerialism	4.09±0.90	71*

Likert scale: 1, not important; 2, somewhat important; 3, moderately important; 4, important; 5, very important.
*Percent agreement <75%.
†Mean score <4.0.

bachelor programmes in the USA encourage interdisciplinary coursework.[29] Allegheny College, Arizona State University, Georgetown University and the University of California San Diego all offer interdisciplinary courses such as sociology, political sciences and economics which, however, are set in elective modules.[30–33] In our GH bachelor programme, students are required to master interdisciplinary knowledge, which will ensure them to successfully work in GH field.

Through the web search of GH bachelor curricula abroad, we found that Kent State University provided a special course on the application of GIS in health research.[34] As the most efficient way for global spatial and geographical mapping,[35] GIS technology should be included in the Methodology module. However, considering that it may be difficult for students to understand the learning material, panel members suggested incorporating GIS technology into Research Methods in Global Health and students could choose this course as an elective one for further study. Also, we found that many colleges and universities in the USA provided research method courses in their GH bachelor curricula. For example, the University of Southern California offered 'core studies' as one of the required modules, which includes Health Behaviour Statistical Methods, Health Behaviour Research Methods and Directed Research.[9] In the review of GH bachelor education in the UK, research methods and epidemiology were two of the most frequently offered courses, and they were emphasised in the programmes at University of Oxford and King's College.[6] As the Global Health Education Consortium has proposed the 'Methods, Tools, and Skills' module in GH undergraduate education,[36] we believe that research methods are essential in the GH bachelor curriculum.

Intercultural competency training is a challenge for the success of GH education programmes.[35] The most frequently mentioned core competency of GH for healthcare professionals is 'be able to communicate with different populations and work under various cultural environments and medical systems'.[37 38] This competency was also a main focus of our GH bachelor programme and was emphasised repeatedly by potential employers of GH graduates of degrees. Sociocultural and political awareness is needed by GH professionals to work effectively across diverse geographical and cultural areas with a variety of populations and health policies.[39 40] The ability of problem-solving in practical work should also be improved among GH professionals to deal with health problems in different regions and healthcare systems.

The module of Health Policy and Programme Management comprises both domestic and international internships. Prior studies have highlighted the benefits of GH internships which include (1) opening doors to applying the course theories in settings of limited resources domestically and internationally and engaging in collaborative research throughout the world[41]; (2) helping increase knowledge, develop skills and gain confidence and better cultural sensitivity[42 43]; and (3) providing opportunities for graduate programmes and jobs.[29] Practicum or internship experiences have been consistently emphasised in GH bachelor programmes abroad. The five GH bachelor programmes in the USA (Allegheny College, Arizona State University, Duke University, New York University and University of California San Diego) require students to have practicum experiences and another three (Arizona State University, Mercer University and New York University) require students to have international experiences.[29] These experiences are part of transformational learning components for students and should be promoted and encouraged.

Table 3 Recommended course name changes

	Original course name	Course name after renaming
1	Global Health Economics	Health Economics
2	Maternal and Child Health	Introduction to Maternal and Child Health
3	Global Mental Health	Mental Health
4	Environment and Health	Environment and Global Health
5	International Law	International Health Law
6	Global Health Management	Global Health Governance

Table 4 Final global health curriculum: course scores in round 2

Module	Course	Mean±SD	Agreement (%)
General Knowledge	Preventive Medicine	4.53±0.51	100
	Health Economics	4.47±0.62	94
	Introduction to Global Health	4.41±0.80	82
	Introduction to Sociology	4.35±0.70	88
	Introduction to Ethics	4.29±0.69	88
	Introduction to Clinical Medicine	4.12±0.93	76
	Social Psychology	4.12±0.73	82
	Culture Anthropology	4.00±0.71	76
	Introduction to Eastern and Western Philosophy	4.00±0.87	76
	Organisational Behaviour	3.71±0.77*	65†
Methodology	Epidemiology	4.70±0.47	100
	Research Methods in Global Health	4.59±0.71	88
	Biostatistics	4.59±0.51	100
	Literature Review	4.06±0.75	76
	Common Statistical Software	4.06±0.66	82
Global Health Issues	Non-Communicable Diseases	4.65±0.49	100
	Environment and Global Health	4.53±0.72	88
	Case Studies in Global Health	4.53±0.51	100
	Communicable Diseases	4.35±0.70	88
	Introduction to Maternal and Child Health	4.29±0.69	88
	Global Health and Ageing	4.24±0.66	88
	Food and Nutrition Security	4.12±0.73	82
	Mental Health	4.00±0.71	76
Intercultural Communication	Health Professional English	4.47±0.62	94
	International Health Law	4.35±0.79	82
	Intercultural Communication	4.06±0.75	76
	International Political Economy	4.00±0.87	76
	Modern International Relationship	4.00±0.71	76
Health Policy and Programme Management	Global Health Internship	4.65±0.61	94
	Global Health Governance	4.59±0.62	94
	International Health Project Management	4.47±0.62	94
	Global Health Diplomacy Practice	4.24±0.83	76

Likert scale: 1, not important; 2, somewhat important; 3, moderately important; 4, important; 5, very important.
*Mean score <4.0.
†Percent agreement <75%.

Our study was to identify the required GH major courses for a GH bachelor degree. All of the 31 courses listed in the curriculum are required GH major courses without elective courses, which are much more than the major courses required in the American universities for a GH bachelor degree. Despite this, the course contents of our curriculum have much in common with those found in the Western countries. They lay the foundation for Chinese GH students to study and work abroad in the future. This curriculum was implemented in September 2013 and the first group of students successfully completed the GH bachelor programme in 2017. Tested in both teaching and learning practices, the curriculum was proven to be practical. We would like to summarise the previous research work during the development of the curriculum to provide some information for future improvement of the curriculum. Currently, the faculty members of School of Health Sciences at Wuhan University are obtaining feedback from these graduates.

A limitation of this study is that all of the international panel members were from the USA. In the preparation phase, due to our limited professional network and financial support to recruit Delphi participants, we were not able to seek opinions from academics and GH

practitioners from other foreign countries. As we and others know, it is important to seek advice from GH educators, researchers and practitioners working in low-income countries. They know much better than those in high-income countries about the knowledge and skills needed to function in the field and to offer solutions to solve GH issues in low-income countries, which are useful trainings for GH workforce. Five years later, with the development of GH education worldwide, we will continue to try to get feedback from those GH colleagues from low-income countries to share their experience on cultivation of GH undergraduates and discuss the proposed GH bachelor curriculum to identify areas of strength and weakness for further improvement.

CONCLUSION

In this study, the consensus was reached on five modules with 31 courses in the GH bachelor curriculum among international experts after two rounds of a Delphi study. This study broke new ground by developing the first GH bachelor curriculum in China. We hope that our study will provide some guidelines and references for other institutions to set up their GH programmes or curricula. This may help facilitate GH education in China as well as in other middle-income countries in the near future.

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