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Clinical Informatics Professionals' Training Needs and Job Satisfaction in Singapore

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Abstract

Objectives: To examine the training needs and job satisfaction of clinical informatics professionals in Singapore public hospitals and institutions. Design: an anonymous online survey was disseminated by institutions' informatics leads to their respective teams. Results & conclusions: 53 professionals responded to the survey. About 80% of respondents agreed that informatics work was meaningful, and they were happy in their roles. Only 9% indicated they would consider leaving their jobs. Fifty-one per cent of respondents were pleased with the career development opportunities available. Forty-nine percent agreed that their organization looked after their professional growth. Fifty-three percent felt that they received sufficient training opportunities for the work they do, while 25% disagreed. The results suggest that more could be done to improve clinical informatics professional development and training in Singapore.

Keywords:

Clinical Informatics, Professional education, professional development, survey

Introduction

Biomedical informatics is a scientific discipline focused on the effective use of knowledge and information in patient care, public health and biomedicine. The branch involving patient care is often termed clinical informatics [1]. Clinical informatics (CI) professionals play an increasingly important role in the implementation of healthcare information systems [2]. They analyze, design, implement, and evaluate information systems to enhance individual and population health outcomes, improve patient care, and strengthen the clinician-patient relationship [3]. The field of Clinical Informatics is multidisciplinary and the delineation of practice of Clinical Informaticians is continually evolving [4, 5]. In Singapore, clinical informatics professionals may consist of physicians, nurses, allied health and non-medical personnel, as the delineation between various aspects of Health Informatics (e.g., Nursing Informatics, Public Health Informatics etc.) is not well established locally.

Most of these CI professionals are nurtured from the public sector as public hospitals and institutions were among the first to digitalize over two decades ago [6]. Many are now working in public institutions, mainly tertiary hospitals and in a government-linked health technology company, called Integrated Health Information Systems (IHIS) Private Limited. IHIS is the main IT agency supporting all public hospitals and institutions in Singapore. Founded in 2008, IHIS took on the role as our Ministry of Health's HealthTech agency to advance healthcare IT in Singapore. At present, our country does not have a formal accreditation process for Clinical or Health Informatics professionals. Neither do we have formal training pathways.

This study was conducted as part of a bigger plan to review the local informatics professionals' training needs, and job satisfaction. The survey findings in this paper form part of our final recommendations to the Ministry of Health's Chief Medical Information Officer (CMIO). As part of the review, we had also conducted additional face to face interviews with CMIOs from several large public hospitals in Singapore. An excerpt of the CMIO discussions will be presented in the Discussion section.

Methods

An anonymous on-line survey was designed using Google Forms, comprising of a series of questions with 3 main sections; (i) Respondent's background, (ii) Education and Training, (iii) Job Satisfaction. Questions for Section (iii) were adapted from the 2016 Health IT Industry Survey [7] by Morsani College of Medicine, University of South Florida. The online survey link was disseminated by the institutions' informatics leads to all their respective team members. Based on our checks with the various teams, we had estimated a minimum of 120 full time clinical informatics professionals working in the public hospitals and healthcare institutions. We had excluded clinicians who were working part time as user champions or subject matter experts. The survey structure and questions are listed in Table 1.

Participation in the survey was voluntary and anonymous with no personal identifiable data collected. The survey was closed after two weeks, and data was validated and encoded into a spreadsheet for analysis.

Results

A total of 53 professionals responded, out of an estimated total of 120 Clinical Informatics professionals across IHIS and the various institutions in Singapore. (Response rate of 44%). Respondents comprised of 34% physicians, 23% pharmacists, 17% nurses and 6% from allied health professional backgrounds. The remaining 21% were non-clinicians.

Table 2 shows the demographic characteristics of our respondents, with a slight predominance of males (55%) over females (45%). Fifty-eight percent were 40 years old and younger. Most (56.6%) were employed by public healthcare institutions, mostly tertiary hospitals, while the rest (43.4%) were employed by the government linked health technology company, Integrated Healthcare Information Systems (IHIS).

Sixty percent of the respondents had ten or more years of clinical care experience. About 24% of respondents had less than 5 years of experience in clinical settings before transiting to full time clinical informatics work.

In addition, many respondents had significant working experience in clinical informatics roles. Twenty six percent of them had been working in their current clinical informatics roles for 10 or more years.

Table 1 – Survey Questions

Demographics

1. Gender
2. Clinical background, if any:
   - Nursing
   - Physician
   - Pharmacy
   - Allied Health
3. Industry previously employed in:
   - Healthcare
   - IT or tech
   - Others: _____

Education & Training

1. Highest Qualification?
   - Diploma
   - Bachelor's degree
   - Master's degree
   - Doctoral degree
2. What other courses/training programs have you participated in?
3. Experience in healthcare. State Duration
4. Experience in informatics work. State Duration

Job Satisfaction (Likert scale)

1. I find my work meaningful
2. I find my work is valued by my team
3. When I encounter problems at work, I can rely on colleagues for help/support
4. I am happy working in Clinical Informatics
5. I intend to leave my job in the next 1-2 years
6. Overall job satisfaction score
7. Do you see potential growth opportunities in your career in the next 5 years?

Table 2 – Demographic characteristics of respondents

Variable	Number (%)
Gender	
Male	29 (55)
Female	24 (45)
Age (years)	
Less than 25	1 (1.9)
25 - 30	7 (13.2)
31 - 40	23 (43.4)
41 - 50	15 (28.3)
51 - 60	7 (13.2)
More than 60	0
Clinical Background	
Physician	18 (34)
Pharmacist	12 (22.6)
Nurses	9 (17)
Non-clinical background	11 (20.7)
Other allied health	3 (5.7)
Employment	
Public Healthcare Institutions	30 (56.6)
IHIS	23 (43.4)
Years of experience in healthcare	
>15 Years	14 (26.4)
10-15 Years	18 (34)
6-9 Years	8 (15.1)
3-5 Years	6 (11.3)
0-2 Years	7 (13.2)
Years of experience in current CI role	
>15 Years	3 (5.7)
10-15 Years	11 (20.8)
6-9 Years	14 (26.4)
3-5 Years	12 (22.6)
0-2 Years	13 (24.5)

Clinical Informatics Education & Training

Figure 1 below shows that 15% of respondents had post graduate degrees in a related informatics discipline (e.g., Biomedical or health informatics), 41% had attended introductory or basic courses (e.g., AMIA 10x10), while 37% had no training at all.

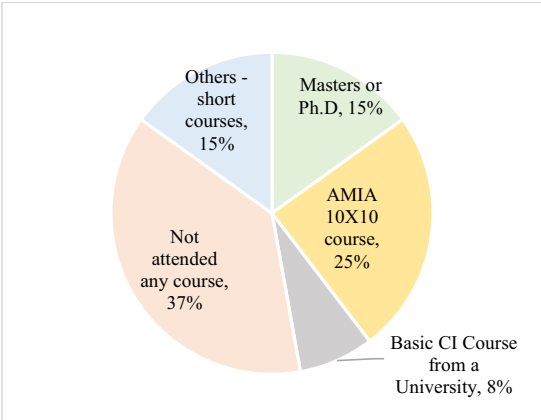

Figure 1 – Clinical Informatics Professional Education

Table 3 below shows a high participation rate in yearly professional education activities with 81% attending at least one relevant conference or course in the past year. However, 19% did not attend any learning events at all in the past year.

Table 3 – Participation in yearly learning activities

Attended at least one relevant seminar, conference, program in the past 1 year?	Number (%)
Yes	43 (81%)
No	10 (19%)

The responses in Figure 1 and table 2 suggest more can be done to increase training and learning opportunities for CI professionals in the country.

The survey respondents were further asked to select topics which they would like to learn in the coming year. They could select one or more of the following high-level topics for learning.

- Clinical systems implementation: Examples include software development lifecycle, project management, requirements gathering and analysis.
- Computing concepts, such as programming, software, hardware and network concepts.
- Our healthcare delivery system, policies and economics, including models of care, healthcare financing.
- Clinical data standards, including the use of standards like SNOMED, LOINC etc.
- Leading Change: topics include leadership and managerial training, communication, strategy.
- User interface, usability and user experience
- Analytics, data science and statistics, including the use of artificial intelligence in healthcare.

Table 4 shows the training wish list based on the frequency of choices.

Table 4 – Training Wish List

High Level Topics Interested	Frequency
1. Computing Concepts	22
2. Clinical systems Implementation	13
3. Analytics and Data Science	8
4. Our Healthcare Delivery System	4
5. Clinical Data Standards	2
6. Leading Change	1
7. User Interface, Usability and user experience	1

This training wish list can be used to plan for future training courses and provide an approximate gauge of demand.

Career Development and Job Satisfaction

In this section, respondents were asked to rate their level of agreement to a series of statements on a five-point Likert scale.

Figure 2 below shows the responses to the statements, with the orange bars representing the percentage of respondents who strongly disagree or disagree; the yellow bars representing the percentage of neutral ratings; the green bars representing percentage of those who strongly agree or agree.

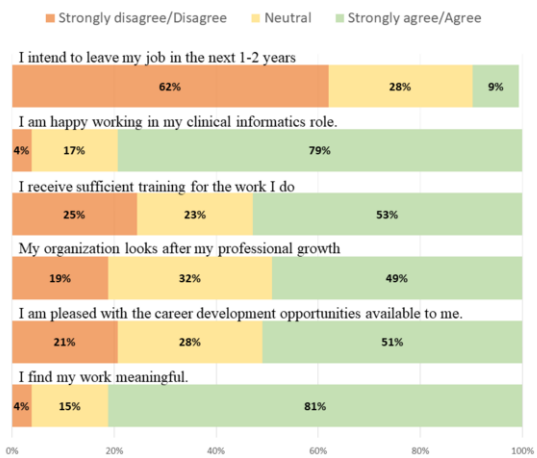

Figure 2 - Career Development and Job Satisfaction Ratings

The respondents were generally happy with their jobs (79% agreed) with only 9% indicating their intention to leave their jobs in the next one to two years. Eighty-one percent indicated they found their work meaningful. However, 25% disagreed with the statement that they had sufficient training for the work they do.

Discussion & Conclusions

Our relatively low response rate of 44% can lead to some selection bias and is a limitation of this study. This can be attributed to poor outreach as we had disseminated the survey via a top-down approach and in a short period of two weeks. In addition, no incentive was given to complete the survey. A larger scale study can be done in the future to build on this study's findings. Nevertheless, the results still provided interesting and actionable insights:

- A significant number (37%) had no relevant informatics training (Figure 1) and 19% did not even participate in any learning event in the past year (Table 2). Therefore, we should advocate all CI professionals attend some form of basic training course and participate in yearly learning activities.
- The majority (81%) of the respondents found their work meaningful and were happy working in their Clinical Informatics role.
- However, only 51 % of respondents were pleased with their career development opportunities, and 49% agreed that their organization looked after their professional growth. Twenty percent of the respondents disagreed with these statements.
- Sixty two percent of respondents had no intention to leave their jobs in the next one to two years. Twenty-eight percent were neutral in their responses while 9% indicated that they might leave their jobs in the next one to two years.

While the scores for job happiness and satisfaction appeared high, a significant number of respondents did not give clear indication that they would stay in their jobs in the near term. There could be other underlying push or pull factors which were not covered by this study, such as remuneration, intra-team relationships. A future study can be designed to investigate these factors in more detail. Nevertheless, the results do suggest more can be done to engage and retain existing informatics professionals.

In our face-to-face interviews with the CMIOs of several large public hospitals, they had recognized the need to retain and recruit more informatics professionals in Singapore as our healthcare sector has been expanding rapidly. They recognized the difficulty in hiring trained informatics professionals for public service. While Health IT systems have certainly improved, as have basic informatics skills in health professionals, similar progress is lacking in the number of more highly expert biomedical and health informatics professionals [8]. In Singapore, we recognize the need to improve growth and training in this area to keep up with developments in health information and technology.

To address the issues around professional growth and development, our CMIOs gave several suggestions, including, but not limited to:

1. Short term job rotations to increase exposure to different informatics domains. However, advance planning and coordination will be required between different public institutions for such rotations to take place.

2. Develop recognized career pathways:
   The CMIOs agreed that developing clear career progression pathways would result in more engaged employees. Providing mere job security and stability in the public service might not be good enough factors to retain and attract talents.

3. Develop formal training and education programs with local context.

Singapore like many Asian countries does not have any formal clinical or health informatics training program [9], unlike the US where there are many universities offering post graduate degrees, some affiliated with hospitals to provide practical training. For example, the UCLA Health Resident Informaticist Program [10] allows specialist residents to train in the fields of health IT and Clinical Informatics. Further, US board certified physicians can obtain Clinical Informatics subspecialty certification under the American Board of Preventive Medicine [11].

In Singapore, healthcare professionals who desire post graduate degrees in clinical or biomedical informatics often take up distance learning courses with American or European universities.

For short courses and programs, local professionals can attend the American Medical Informatics Association (AMIA) 10x10 course in Singapore, started by a local training provider in partnership with Oregon Health & Science University [12], or short courses taught by the Centre for Health Informatics, started by the National University of Singapore [13]. We foresee the career framework for Informatics to cross clinical practice, education, management and leadership as well as research [14]. While courses and training are available, there is no consensus in the country on the format of training or certification required for clinical or health informatics work. The CMIOs recognized that a proper training and certification process should be considered for the long-term professional growth of their staff.

In conclusion, informatics professionals in this survey were generally happy with their work, but the deficiencies in training and professional development require further action.

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