

Prospective Students': A survey of pre-university student perspectives on the development of outcome based undergraduate Pharmacy curriculum in Brunei Darussalam

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Abstract

Background: In Brunei, there is no university offering undergraduate Pharmacy degree programme yet. All the pharmacist graduates are qualified from overseas. Thus in 2013, a team from Universiti Brunei Darussalam (UBD) and Ministry of Health planned to design the BHSc (Pharmacy) degree programme to start in 2016.

Aim and Methods: A small market survey to 700 pre-university students was conducted to investigate their attitudes and opinions on the BHSc (Pharmacy) degree admission criteria and training programme. Random sampling was used to administer the instrument to the students studying at the 7 pre-university colleges. 700 survey forms were distributed. Participants' self-administered the questionnaire with information sheet about the aim of study. The inclusion criteria were male, female and students registered under the participating schools.

Results: The response rate was good, 82.3% (576/700). 96.7% ($n=549$) respondents aged below 25 years old. Majority (87.8%) were Bruneians and the rest were permanent residents and from overseas. 79.2% ($n=450$) either strongly agreed or agreed that it was appropriate and timely to introduce Pharmacy degree in Brunei. Whereas 20.8% ($n=118$) either were not sure or disagreed about introducing Pharmacy degree. 34.6% ($n=196$) inclined towards having GCE "A" level grades of BBB in science subjects for their admission criteria to join the programme. Majority agreed that ($n=520$, 91.6%) professional training need to be done in Brunei and/or overseas, which was aligned with our 1 year Discovery year model.

Conclusion: Survey results informed a follow-up workshop amongst 20 Pharmacists from Ministry of Health and private clinics that formulated an outcome-based curriculum. Future workshop will involve training the trainers, assessment and methods of pedagogy.

Keywords: Undergraduate Pharmacy; Admission; Pharmacy Curriculum; Universiti Brunei Darussalam.

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INTRODUCTION

In Brunei Darussalam, there are only 4 government public universities. Universiti Brunei Darussalam (UBD) established in 1985 is the National University in Brunei where Pengiran Anak Puteri Rashidah Sa'adatul Bolkiah Institute of Health Sciences (IHS) was established in 2000. The Institute of Health Sciences offered 4 major undergraduate disciplines, i.e. Medicine, Biomedical Sciences, Nursing and Midwifery. There is no undergraduate pharmacy degree programme offer yet in Brunei and most of the pharmacists working in Brunei graduated are from overseas. Thus a steering group comprising of academics and also pharmacists working at the Ministry of Health has designed a curriculum that matched Brunei needs. In line with the goal set by the Ministry of Health, Brunei Darussalam *"Towards a Healthy Nation 2035"*, the Department of Pharmaceutical Services, Ministry of Health is striving to achieve this particular goal through human resource development in Pharmacy (*Department of Pharmaceutical Services, Ministry of Health Brunei*). For long term strategic planning, the set-up of Bachelor of Health Science (Pharmacy) can also provide the solutions to handle low turnover rate of local pharmacist graduates working at the Ministry of Health and private clinics. The pharmacist ratio in Brunei is still 1:9,637, while in developed country like Singapore is 1:2,130 (*Ministry of Health Singapore statistics, 2014*). Thus it is timely that UBD offers undergraduate degree programme to produce more pharmacy graduates for the country. The cost for sending Bruneians students overseas could justify the setup of this programme too.

Background

The development of BHSc (Pharmacy) programme forms an important aspect of a much broader vision to improve and enhance the available local professional Pharmacy education and services. With the goals of the department

of Pharmaceutical services to provide, *"High Professional Pharmaceutical Services and Care through Ensuring Sufficient Supply of Pharmaceuticals which are safe, Efficacious and of Acceptable Quality to the Population of Brunei Darussalam"*, it is appropriate that UBD, the National University, takes an active role of producing high quality Pharmacy graduates who acquire the required knowledge, understanding and skills in pharmaceutical context with reference to Pharmaceutical services. Pharmacy graduates would be team players capable of working in Multidisciplinary teams in health care sector, problem solvers with high ethical standards in their pharmacy practice which will be aligned with the Standards set out by the General Pharmaceutical Council, UK (General Pharmaceutical Council website UK). The graduates should eventually be able to work as clinical pharmacist, community pharmacist or Industrial pharmacist. The demand for producing pharmacy graduates from the stakeholders as well as national demand to meet the needs of the Brunei Vision 2035. His Royal Highness Prince Al-Muhtadee Billah, Crown Prince of Brunei Darussalam and the Senior Minister of the Prime Minister's Office, in *'The Report - Brunei Darussalam 2014'*, stated that, *"Providing the right training and education is a must and is crucial for achieving the goals of Wawasan (vision) Brunei 2035, which aims to see Brunei Darussalam widely recognised for the accomplishments of its well-educated and highly skilled people, the quality of life and its dynamic, sustainable economy. To achieve this objective, we aim for Brunei Darussalam to not only become a training hub, but to become one that offers widely recognised, high-standard training and educational institutions."* These directives to achieve Brunei Vision 2035 have influenced the preparation of the Pharmacy programme and curriculum in Brunei. After several months of planning and meetings in 2013/14, the curriculum team decided to follow the UBD GenNEXT four year degree programme which will incorporate the one year experiential learning (discovery year) within the

programme. The BHSc (Pharmacy) degree programme will be conducted as a full time programme with 2 semesters per year. The one year Discovery year whereby students will spend a year abroad to broaden their horizons and experiential learning is included in the programme. During the Discovery year, students will have to do their researches, internships or community projects overseas.

There are several papers describing factors describing the students' admission process to the Universities (Bush J, 2012). Knowledge in Chemistry GCSE "A" level equivalent is a pre-requisite for this programme. It is a progression from general to specific knowledge on pharmaceutical relevant subjects and it consists of in-depth application of pharmacy practices. It also includes aspects relevant to the health of nation, psychosocial, legal and ethical issues, research and evidence based practice, management and teaching related to Pharmacy. Upon completion of the programme, the graduates will be able to function as competent members of Pharmaceutical chemist to provide professional pharmaceutical services and care to the population of Brunei Darussalam (Community, hospital or industrial setting).

Aim

Before designing the Pharmacy programme, the team designed and administered a small market survey to 700 pre-university students to investigate their attitudes and opinions on the admission criteria and training programme. This questionnaire survey was done in March-April 2013 to investigate the need from the stakeholders. The aims/objectives of this survey questionnaires were to know if potential candidates agree on:

- i. the set-up of the BHSc (Pharmacy) at UBD;
- ii. the suggested entry requirement for the BHSc (Pharmacy) programme;
- iii. the professional (Discovery year) training be done (either in Brunei alone, or overseas alone, or both); and
- iv. the demography of the students (participants)

The team has also organised a Pharmacy Curriculum workshop amongst 20 pharmacists from Ministry of Health with two facilitators from UBD, an outcome-based curriculum was produced based from the workshop.

Materials and methods

Questionnaire was designed and modified accordingly. Minor correction was made based on the feedback given by a pilot group of participants to make sure the questions in the survey are well understood. The sampling was done by random method to students studying at the 7 pre-university colleges in Brunei. 700 survey forms were distributed. Participants' self-administered the questionnaire with information sheet about the aim of study. The inclusion criteria were male, female and students registered under the participating schools and must mentally competent to answer the surveys. Approval was sought from the Principals of all the participating schools. Data entry and analysis were done using www.qualtrics.com.

For the curriculum development for the Pharmacy programme, workshop style focus group discussions was held amongst 20 pharmacists within Brunei. All the knowledge, skills and attitudes to become a competent pharmacist were based on the set of competencies laid out by the General Pharmaceutical Councils, United Kingdom. Some local context was added into the curriculum to match Brunei's needs. Formal administrative approval was obtained from relevant authorities (PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam and Department of Pharmaceutical Services, Ministry of Health, Brunei).

Results

Majority (87.8%) were Bruneians and the rest were permanent residents and from overseas. 96.7% ($n=549$) respondents aged below 25 years old. Participants' gender is illustrated in **Figure 1**.

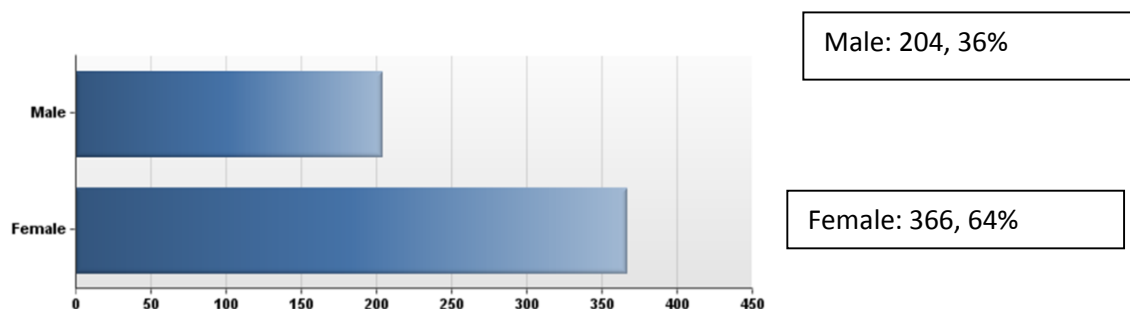


Figure 1. Participants' gender.

Our stakeholders or the potential students in Brunei has indicated strong support for the introduction of an undergraduate Pharmacy degree programme. It is worth highlighting from 574 respondents, n=452 participants (79%) either strongly agreed or agreed that it was appropriate and timely to introduce a Pharmacy degree programme in Brunei. The response rate was good, 82.3% (576/700). 79.2% (n= 450) either strongly agreed or agreed that it was appropriate and timely to introduce a Pharmacy programme in Brunei. Whereas 20.8% (n =118) were either not sure or disagree about introducing Pharmacy degree programme in Brunei (see **Figure 2**).

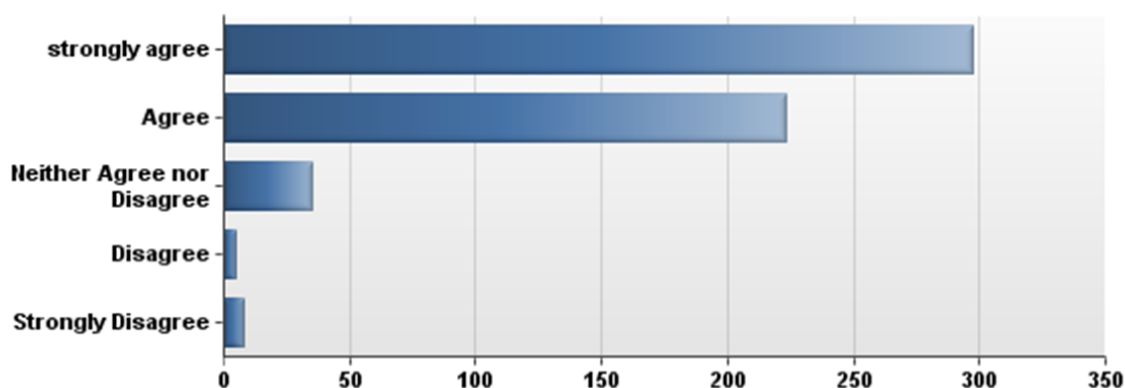


Figure 2. Participants' trends of answer on the new set-up of Pharmacy undergraduate degree programme at UBD and its legend.

In terms of admission criteria, 34.6% (n=196) inclined towards having GCE "A" level grades of BBB in 3 science subjects for their admission criteria to join the Pharmacy programme (**Figure 3**). Second most popular were Grades ABB in 3 science subjects. Third most popular answers were Grades BBC in 3 science subjects. To have Grades BBB in 3 science subjects for entry requirement in BHSc (Pharmacy) was also anticipated by the Curriculum team from both University and the Ministry. Thus it was decided to have 300 points as the entry requirement for the programme.

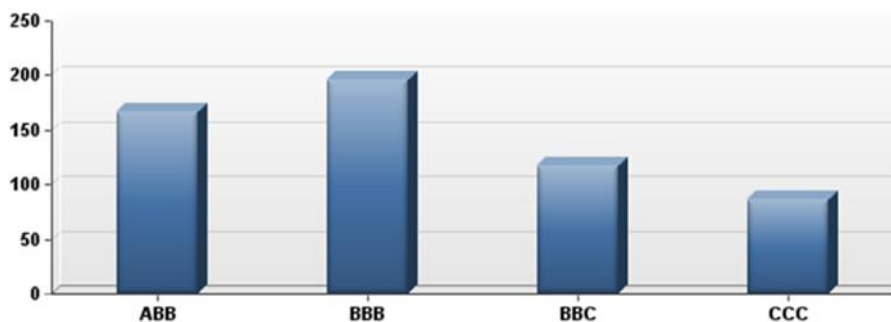


Figure 3. Participants’ trends of answer on the admission criteria for Pharmacy undergraduate degree programme at UBD and its legend.

Participants’ agreed that ($n=520$, 91.6%) professional training needs to be done in Brunei and overseas (**Figure 4**). Professional training refers to the training for research, clinical pharmacy or other aspects of pharmacy which is through Discovery Year either in Brunei or overseas.

No.	Answer	No.	%
1	strongly agree	297	52%
2	Agree	223	39%
3	Neither Agree nor Disagree	35	6%
4	Disagree	5	1%
5	Strongly Disagree	8	1%
		Total: 568	100%

Figure 4. Participants’ are in agreement that Professional training should be conducted in Brunei and overseas and its legend.

From the workshop held soon after the survey, the team have compiled an Outcome based curriculum for the programme. The team indicated that the graduates should be able to demonstrate and meet the educational outcomes (**see Table 1**).

Table 1: Educational outcomes for Outcome based Undergraduate Pharmacy curriculum

KNOWLEDGE AND UNDERSTANDING	SKILLS	ATTITUDE
<p>Demonstrate knowledge and understanding of:</p> <ol style="list-style-type: none"> 1. Brunei Darussalam’s National Philosophy of Malay Islamic Monarchy (“Melayu Islam Beraja”); 2. the Islamic values and principles in Pharmacy practices; 3. ethical dilemmas in healthcare, and understands ways in which these might be managed by healthcare professionals, whilst taking account of relevant law; 4. main sources of drugs; ways in which drugs are purified, characterised and analysed; their physico-chemical properties; and properties drugs display as biologically active molecules in living systems;,, 5. the design, manufacture and performance of drug dosage forms and is able critically to appreciate the inter-relationship between formulation, drug delivery and therapeutic effectiveness;,, 6. how medicines are developed, manufactured and brought to the market place, 7. performing pharmaceutical calculations accurately;,, 8. how to prepare extemporaneously any medicine for which this would be regarded as the normal means of provision, including by aseptic technique;,, 9. is able to interpret and evaluate, for safety, quality, efficacy and economy, prescriptions and other orders for medicines; 10. how to advise patients and other healthcare professionals about medicines and their usage; 11. the systems for the quality assurance of products and pharmaceutical services. This includes the management of risk; 12. supply medicines in accordance with legal and professional requirements;,, 13. critical appraisal of information or conjecture in all forms of presentation, 	<p>Be able to practise key competent skills:</p> <ol style="list-style-type: none"> 1. communicate effectively, orally and in writing, with his/her teachers and peers, as a sound basis for future interaction with patients, carers and other healthcare professionals; 2. Gains first-hand structured experience of practice, including contact with patients and practitioners of other healthcare professions; 3. communicate with individuals and audiences; 4. to apply, library and other information resources; 5. apply routinely, word-processing, spread sheet, database, e-mail and information retrieval computer applications; 6. continue professional development opportunities open to practising pharmacists, 7. undertake, employment or attachment for vacation experience in pharmacy practice; 8. seek networking opportunities in professional pharmacy organisations;Work with members of a multidisciplinary team and understand their own personal roles and responsibilities within the team, as well as those of other allied health professions; 	<p>Demonstrate key attitudes or abilities to:</p> <ol style="list-style-type: none"> 1. Accept the moral, ethical and professional responsibilities involved in conducting scientific research 2. Recognise the impact of their own health on their ability to conduct scientific investigation and respond appropriately 3. Accept the moral, ethical and professional responsibilities involved in handling and testing any pharmaceutical products 4. Respect patient confidentiality and identity regardless of their lifestyle, culture, belief, religion, race, colour, gender, sexuality, disability, age, or social or economic status 5. Recognise their own limitations, accept criticism when justified and know when to ask for help 6. be honest and true to themselves and their beliefs 7. At all times behave in a professional manner by being punctual, reliable, honest, respectful, courteous, and well-presented 8. Keep themselves up to date through self-directed learning and recognise that pharmacy education is a life-long process

<p>14. can undertake structured problem-solving;; 15. can apply appropriate research approaches and methods to manage scientific and practice problems; and 16. the pharmaceutical services system in Brunei Darussalam and the medico-legal issues relating to it.</p>	<p>9. Show qualities of organisation, including prioritisation of workload and time management, with a sense of entrepreneurship; and 10. Demonstrate that they have strategies for preventing and coping with stress</p>	
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Discussion

Designing a new pharmacy course is a big commitment by faculty members and filled with challenges as it has to be relevant and contextual. Perepelkin (2012) redesigned a major course namely, pharmacy management, which was part of undergraduate pharmacy program, in consultations with former and current students of their University of Saskatchewan. The consultations were to raise the course relevance to the future professional practice (Perepelkin, 2012). It was rewarding for all involved in the Canadian study to involve the present and former students, as all the students realised the necessity of the restructuring for relevance to professional practice of the programme. Similarly, this study survey was undertaken in Brunei to understand the relevance of the Pharmacy course in Bruneian context and to gauge the interest of the prospective students to future professional practice. It is important to ensure that the candidates entering the undergraduate pharmacy program will be able to perform well and graduate to become successful in their future professional practice.

As mentioned by Boyce & Lawson (2009)., there are challenges in establishing a correlation between the preprofessional academic performance and the success of the candidates during and after the pharmacy program. The influence of the preprofessional attributes and abilities on their success as an undergraduate student and a future practitioner needs further careful evaluation (Boyce & Lawson, 2009). Ried mentions about the changing entry-

level criteria with the times as pharmacy moves forward as a profession with increasing and expanding roles in the health care sector (Ried & Posey, 2006).

The different performance predictors for successful graduation in undergraduate pharmacy program were correlated with preprofessional requirements in a study conducted across various universities in United States of America (Broedel-Zaugg et al., 2008). It is imperative to note that the main goal of the screening for the preprofessional qualification is to ascertain that the students are adequately prepared for the professional pharmacy program. Most respondents indicated that basic sciences and English composition are requirements for entry into the program. The results from our study is in line with their data, wherein 35% of the respondents agreed that 3 science subjects should be required for entry requirement with GCE A Level Grades B,B,B minimum which would be the equivalent of 300 UCAS points for their admission criteria to join the Pharmacy programme. This is a good indicator that the perceptions of the Brunei’s prospective students are similar to the pharmacy administrators.

A cohort analysis undertaken retrospectively for MPharm program emphasised the importance of prior academic achievement as the single dominant predictor of performance (Bush, 2012). Furthermore, the recently published study conducted by Steinberg established the positively association correlation of higher likelihood of

on-time graduation with higher overall GPA. The analysis specifically mentions that students in first quartile had higher incidence of on time graduation than the ones in lower quartiles (Steinberg & Morin, 2015). Although the process of making admission decisions for pharmacy school applicants is complex and imperfect, the success prospects of candidates entering the pharmacy school can be increased by raising their eligibility criteria of science subjects to the first quartile. As revealed by statistics from some colleges and schools there may be a temporary reduction of applications for the program, due to the high GPA prerequisites, but would be beneficial in the long run (Gleason et al., 2013). The GCE A Level B, B, B grades in 3 science subjects are definitely in the first quartile and this study gave us good indication of the admission criteria which the team agreed upon. In terms of training the students overseas and in Brunei Darussalam, this is the Discovery Year opportunity that our potential students may be able to undertake. The workshop that was conducted in June 2013 was also fruitful in terms of producing the Knowledge, Attitudes and Skills outcomes required for future graduates of the BHSc (Pharmacy) degree programme (See Table 1). Future workshops will involve training the trainers, assessment and methods of pedagogy such as Team-Based learning (TBL). It is expected that the graduates will be able to function as competent Pharmacist to provide professional pharmaceutical services and care to the population of Brunei Darussalam.

Conclusion

The limitations of this survey questionnaire may be due to the nature of the random sampling whereby most of the participating schools are from Brunei Muara districts (most populated area in Brunei), however, we did not include other districts such as from Tutong, Temburong and Belait districts. Also the no. of questions we posed in the survey are quite limited, where in actual fact we also used Mini

Multiple interview for our actual admission process into the BHSc (Pharmacy) programme. Mini Multiple interview (MMI) involved around 8 active stations whereby we have asked the potential students on their chemistry and healthcare services knowledge as well as questions on ethics and communication skills. We have incorporated grades obtained from this MMI in our admission process. We have yet to see the correlation between the student's academic performances in GCE A level and MMI performances with regards to their academic performances in the degree programme in few years time. This could be our future study in the years to come.

We conclude that it is clear that there is a demand for BHSc (Pharmacy) programme to be conducted at Universiti Brunei Darussalam. This survey gave us good indication of the admission criteria which the team agreed upon. In terms of training the graduates overseas and in Brunei Darussalam, this is in line with what we have envisioned them to be.

ACKNOWLEDGEMENT

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