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Assessment of motivation, learning styles and programme selections of Saudi pharmacy and non-pharmacy candidates during the preparatory year

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Abstract

Aim: This study was aimed to evaluate the motivation, learning styles and programme selections of pharmacy and non-pharmacy candidates doing the preparatory year.

Method: A questionnaire survey was conducted at the end of the preparatory-year in Dammam University during the Orientation Week in April 2014. Interviews with some students and instructors were also conducted to triangulate the survey data. A semi-structured questionnaire was specially designed, checked for face validity and piloted in students. A chi-squared or *t* test was utilised to compare the programme selections and relevant variables with the significance level (α) set at 0.05.

Results: A total of 74 pharmacy and 342 non-pharmacy candidates completed the questionnaire. Both groups mostly consisted of males aged 19 (60% – 70%) with the secondary school scores in the range of 96% - 100%. Almost all students could identify their strengths and weaknesses, especially in Chemistry, Physics and English. They felt stressed out and unhappy and needed some advice or counselling. Both contingents had similar motivation and career goals. Top three health-related programmes of choice were Dentistry, Medicine and Applied Medical Sciences. They claimed to have enough information to make a decision and preferred a one-to-one discussion with the programme instructors to get the programme information. Both groups had the same learning styles - 'Director (or Converger)' as a dominant (average score: 5.1 vs. 5.2) and 'Producer (or Assimilator)' as a secondary style (average score: 4.9 vs. 5.0).

Conclusion: The pharmacy and non-pharmacy candidates have similar perceptions, motivation and learning styles, but marginal differences were found in the programme selections and acquiring information. Pharmacy orientation and counselling sessions are needed to correct their misperception about chemistry and to recruit high-performing students. Pharmacy images and professionalism among preparatory-year and pharmacy students warrant further studies.

Keywords: *Assessment, Motivation, Learning Styles, Programme Selection, Pharmacy Candidates, Preparatory Year Study, Saudi Arabia*

Introduction

Pharmacy education in the western world has gradually evolved over the past 60 years in response to the advancement of pharmacy practice and pharmaceutical care. Nevertheless, the education for pharmacists in the Middle East has just been rapidly changed over the past decade to meet the needs of clinical pharmacy practice in this region (Kheir *et al*., 2008). The term 'clinical pharmacy' has been adopted to signify the new roles of pharmacists in patient care (Ibrahim, 2011). Most pharmacy schools in the Gulf countries have now offered the Bachelor of Pharmacy (BPharm) or Bachelor of Science in Pharmacy (BSc in Pharm) programmes, together with the Doctor of Pharmacy (PharmD) programmes like the North American universities (Al-Wazaify *et al*., 2006; Kheir *et al*., 2008). In Saudi Arabia, undergraduate (PharmD and/or BPharm) and graduate studies have been established for a period of time (Asiri, 2011), but research in pharmacy education is rarely exploited to improve student's learning and faculty's teaching or training.

Two major issues in pharmacy education, *i.e*. student motivation and learning styles, have not been fully explored by academics, especially in the Middle East. Motivation generally refers to an internal and external desire to achieve a goal in life; the internal desire is also known as a personal 'drive' (Tileston, 2010). Students can have two types of motivation, *i.e.* intrinsic and extrinsic, for learning and work. The motivation can shift with time

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and circumstances, as evidenced by the study of Hastings and her team (2005). They reported that pharmacy students are highly motivated in the first year; however, when they progress through the PharmD curriculum, they want to learn just to pass the examinations. The authors suggested pharmacy educators should motivate students and foster their lifelong learning skills. Additionally, Keshishian *et al*. (2010) examined some motivational factors that may influence student's choice of academic major. The student motivation has been mostly measured using Archer's Health Professions Motivation Survey (Perrot *et al*., 2001) or its modified version (Hastings *et al.*, 2005). However, the issue of motivation and its linkage to a pharmacy programme selection has not yet been investigated in Saudi students.

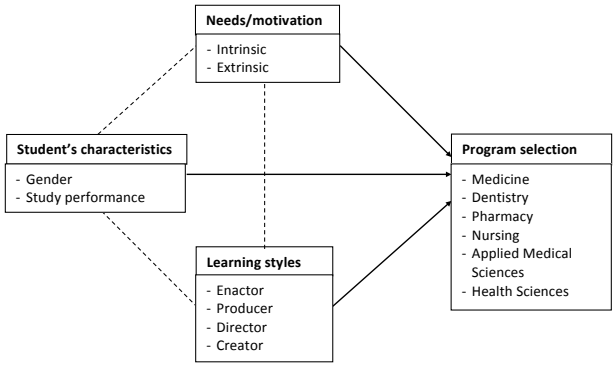
Learning styles are considered as one factor of student's success in higher education. It refers to "characteristic cognitive, effective and psychosocial behaviors that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environment" (Curry, 1981). The knowledge of learning styles is beneficial to both educators and students in terms of choosing suitable teaching methods and study techniques. Three major instruments have been widely employed to evaluate student's learning styles, namely Kolb Learning Style Inventory (LSI; Kolb, 2000), Honey and Mumford Learning Styles Questionnaire (LSQ; Honey & Mumford, 2000) and Gregorc Style Delineator (GSD; Reio & Wiswell, 2006). As these measures are quite lengthy and difficult to administer in practice, a more specific tool for the pharmacy discipline called "Pharmacist's Inventory of Learning Styles" (PILS) was developed using the data from Canadian practicing pharmacists (Austin, 2004a). However, PILS has not been fully validated in pharmacy students.

At some public universities in Saudi Arabia, a preparatory-year programme has been organised for the first-year students. For instance, the University of Dammam arranges this programme to standardise the preparatory/first-year study and to prepare students with the same field (*i.e.* Health, Engineering, or Sciences) for the university life and study (University of Dammam, 2014). This programme also helps them make a better decision on a major of study in the following years. For example, based on their grade point averages (GPA) students in the health track will be allocated to a professional programme, such as PharmD, Medicine, Dentistry, etc. It has now been the second year of the programme provision, but the whole programme remained unevaluated. From an extensive literature, no study has been carried out in preparatory-year students on any aspects. This study therefore aimed to assess the motivation, learning styles and programme selections of pharmacy and non-pharmacy candidates doing the preparatory year study.

Methods

The survey research was approved by the College of Clinical Pharmacy and Deanship of Preparatory and Support Studies. It was carried out in the preparatory year students at the University of Dammam, Saudi Arabia, during March – June 2014. The conceptual framework of the study is illustrated in Figure 1. Students' programme selections might be influenced by their characteristics (*e.g.* gender or study performance), motivation and learning styles. It was anticipated that pharmacy selectors might have some unique features, such as specific styles of learning. The research hypothesis was thus "pharmacy and non-pharmacy candidates are different in terms of characteristics, needs, or learning styles". Details of the study are summarised below.

Figure 1: Conceptual framework of the study



Population and sample

The population of the study were preparatory-year students who enrolled in the health track 2013/14, *i.e.* approximately 544 males and 446 females. Students would be included in the study if they were willing to take part in the survey. Exclusion criteria were: those who rejected to fill out a questionnaire or completed some parts of it. The sample size was estimated using the equation: the required sample (N) = 4(Zcrit)2p(1-p)/d2 (Eng, 2003). A sample size of 73 was determined based on the number of students selecting the pharmacy programme in the previous year (5%) and a 95% confidence interval with the expected width of 10%. When considering the incomplete data, at least 100 – 200 students were expected to complete the survey.

Pharmacy candidates here were students who potentially selected pharmacy (PharmD) as their 1st or 2nd choice and were likely to be admitted to the pharmacy programme, whereas the non-pharmacy candidates refer to those who picked other health-related programmes as 1st – 3rd choice or pharmacy for the third option.

Study instrument

A semi-structured questionnaire was conceptualised based on the theories of student's motivation, learning styles and programme selections as shown in Figure 1. All items were generated from informal discussions with students and the academic adviser, and related literature. The questionnaire was initially constructed in the English language and intended to be self-administered. It consisted of two sections. Section 1 was to elicit students'

perceptions about the preparatory-year programme, motivation, learning styles and programme selections. Since this study only explore student's intrinsic and extrinsic motivation plus career goals but not the types of motivation, the Archer's Survey was not employed. Furthermore, the Pharmacists' Inventory of Learning Styles (PILS; Austin, 2004a) was incorporated into the questionnaire with permission (personal communication). PILS contains 17 items with four choices, i.e. in this study – 3 = usually; 2 = sometimes; 1 = rarely; and 0 = hardly. According to Austin (2004a), the four learning styles include the following features:

> ***"Director (or Converger)***: The persons are focused, practical and to the point. They usually find themselves in a leadership role and enjoy this challenge. They have little time or patience for those who dither or are indecisive, or who spend too much time on impractical, theoretical matters. They are good at coming to quick, decisive conclusions, but recognise that at times their speed may result in less than perfect results. They would rather get a good job done on time, than get an excellent job delivered late. They like being in a high-performance, high-energy, fast-paced environment.
>
> ***Producer (Assimilator):*** They generally prefer working by themselves, at their own pace and in their own time, or with a very small group of like-minded people. They tend to avoid situations where they are the center of attention, or are constantly watched - they prefer to be the one observing (and learning) from others. They have an ability to learn from their own - and other people's - mistakes. They place a high priority on getting things done properly, according to the rules, but at times, they can be their own worst critic. They value organisation and attentiveness to detail.
>
> ***Enactor (or Accomodator):*** They enjoy dealing directly with people and have little time or patience for indirect or soft-sell jobs. They enjoy looking for, and exploiting, opportunities as they arrive, and have an entrepreneurial spirit. They learn best in a hands-on, unencumbered manner, not in a traditional lecture style format. Though they don't take any particular pleasure in leading others, they do so because they sense they are best-suited for the job. They are confident, have strong opinions and value efficiency. They are concerned about time and like to see a job get done. Sometimes, however, their concern with efficiency means the quality of their work may suffer, and that they may not be paying as much attention to others' feelings and desires as they ought to.
>
> ***Creator (or Diverger):*** They enjoy out-of-the-box environments where time and resources are not particularly constrained. They have a flair for keeping others entertained and engaged and sincerely believe this is the way to motivate others and get the best out of everyone. They are most concerned - sometimes too concerned - about how others perceive them and they place a high priority on harmony. They find little difficulty dealing with complex, ambiguous, theoretical situations (provided there is not a lot of pressure to perform), but sometimes have a hard time dealing with the practical, day-to-day issues."

As this tool was developed using the Canadian colloquial language, the research team decided to amend it slightly to suit the Saudi context, for example, "I rise to the occasion if I'm under pressure" being changed to "I perform better than usual if I am under pressure" and "I trust my hunches" to "I trust my guess based on intuition". Section 2 contained students' details: age, strengths, weaknesses, English class group and percentage score for the secondary school.

The questionnaire was eventually translated from English into Arabic to produce a bilingual format with six pages. It was then checked for face validity by two experts in education who are proficient in English and Arabic at the Deanship of Educational Development. The experts helped edit some wordings in both languages and suggested the researchers should keep only the Arabic version to make it easier for students to comprehend and complete it. Thus, the final draft of the Arabic version was shortened to only three pages. After that, it was piloted in ten male and ten female students to check for its clarity and wordings. The pilot results found most students did not know the meaning of 'strengths' and 'weaknesses' in Section 2. Hence, the two words were amended to "subjects or skills you perform well" and "subjects or skills you perform badly", respectively.

Study procedure

As male students were divided into 17 groups and females into 13 groups in the segregated male or female campus, it was not practical to go through each class to meet with students. A survey was therefore planned to perform during the Programme Orientation Week, which was organised separately in male and female campuses at the end of April 2014. The first day of the week was assigned for the one-hour presentation of each health programme; students could join any sessions they liked. Students in both campuses who attended the pharmacy talks were asked to fill out the questionnaire at the end of the sessions. They were told to put in their names and student codes in order to confirm their data where appropriate, but ensured to keep all personal details confidential. Aside from that, the preparatory-year students visiting the pharmacy booth were also invited to complete a questionnaire. To increase the response rate the researchers went to some classes to remind students of the questionnaire after the Orientation Week. Each completed copy was then given identification codes for either male (M) or female (F), such as M10, F80, F111, etc. Moreover, the interviews of 10 students regarding the questionnaire, two Physics professors and two English instructors were conducted to partly triangulate the data obtained from the survey.

Statistical analysis

All data were entered into SPSS Statistics 19 (IBM-SPSS Co., Chicago, IL) and some data, *e.g.* students' age, English classes and learning styles, were recorded for the analysis. For 17-item learning styles, the four scores (i.e. usually, sometimes, rarely and hardly) were changed to four letters (A = Enactor; B = Producer; C = Director; D = Creator) according to the particular items (Austin, 2004a). Subsequently, the number of times students circled each letter was added up and averaged to yield the dominant and secondary learning styles. All data were analysed using descriptive statistics, such as mean, standard deviation (SD), or percentage. A chi-squared test was used to test differences in categorical and ranked variables, such as perceptions of the preparatory-year study between pharmacy and non-pharmacy groups. Additionally, an independent *t*-test was used for continuous data, *e.g.* age or percentage score for the secondary school. A significance level was determined at $\alpha = 0.05$.

Results

At first, 157 female and 265 male students returned the questionnaire, but one female and five males were excluded owing to incomplete data. The data of 416 students (i.e. 156 females and 260 males) were therefore utilised. Since differences in gender might bring about the sample heterogeneity, a hypothesis test for any discrepancies was performed. The results (data not shown in the table) revealed both male and female students had similar characteristics (*e.g.* age, strengths, weaknesses and percentage scores), motivation, learning styles and programme selection patterns (all $p > 0.05$). Thus, the data set was homogeneous in terms of gender for the further analysis of pharmacy and non-pharmacy candidates.

Table I demonstrates the characteristics of 416 students categorised by pharmacy and non-pharmacy candidates. Students in both groups were similar in terms of gender and age, i.e. mostly males aged 19 (60% – 70%). Almost all students could identify their strengths in the areas of Chemistry, Biology and Mathematics and their weaknesses in Physics, English and oral presentation. Compared with the non-pharmacy candidates, students choosing pharmacy were significantly good at Chemistry but rather weak in English ($p = 0.002$, $\chi2 = 9.773$, df = 1; $p = 0.037$, $\chi2 = 4.359$, df = 2). Data from the interview and discussion with the students throughout the Orientation Week also showed that many students perceived Chemistry as the dominant subject in pharmacy colleges. In both groups, few students were unable to assess their strengths (1.4% vs. 1.2%) and weaknesses (4.1% vs. 8.5%) by leaving the items blank (data not shown in the table). In the pharmacy group, the number of students was significantly higher in beginner English classes, but lower in the intermediate and advanced ones than the non-pharmacy counterpart ($p = 0.001$, $\chi2 = 13.996$, df = 2). Although the average percentage score of pharmacy candidate from the secondary school were slightly lower than that of the non-pharmacy (96.59% vs. 97.27%), they were mostly at the high end of 96% - 100%.

Table I: Characteristics of students in the study

Characteristic	Number of students (%)		*P*-value[a]
	Pharmacy candidates (n=74)	Non-pharmacy candidates (n=342)	
Gender			
Female	24 (32.4)	132 (38.6)	0.321
Male	50 (67.6)	210 (61.4)	
Age (years): **Mean (SD)**	***19.0 (0.7)***	***18.9 (0.5)***	***0.062[b]***
18	10 (13.5)	69 (20.2)	
19	56 (75.7)	250 (73.1)	
≥ 20	8 (10.8)	23 (6.7)	
Subjects or skills performed well (strengths)[c]			
Mathematics	40 (54.1)	202 (59.1)	0.434
Physics	23 (31.1)	75 (21.9)	0.218
Biology	52 (70.3)	260 (76.0)	0.639
Chemistry	63 (85.1)	230 (67.3)	0.002*
English	37 (50.0)	195 (57.0)	0.478
Communication with other people	33 (44.6)	185 (54.1)	0.289
Oral presentation	17 (23.0)	92 (26.9)	0.700
Problem solving	34 (45.9)	161 (47.1)	0.882
Decision making	19 (25.7)	127 (37.1)	0.254
Computer and IT	32 (43.2)	143 (41.8)	0.876
Other, *e.g.* drawing and arts, *etc.*	4 (5.4)	25 (7.3)	-
Subjects or skills performed badly (weaknesses)[c]			
Mathematics	18 (24.3)	71 (20.8)	0.630
Physics	40 (54.1)	226 (66.1)	0.009*
Biology	6 (8.1)	26 (7.6)	0.968
Chemistry	2 (2.7)	35 (10.2)	0.031*
English	24 (32.4)	69 (20.2)	0.037*
Communication with other people	12 (16.2)	31 (9.1)	0.091
Oral presentation	20 (27.0)	109 (31.9)	0.284
Problem solving	8 (10.8)	32 (9.4)	0.795
Decision making	13 (17.6)	54 (15.8)	0.832
Computer and IT	7 (9.5)	60 (17.5)	0.062
Other *e.g.* memorising, research, *etc.*	2 (2.7)	7 (2.0)	-
English class group			
Beginner	30 (40.5)	70 (20.5)	0.001*
Intermediate	35 (47.3)	215 (62.9)	
Advanced	9 (12.2)	57 (16.6)	
Percentage score for the secondary school:	(n=73)	(n=337)	
Mean (SD)	***96.59 (3.38)***	***97.27 (6.01)***	***0.346[b]***
90% - 95%	20 (27.4)	53 (15.7)	
96% - 100%	53 (72.6)	284 (84.3)	

* Statistically significant ($p < 0.05$)
[a] Calculated using the chi-squared test
[b] Calculated using the t test
[a] More than one answer was allowed; thus the total percentage was not equal to 100.

With respect to students' perceptions as delineated in Table II, both groups tended to share the same feelings and motivators. They both perceived the preparatory-year study was stressful and competitive. Moreover, they felt unhappy and required some advice or counselling to solve the study problems. For their personal drive, they wished to work what they liked and succeed in the work, and

wanted to work hard. Nevertheless, the pharmacy candidates somewhat differed from the non-pharmacy in the issue of respect for others' opinions (32.4% vs. 21.3%; $p = 0.041$, $\chi2 = 4.183$, df = 1). When asked about the external motivational factors, they both preferred to have a secure job (64.9% vs. 50.9%; $p = 0.029$, $\chi2 = 4.783$, df = 1) and a good boss plus helpful colleagues, and to get some opportunities for self-development, such as on-job training or attending short courses. A high salary was also a basic motivator as expected. The majority of students in the two groups had their own career goals, *i.e.* mainly being physicians, dentists or specialised therapists, in response to the needs. To achieve the career goals, they both liked to pay attention to the study, work hard and find some relevant data on the career of interest.

Table II: Students' perceptions, motivation and programme preference

Response	Number of students (%)		*P*-value[a]
	Pharmacy candidates (n=74)	Non-pharmacy candidates (n=342)	
Perceptions of the preparatory-year study[b]			
Feel unhappy	12 (16.2)	88 (25.7)	0.082
Feel stressed out	61 (82.4)	269 (78.7)	0.467
Compete with classmates	22 (29.7)	122 (35.7)	0.330
Need some advice or counselling	30 (40.5)	124 (36.3)	0.489
Feel happy	6 (8.1)	46 (13.5)	0.208
Enjoy your courses (or modules UK)	9 (12.2)	47 (13.7)	0.718
Work with classmates	11 (14.9)	64 (18.7)	0.435
Can cope with lots of pressure	9 (12.2)	56 (16.4)	0.366
Other, *e.g.* anxious, unfair, *etc.*	4 (5.4)	31 (9.1)	-
Personal needs for future work[b]			
Work what you like	54 (73.0)	266 (77.8)	0.374
Have a good relationship with colleagues	17 (23.0)	116 (33.9)	0.067
Want to work hard	38 (51.4)	151 (44.2)	0.259
Manage time effectively	21 (28.4)	103 (30.1)	0.767
Have high responsibilities	13 (17.6)	81 (23.7)	0.254
Succeed in your work	44 (59.5)	225 (65.8)	0.302
Work with full potential	16 (21.6)	66 (19.3)	0.649
Respect others' opinions	24 (32.4)	73 (21.3)	0.041*
External needs (motivational factors)[b]			
Have a secure job	48 (64.9)	174 (50.9)	0.029*
Have adequate facilities	15 (20.3)	75 (21.9)	0.753
Receive praise from people around you	15 (20.3)	97 (28.4)	0.155
Get promoted with fairness	17 (23.0)	100 (29.2)	0.277
Have a high salary	27 (36.5)	173 (50.6)	0.075
Have a safe working environment	19 (25.7)	111 (32.5)	0.254
Have a good boss and helpful colleagues	36 (48.6)	140 (40.9)	0.223
Be recognised by others	3 (4.1)	40 (11.7)	0.050
Get opportunities for self-development	35 (47.3)	154 (45.0)	0.722
Career goal to meet your needs			
No	9 (12.2)	44 (12.9)	0.955
Yes	45 (60.8)	211 (61.7)	
Not sure	20 (27.0)	87 (25.4)	
How to achieve your career goal[b] (for those answering 'Yes' only)			
Let it be	6 (8.1)	21 (6.1)	0.567
Pay attention to the study	44 (59.5)	219 (64.0)	0.280
Nothing now	1 (1.4)	5 (1.5)	0.925
Work hard	42 (56.8)	215 (62.9)	0.184
Find some relevant data on the career	25 (33.8)	103 (30.1)	0.613
Other, *e.g.* trust in Allah, *etc.*	1 (1.4)	20 (5.8)	-
Health-related programmes of choice[c]			
Medicine	36 (48.6)	305 (89.2)	0.001*
Dentistry	41 (55.4)	312 (91.2)	0.001*
Pharmacy	74 (100.0)	164 (48.0)	0.001*
Nursing	13 (17.6)	15 (4.4)	0.001*
Applied Medical Sciences	49 (66.2)	169 (49.4)	0.009*
Health Sciences (for females)	2 (2.7)	9 (2.6)	0.975
Reasons for choosing the programmes[b]			
Advice from family	15 (20.3)	81 (23.7)	0.556
Social values	23 (31.1)	131 (38.3)	0.268
Your own need	53 (71.6)	263 (76.9)	0.409
Suggestions from friends or seniors	6 (8.1)	38 (11.1)	0.462
Advertisement from media	2 (2.7)	5 (1.5)	0.444
Other	16 (21.6)	77 (22.5)	-
Receiving enough information			
No	7 (9.5)	27 (7.9)	0.035*
Yes	41 (55.4)	241 (70.5)	
Not sure	26 (35.1)	74 (21.6)	
Type of information you like most[b]			
Pamphlets or brochures produced by the responsible colleges	18 (24.3)	77 (22.5)	0.721
One-to-one discussion with the programme instructors	39 (52.7)	200 (58.5)	0.074
Counselling sessions for the programme selection	12 (16.2)	92 (26.9)	0.056
University's webpage	16 (21.6)	81 (23.7)	0.718
Poster presentation with booths to explain the programmes	11 (14.9)	61 (17.8)	0.550
E-mail to talk to the programme lecturers	4 (5.4)	27 (7.9)	0.465
Other	4 (5.4)	15 (4.4)	-

* Statistically significant ($p < 0.05$)
[a] Calculated using the chi-squared test
[b] More than one answer was allowed; thus the total percentage was not equal to 100.
[c] Ranking for only three programmes, *i.e.* 1, 2 or 3

For the selection of three health-related programmes, the pharmacy candidates clearly specified Pharmacy, Applied Medical Sciences (*i.e.* Respiratory Care, Radiology and Cardiac Technology) and Dentistry as their programmes of choice (Table II). This was rather opposite to the non-pharmacy candidates that opted for Dentistry, Medicine and Applied Medical Sciences (*i.e.* Respiratory Care, Cardiac Technology and Emergency Medicine); all chosen programmes were significantly different between two groups ($p < 0.05$). The reasons why they chose the programmes were self-interest, social values, advice from family and other factors, e.g. their ambition or dream, salaries, etc. As for the information adequacy to make a decision, the views of the pharmacy group were somewhat different from those of the other group ($p = 0.035$, $\chi2 = 6.709$, df = 2), *i.e.* being less agreed and unsure of it. The types of information dissemination they mostly favored were 'one-to-one discussion with the programme instructors', 'pamphlets or brochures produced by the colleges', 'university webpage' and 'counseling sessions for the programme selection'.

In regard to students' learning styles, the two groups responded to 17 items with the same tendency as

elaborated in Table III. They primarily picked 'Usually' or 'Sometimes', except for Items 3 ("I work by myself, rather than with other people") and 8 ("I perform better than usual if I am under pressure") with the answers 'Sometimes' or 'Rarely'. Considering learning styles based on the average values in Figure 2, both pharmacy and non-pharmacy contingents preferred the same patterns, i.e. 'Director' as a dominant (average score: 5.1 vs. 5.2) and 'Producer' as a secondary style (average score: 4.9 vs. 5.0).

No statistically significant differences of four learning styles, i.e. Enactor, Producer, Director and Creator, were detected between two groups (p = 0.990, 0.930, 0.974 and 0.911, respectively; data not included in the table). The results of the interviews with some students and instructors confirmed all aforementioned findings. Some examples of their opinions (Ixx = interviewee number, e.g. I05 = interviewee no.5) included:

> "I am not happy with my study and worried about my future. It is so stressful. I might be sad if I did not get my first choice – Dentistry." (I01)
>
> "My classmates are selfish and so competitive. They all want to be doctors or dentists." (I07)
>
> "Students choose a programme by word of mouth, especially from their seniors and family guidance. Physics and English may be a barrier to them." (I11)
>
> "All preparatory year courses (*or modules in the UK*) do not tailor to the college's needs. This is different from the system before" (I13)

Figure 2: Learning styles of (a) pharmacy candidates and (b) non-pharmacy candidates with the average value for each domain

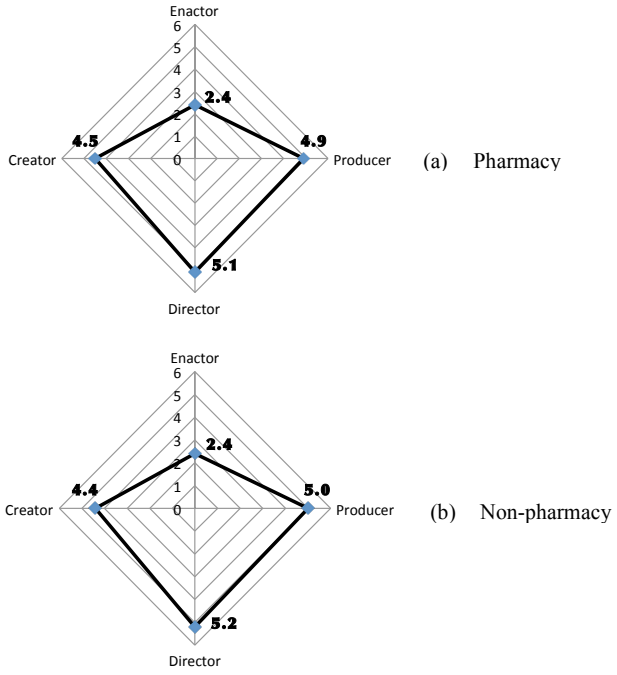


Table III: Students' learning styles based on the Pharmacists' Inventory of Learning Styles (PILS) categorised by programme preference

When I am trying to learn something new…	Percentage of students (%)									
	Pharmacy candidates (n=73)					Non-pharmacy candidates (n=338)				
	Mean (SD)	U	S	R	H	Mean (SD)	U	S	R	H
1. I watch others before trying it for myself.	2.1 (0.8)	28.4	55.4	8.1	6.8	2.0 (0.8)	22.5	58.5	12.6	5.3
2. I consult a manual, textbook, or instruction guide first.	2.0 (0.9)	33.8	39.2	21.6	4.1	2.0 (0.9)	31.6	37.4	24.6	5.3
3. I work by myself, rather than with other people.	1.5 (1.0)	16.2	40.5	21.6	20.3	1.6 (1.0)	17.5	43.3	21.6	16.4
4. I take notes, or write things down as I am going along.	2.2 (0.8)	43.2	36.5	16.2	2.7	2.3 (0.8)	44.7	37.7	12.6	3.8
5. I am critical of myself if things do not work out as I hoped.	2.2 (0.8)	40.5	40.5	13.5	4.1	2.2 (0.8)	38.9	42.4	13.2	4.4
6. I compare myself to other people just so I know I am keeping up.	2.0 (0.9)	29.7	45.9	14.9	8.1	2.0 (1.0)	36.3	37.4	14.3	10.8
7. I examine things closely instead of jumping right in.	2.4 (0.8)	50.0	36.5	9.5	2.7	2.3 (0.8)	45.6	41.5	8.8	2.9
8. I perform better than usual if I am under pressure.	1.3 (1.1)	16.2	28.4	25.7	28.4	1.3 (1.0)	11.1	35.7	23.4	28.7
9. I have plenty of time to think about something new before trying it.	2.1 (0.9)	41.9	35.1	14.9	6.8	2.3 (0.8)	41.8	43.9	9.9	3.2
10. I pay a lot of attention to the details.	2.3 (0.7)	44.6	43.2	9.5	1.4	2.3 (0.7)	46.5	40.4	9.9	2.0
11. I concentrate on improving the things I did wrong in the past.	2.9 (0.4)	95.1	12.2	1.4	0.0	2.8 (0.4)	79.8	17.3	1.8	0.0
12. I focus on reinforcing the things I got right in the past.	2.6 (0.6)	67.6	25.7	4.1	1.4	2.6 (0.6)	64.0	29.8	4.7	0.3
13. I please the person teaching me.	2.7 (0.6)	77.0	16.2	4.1	1.4	2.6 (0.7)	66.7	24.9	6.1	1.2
14. I trust my guess based on intuition.	2.1 (0.7)	28.4	55.4	14.9	0.0	2.1 (0.8)	27.5	52.6	14.9	3.8
15. In a group, I am the first one to finish whatever we are doing.	1.8 (0.8)	16.2	59.5	13.5	9.5	1.9 (0.7)	12.3	64.9	16.4	5.3
16. I take charge of a situation.	2.0 (1.0)	36.5	41.9	6.8	13.5	2.2 (0.8)	14.5	40.1	12.0	5.3
17. I am well-organised.	2.3 (0.7)	35.1	56.8	2.7	4.1	2.0 (0.9)	33.0	44.4	12.9	8.5

Note - Responses: U = usually; S = sometimes; R = rarely; and H = hardly

In each academic year, the PharmD Programme can offer 100 seats, *i.e*. 50 males and 50 females. After the result of the programme allocation had been released, it was found that 64 respondents (or 64%) in this study were accepted to the pharmacy programme with their 1st – 3rd choice. Of these, 19 were in the pharmacy group and 45 in the non-pharmacy; 35 were female and 29 male (data not presented in the table).

Discussion

This was the first study conducted in Saudi preparatory-year students by focusing on pharmacy and non-pharmacy candidates. Both groups possessed nearly the same characteristics, but the pharmacy group seemed to be weak in English and had lower scores for their secondary schools. As the low-to-moderate pharmacy input at the first entry would affect the students' quality and pharmacists' competencies in the long run, pharmacy educators should put more efforts into promoting the PharmD Programme and pharmacy profession. This would help attract high-performing students into the programme and profession. One good thing about the two groups was that the majority were able to assess their strengths (*i.e.* Chemistry, Biology and Mathematics) and weaknesses in various areas to some extent. This was congruent with the findings of Keshishian *et al*. (2010) that affirmed pharmacy students are more likely to be interested in science and Mathematics than other students. Since most pharmacy candidates specified Chemistry as one of their strengths and thought it was the major subject of pharmacy, it was possible that they picked pharmacy as a potential field of study and future career as well. In fact, the PharmD programme does not entirely emphasise on chemistry, but is rather clinically oriented. This misperception needs to be rectified by an appropriate orientation or counseling session. The identification of individual strengths and weaknesses is actually the first step of choosing a suitable programme effectively and for continuing professional education or development (CPE or CPD). CPE is usually composed of five states: reflection on practice, planning, action, evaluation and recording/reviewing (Dopp et al., 2010). It was a good sign that at this stage they knew themselves. In the future, they would hopefully be able to reflect on their study and complete CPE without any difficulties.

Evidence-based or research-informed policy making (EBP) is of paramount importance to education and other areas (Sanderson, 2003); thus, it should be applied to the management of the preparatory year study. Nearly all preparatory-year students felt the study was stressful and created competition among classmates. This stress could be due to the transition from the secondary to higher education or other factors, such as busy timetables, anxiety about their grades, programme selections, or uncertain future. These psychological impacts should be taken into consideration and merit further investigation. Nevertheless, the University may officially evaluate the preparatory-year programme as to whether it has achieved the programme outcomes.

In light of what students responded, both groups had the same intrinsic and extrinsic motivation, career goals they were looking for (*i.e.* mostly doctors, dentists, or specialised therapists) and how to achieve their goals in life. Although few students in this study selected pharmacy as their 1st or 2nd choice, a large number did put it as the 3rd option after Dentistry and Medicine. Based on the results, social values, media and family advice could affect students' attitudes and understanding about a particular programme and career of choice. Since they preferred a one-to-one discussion with the programme instructors, a pharmacy week with a counseling clinic in terms of education and patient care may be initiated; computer-assisted career guidance is also worth exploring. Aside from the academic attempts, Saudi Pharmaceutical Society should play a major role in promoting the pharmacy profession and building up good images in the public, such as launching mobile pharmacy services or communicating any pharmacy-related issues through media on a regular basis. Accordingly, pharmacists and the pharmacy profession would be well recognised in the near future.

As with the non-pharmacy selectors, the pharmacy candidates possessed two main learning styles: Director and Producer. This was comparable to the study of Canadian studies (Austin, 2004b; Loewen & Jelescu-Bodos, 2013) using PILS that identified the learning styles of pharmacists, pharmacy residents, or faculty preceptors based on the Kolb's domains as Assimilator (or Producer) and Converger (or Director) being dominant and secondary patterns, respectively. In the US, Crawford *et al*. (2012) also concluded the same findings with PILS found in American PharmD students and faculty members. It was therefore possible that pharmacy or health-related students, like pharmacists, had the same learning patterns associated with abstract rather than concrete thinking. These two learning styles are quite unique for pharmacists and healthcare professionals that could possibly be used for career guidance, as partly stated in the review of Coffield *et al*. (2004) – learning styles and career counselling.

Similar to student motivation, learning styles may change depending on circumstances and environment. Pharmacy academics should occasionally assess students' learning styles, as the knowledge is beneficial; instructors can tailor their teaching styles to the learning preferences of individual students or a whole class, whereas students can make use of various techniques to enhance their learning that leads to educational satisfaction (Romanelli *et al*., 2009). For the two learning styles, appropriate teaching modalities embrace didactic teaching, *i.e*. lectures and laboratory work, together with small-group discussions, role-plays, web-based learning and clinical practice (Austin, 2004b). Ideally, problem-based learning should be implemented to strengthen students' learning styles and motivation. Yousif *et al*. (2013) reported that most Saudi students in the study (59.7%) prefer the combined type of instruction, *i.e*. direct lectures and interactive one, which helps them recall information and perform well in the examinations. This was probably

evident that those students might also have the two major learning styles as identified in this study.

For the gender issue in pharmacy education, Kheir et al. (2008) pointed out there is a higher proportion of female than male students in pharmacy programmes across 13 Middle Eastern countries. Even with a quota and segregate classes like in Saudi Arabia, it is no exception. Langley and his colleagues (2010) indicated female students when making their choice to study pharmacy are more concerned about future patterns of working than males. In the present study, many female students with high grades were interested in the PharmD Programme and paid much attention to their study. Thus, they should be encouraged to work in all pharmacy sectors. To date, no female pharmacist has worked in a Saudi community pharmacy for religious and culture reasons. With the assistance of Saudi Pharmaceutical Society, all female pharmacists would hopefully be able to open up a female drugstore in order to deliver pharmacy and pharmaceutical care services to female customers and families. This is crucial, as male pharmacists normally cannot provide effective information or services for female clients, especially for problems related to sensitive issues, such as pregnancy or contraception, as implied by Zaki & Albarraq (2013).

Limitations of the study

With all great efforts, many female and male students were approached to complete the questionnaire, but some refused to cooperate for personal reasons, such as "do not want to disclose the identity or feelings", or "simply do not like filling out a questionnaire". This made it difficult to increase the number of respondents for the survey.

In conclusion, students' characteristics, motivation and learning styles could have an impact on their programme selection, but there was no difference of these variables between pharmacy and non-pharmacy candidates. However, both groups were marginally different in terms of the programme selections and acquiring relevant information. The perceptions of all students about the preparatory-year study were rather negative, but further studies are required to elicit their attitudes and understanding of the programme. Although individual students have their own motivation and career goals, these can be changed over a period of time. More efforts should be made to arrange pharmacy orientation or counseling sessions to correct the misperception about chemistry representing pharmacy and to recruit high-performing students. Saudi Pharmaceutical Society together with pharmacy academics should be more proactive to promote the pharmacy education and profession in the society so that high-quality students will be enticed into the profession. In addition to motivation, pharmacy educators should assess students' learning styles to improve pedagogy and learning activities. Overall, the findings of this study would serve as primary data for further investigations of the preparatory-year programme and learning styles of pharmacy students. The issues of pharmacy images and professionalism among the first-year and pharmacy students merit further investigation for the benefit of the pharmacy profession as a whole.

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Conflict of interest

We have no conflicts of interest to disclose.

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