

## Sudanese Pharmacy students: career intentions, expectations and factors affecting their choices

### Abstract:

**Introduction:** Pharmacy is a profession with wide careers. The desires to study pharmacy affect selection of pharmacy careers. Despite that in the last year's pharmacy careers had developed and expanded, the majority of the pharmacists end up in hospital or community pharmacy that creates an imbalance in the distribution of pharmacists and shortage in the workforce. This may be due to career pathways that were not addressed as part of the pharmacy curriculum. **Objectives:** To assess final year pharmacy students career intentions, expectations and factors affecting their choices in Khartoum state. **Material and Methods:** This study is an observational cross-sectional, study conducted during the period from September 2017 to April 2018 for 257 final year pharmacy students selected by non-random convenient sampling in the four universities, data analyzed using SPSS version 21. **Results:** There were wide factors can affect students to study pharmacy, the family was the most effective factor (46.7%) and the desire to work in the medical profession (44.4%). Approximately 53% of the students are satisfied with studying pharmacy. The level of satisfaction was significantly associated with gender and whether pharmacy was their first choice. (P-value =0.001). There was significantly different in the response of career intention regarding attendance in career advice sessions (P =0.035). Student's opinions about each career were as follows: community pharmacy as the most familiar (69.3%), academia as the most prestigious (31.1%), clinical pharmacy as the most stressful (32.3%), marketing and industrial pharmacy as the ones with highest salary (59.5% and 22.2%) and regulatory affairs as the most unfamiliar career (69.6%). There was a significant difference between career intention and salary (P-value =0.00).

**Conclusion:** The most intended careers were hospital and marketing. Personal desire, chances for development, working environment and salary were the most factors affecting student's career intention.

### Introduction

In the turn of the 20th century, pharmacists' responsibility condenses on preparation and development of medicines <sup>(1)</sup>. Nowadays, pharmacy practice has undergone radical change in term of professionalization, a renewal of patient focus, and the development of approaches tools, and competencies to provide direct patient care <sup>(2)</sup>. By tradition hospital and community pharmacy were the standard careers but recently and after the pharmacy has developed, career opportunities have expanded, to include more pharmacy profession and sub-specialization areas, for example, Forensic Pharmacy, Pharmacoeconomics, Pharmaceutical Biotechnology, Industrial Pharmacy, Pharmaco-informatics, Cosmetology, Academic, Journalism, Public Health Pharmacists and Consultancy<sup>(1)</sup>.

### Pharmacist's distribution among pharmacy careers:

There is misdistribution of pharmacists in these pharmacy careers and sub-specializations. At 2008 in south Africa highlighted that there is an imbalance of the distribution of pharmacists in their job, Finding just 16% of registered pharmacists

working in the public sector while the public sector serves more than 80% of the population<sup>(3)</sup>.

In Sudan, there are approximately 18000 pharmacists registered in the Sudanese Medical Council. Among them, only about 800 pharmacists are registered as specialists. The majority of them were clinical pharmacists which 53% registered as clinical pharmacists, 4% registered as industrial pharmacists and 8% in Pharmaceutical biotechnology, according to the Medical Council of Sudan in 2017<sup>(10)</sup>.

#### **Factors influencing the choice of pharmacy careers:**

Some studies (though few) have assessed the factors that influence how pharmacy students make their future choices and locations. Salary, social value, personal developments, job security, job opportunities and part-time work were the most factors can influence students to choose pharmacy careers. Work environment, benefit and salary were the most picked factors in the UK <sup>(1)</sup>. Salary, benefits and geographical location were the most significant factors for selecting a career job in Malaysia <sup>(2)</sup>. Advancement opportunities and salary were the most ranked factors for general careers consideration in Nigeria <sup>(4)</sup>.

#### **The number of pharmacists and pharmacist's workforce:**

Beside the misdistribution of pharmacists in their careers, some studies also reported a shortage in the number of pharmacists to the total population in the developing countries <sup>(4)</sup>.

The World Health Organization (WHO) recommends that the ratio of pharmacist to the general population should be 1:2000 by the year 2020. In Sudan, in 2009 there were approximately seven pharmacists per 100.000 of the population i.e. 1:14000. There were similar findings in Ghana and Tanzania <sup>(5)</sup>. These results are comparable to the situation in Nigeria where the ratio was of 1 pharmacist to 22.000 people <sup>(4)</sup>. The situation is even worse in Sierra Leone 2015 as the pharmacy board of Sierra Leone detect that there were two pharmacists per 100.000 population, that means 167 pharmacists were serving 7 million of the population with a ratio of 1 pharmacist to 42.000 people<sup>(5)</sup>.

The situation in the developed countries is not the same; as the number of pharmacists is increasing significantly. And according to the United State Bureau of labour statistic pharmacists' number projected to increase by 25% between 2010 and 2020, while the increase among all other occupation is only 14.3 % <sup>(6)</sup>. In the United Kingdom (UK) the ratio of pharmacists to population is increasing, there is 30% annual rise in pharmacy students number between 1998 and 2003<sup>(7)</sup>. The number of students in the UK higher education sector entering pharmacy is up to 60.7 % over the decades leading up to 2004<sup>(8)</sup>. In United, State pharmacists are growing in number, with an expectation of 139,600 jobs openings resulting from growth and replacement of retirees in the profession<sup>(6)</sup>

Also in Malaysia, there is aggravation in the number of pharmacists. The number of pharmacy universities in 1996 it has been only 1 Malaysian university, but in 2009 found that 5 public universities and 11 private institutions of higher learning have a pharmacy degree. There were 1.356 registered pharmacists in Malaysia in 2005 and 3.133 in 2007. The introduction of mandatory service was accompanied by an upward revision of pharmacist salary scales. Before 2005, Ministry of Health Malaysia (MOH) preregistration pharmacy graduates were given a training allowance; now they are entitled to a full junior-grade pharmacist salary<sup>(2)</sup>.

In South Australia there was a big shortage of qualified pharmacists, it was observed that the demand and supply of pharmacy workforce was an undersupply of

community and hospital pharmacists in 1999. It was projected that the shortfall would continue beyond 2010, as responses of this shortage number of new pharmacy schools were opened <sup>(9)</sup>.

In Japan from 2011 till 2013, 95% of hospital and community pharmacists have a full positive job satisfaction level than other ordinary employees.

### **Literature review:**

A study was done in the UK in which 71% of students selected pharmacy as the first choice when they entered the university <sup>(11)</sup>. On 2006 in New Zealand 50% of students revealed that pharmacy was their first field of choice <sup>(12)</sup>. As it exists in studies applied in Sierra Leone, Ethiopia and Limpopo found 77.9%, 51.1% and 47% respectively of students picked pharmacy as their first path. <sup>(5, 13, 3)</sup>

Factors can motivate students to study pharmacy were ranging from family, friends, interested in health and medicine to a job were socially useful. In UK friends and someone who own pharmacy in the family were the most factors affecting student's choice to study pharmacy <sup>(11)</sup>. On the other hand, favourite subject and interaction with people were mentioned as the main factors to prompt students to choose pharmacy in New Zealand <sup>(12)</sup>, a study conducted in Australia found that 92.4% ranked interested in health and medicine as important reasons to study pharmacy. Then joined pharmacy because of a friend doing it and family members own a pharmacy were the least important factors for respondents <sup>(14)</sup>. In Sierra Leone, 66.7 % of students selected favourite subject/teacher followed by 61% family and friends to be the most effective factors. While opportunists for part-time work and job were socially useful were the least effective factors <sup>(5)</sup>.

The student satisfaction, factors affecting satisfaction and attitude of satisfaction may be an agent with significant influence on the appropriate choice of future pharmacy careers. The degree of satisfaction was found to be linked to the first reason to study pharmacy as a professional in Australia <sup>(14)</sup>. A study conducted in Limpopo found that 72% of students would still opt to study pharmacy due to pharmacy was their first choice and there are many job opportunities after graduation.

On the other hand, 27% of the students would not study pharmacy again due to that pharmacy was not their first choice and low pharmacist's salaries <sup>(3)</sup>. In a study conducted by Keith Wilson et al in the UK, most of the students were satisfied, as the most pre-graduate students said that studying pharmacy and being pharmacists are an important part of who they want to be. While only 5% were regretting the entire pharmacy field. Eighteen of students who show a positive view about pharmacy tended to take a second degree in pharmacy <sup>(11)</sup>. Sixty of the student in sierra Leon stated they are proud to tell others they are studying pharmacy and 75.7% said that pharmacy is the ideal job for a career in life <sup>(5)</sup>.

In the study that collected in Australia by Grace Shen et al, using TOMA (Top Of Mind Analysis) technique, students were asked about some pharmacy careers they found that the most frequent impressions of students about community pharmacy were: changing, business and more patient's contact. While hospital pharmacy described as competitive, require high knowledge and education. Business/cooperation, research, experience and money all those were characteristics of the pharmaceutical industry <sup>(14)</sup>. In study applied in Japan community and hospital pharmacy were found to be the most chosen by students as careers that promote self-development and requiring continuous learning <sup>(10)</sup>.

Hospital and community pharmacy was recorded the most ranked careers worldwide as observed in the UK, Australia, Japan and Malaysia. There were two studies

conducted in the UK 2006 (11) and 2008 (1) they mentioned the priority in students for community and hospital pharmacy were (48.7% and 35% respectively). These results were consistent with the results of two studies conducted in Australia<sup>(14)</sup> and Malaysia<sup>(2)</sup> community and hospital pharmacy was the most tended career while the selection of academic career is declined. On the other hand, the industrial pharmacy was found popular in Japanese students as 31.5% tend to work in the industrial field and the percentage is closer to students that prefer community field 34.6%<sup>(10)</sup>. Research field rather than community and hospital pharmacy was an option in 44% of New Zealand school of pharmacy<sup>(12)</sup>.

As we moved to develop countries we noticed other career views, as the community is no longer the most desired choice compared to developed countries this was reported in Nigeria, Sierra Leone, Limpopo and Ethiopia students who tended to get away from a community pharmacy (26.9%, 10.8%, 6%, 5.1%) respectively<sup>(4,5,3,13)</sup>. While (44% to 28.9%) of students in the same above countries preferred the hospital pharmacy profession<sup>(3, 4, 5, 13)</sup>.

Some studies indicated that salary versus opportunities for self-development was the most ranking factor that affects the students. In studies applied in Malaysia, New Zealand and UK salary was the most chosen factor<sup>(2, 12, 1)</sup>. While opportunities for self-development was chosen in Japan and Malaysia but has lower effect in the UK<sup>(10, 2, 1)</sup>, training and continued learning respectively shown lower affection in Malaysia<sup>(2)</sup>. In contrast, a study conducted in Nigeria observed that stability of salary and opportunities for self-development as the most picked factor in controlling career intentions<sup>(4)</sup>. These findings agree with the study conducted in Limpopo which found salary was a higher factor for students who selected hospital and community pharmacy while opportunities and research for those who preferred academic field<sup>(3)</sup>.

#### **Justification:**

Despite that in the last years' pharmacy careers had developed and expanded, the majority of the pharmacists end up in hospital or community pharmacy that creates an imbalance in the distribution of pharmacists and shortage in the workforce. This may be due to career pathways were not addressed as part of the pharmacy curriculum in most universities and the final year students have not decided yet their career intention.

#### **Objectives**

##### **General objective:**

To assess final year pharmacy students career intentions, expectations and factors affecting their choices in Khartoum state, September 2017 to April 2018

**Specific objectives:** To identify the factors affecting students in the selection of pharmacy when they entered university, to identify students first choice when they entered university, to assess students satisfaction about studying pharmacy and factors affect their satisfaction, to identify students preferred area for postgraduate studies, To identify students career intentions upon graduation, To identify factors that affect students career intentions, To assess the opinion of students about each career of pharmacy.

**Material and Methods:** This study is an observational cross-sectional, study conducted during the period from September 2017 to April 2018 for 257 final year pharmacy students selected by non-random convenient sampling in the four universities (two of them public universities and the other were private universities using a questionnaire. Then data were entered into Microsoft excel sheet and then exported to Statistical Packages for the Social Sciences (SPSS) version 21. The

statistical association was obtained using chi-square. Data were presented in form of figures and tables.

## Results

### Participant's characteristics:

The mean age of the participants was  $22 \pm 1.8$  years. Youngest was 20 years and the eldest was 33 as shown in figure 1. Females were the greatest majority of the study participants (75%), 94.2% from participants were single, 81.3% from participants have good economic status, while 12.5% have excellent economic status.

58.8% of participants were studied in governmental universities while 41.2% were studied in a private one. 91.4% of participants studied to get a Sudanese high school certificate while 8.6% get non- Sudanese one.

In the area of home town, 36.2% stated that Khartoum, 22.6% outside Khartoum state, 18.3% Omdurman, 17.5% Khartoum North and 5.4% overseas.

In the area of last degree or GPAs achieved, 38.1% obtained good, 31.1% obtained very good, 16.7% stated that not bad and 14% were obtained excellent. In the area of factors that influenced students to study pharmacy, 46.7% stated that the family, 44.4% from them want to work in the medical field, 34.6% stated that pharmacy is prestigious faculty and 32.3% stated that it was school subject as shown in table 1.

**Table 1: Represent the factors that influence participants to study pharmacy**

<b>Factors influence study pharmacy</b>	<b>Percent</b>
<b>Friends</b>	<b>8.9%</b>
<b>Family</b>	<b>46.7%</b>
<b>Financial status</b>	<b>9.3%</b>
<b>A school subject</b>	<b>32.3%</b>
<b>Row model pharmacist</b>	<b>14.8%</b>
<b>A family member owns the pharmacy</b>	<b>10.5%</b>
<b>Want socially useful</b>	<b>22.6%</b>
<b>Pharmacy is a prestigious faculty</b>	<b>34.6%</b>
<b>Easy to get a job</b>	<b>24.6%</b>
<b>Want to make own business</b>	<b>20.6%</b>
<b>Flexible work hours</b>	<b>16.3%</b>
<b>Want to work in the medical field</b>	<b>44.4%</b>
<b>Don't know</b>	<b>3.1%</b>

61.1% from participants stated that pharmacy was their first choice when entered university while 38.9% were not from this 24.1% their choice was medicine, 6.6% dentistry while 8.2% want other fields. Only 53.3% from participants were completely satisfied with studying pharmacy, 29.2% to somehow were satisfied while 11.3% were regretting as shown in table 2. The reasons for regretting to study pharmacy, 51.8% stated that they didn't find their objective, 44.8% stated that it is stressful faculty while 41.4% stated that pharmacy has difficult subjects as shown in table 3. In the area of actions taken by students who regretted studying pharmacy, majority of them (55.2%) stated that it was too late and they will continue in pharmacy, 24.2%

stated that they will change to a non-pharmacy career after graduation and 6.8% stated that they will change to another faculty rather than pharmacy as shown in table 4.

**Table 2: Level of satisfaction of studying pharmacy among participants**

<b>Are you satisfied with studying pharmacy?</b>	<b>Level of satisfaction</b>	<b>Percent</b>
	Completely	53.3%
	Somehow	29.2%
	<b>Regretting</b>	<b>11.3%</b>
	Don't know	6.2%

**Table 3: Reasons of regretting to study pharmacy among study participants**

<b>Why you regret to study pharmacy?</b>	<b>Percent</b>
Difficult subjects	41.4%
Current status of the pharmacist is not motivated	24.4%
Limited job opportunities	17.3%
The opinion of pharmacist about pharmacy	17.3%
Limited Job Options	27.6%
Didn't find your objectives	51.8%
People opinion of pharmacists	27.6%
Stressful faculty	44.8%
Pharmacist role not clear	31%
Don't know	20.7%

**Table 4: Action will be taken by the participants who regretted studying pharmacy**

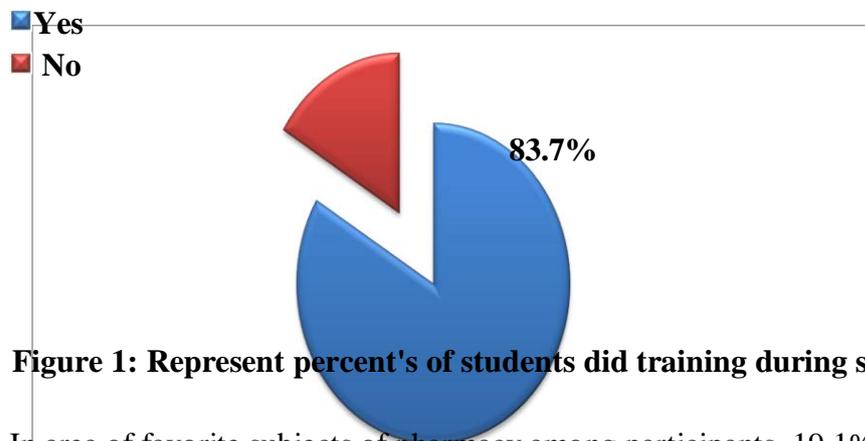
<b>How you act if you are regretting pharmacy?</b>	<b>Action taken</b>	<b>Percent</b>
	Too late, I will continue in pharmacy	55.2%
	Change to a non-pharmacy career upon graduation	24.2%
	Change to another faculty rather than pharmacy	6.8%
	Don't know	13.8%

75.9% from the satisfied or kind satisfied participants stated that they will do post-graduation degree. 19.8% from them will go through clinical pharmacy field, 10.1% will go through industrial pharmacy field, 8.9% didn't know which field they will go

through it and others will go through quality control, pharmacology and biotechnology fields (4.3% for each field).

83.7% from participants did training during faculty time while 16.3% didn't as shown in figure 1. 68.1% from participants did the training did it in community pharmacy, 11.7% did it in hospital pharmacy while 3.9% did it in the industrial field.

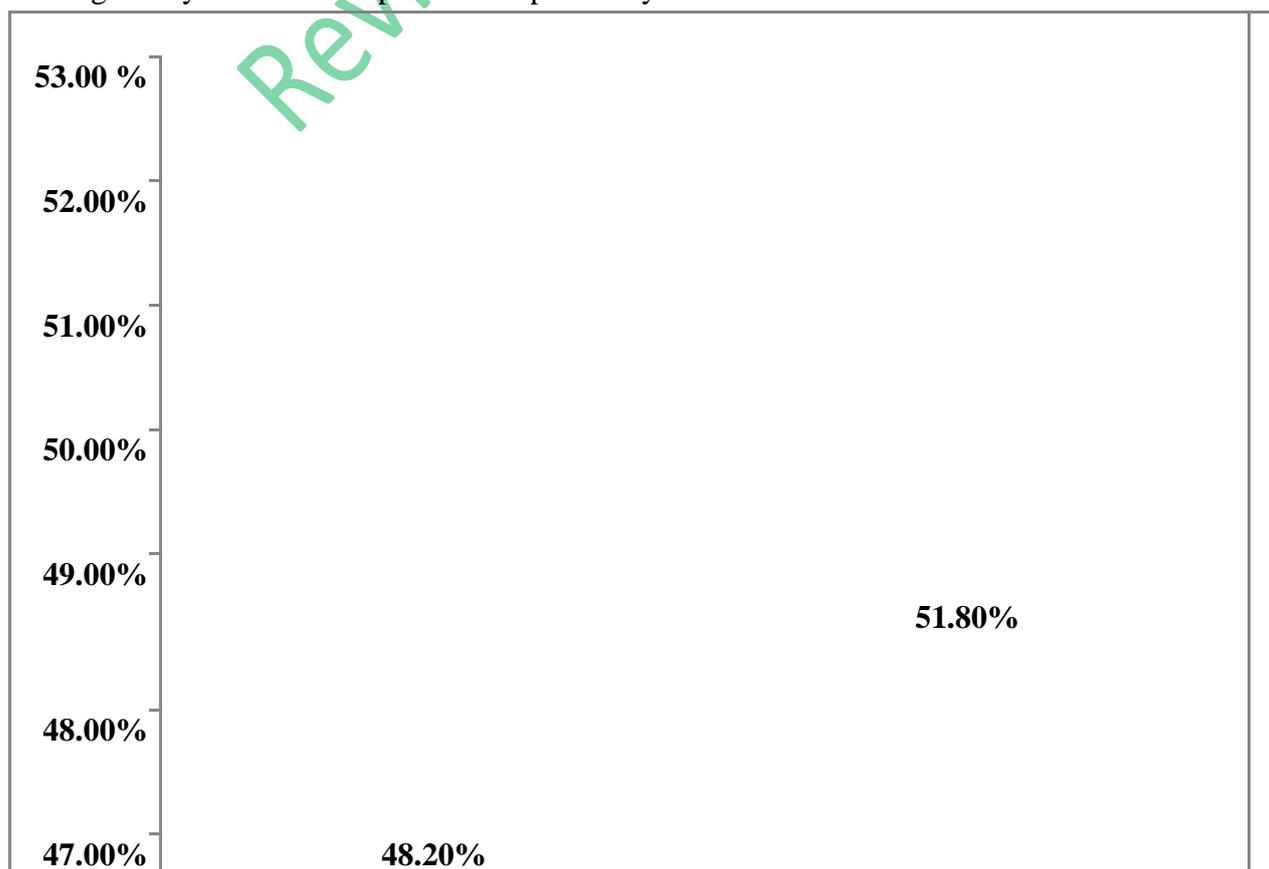
16.30%

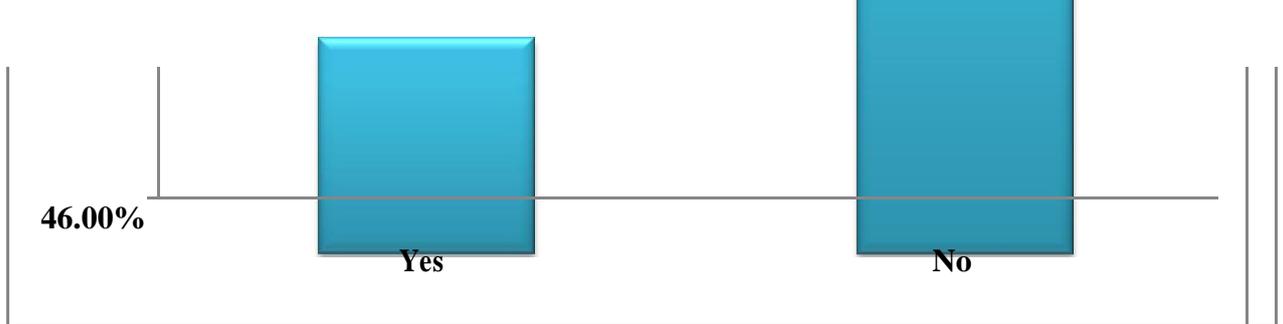


**Figure 1: Represent percent's of students did training during studying pharmacy**

In area of favorite subjects of pharmacy among participants, 19.1% preferred pharmacology, 13.2% preferred pharmaceuticals while 11.3% their favorite subject is medicinal chemistry and 8.9% preferred clinical pharmacy.

51.8% from participants didn't attend workshops in pharmacy while 48.2% from them attend workshops as shown on figure 2. 74.7% from participants didn't attend career advice lecture while only 25.3% attend this lecture as shown in table 5. The intended careers among study participants, 17.9% from participants prefer hospital pharmacy, 16% prefer sales and marketing, 14% prefer academic field, 13.6% didn't know which field they desired, 13.2% prefer community pharmacy, 12.5% prefer industry field, 5.8% regulatory field and 7% prefer non- pharmacy field.





**Figure 2: Percent's of participants attended workshops in pharmacy**

**Table 5: Percent's of participants attended career advice session**

		Percent
Attended career advice session	Yes	25.3%
	No	74.7%

In the area of factors affecting career intention among participants, 81.3% stated that working environment has the high effect, 80.9% stated that salary has high impact, 89.9% stated that personal desire has the high effect, 83.3% stated that if there is the chance for development in the field has high effect choice, 73.5% stated that job security has high effect choice, 65.4% stated that family has high effect choice, 62.6% stated that daily work hours has a high effect on selection, 61.8% stated that work flexible schedule has a high effect on choice and 54.9% stated geographic location has a high effect on their choice.

**Table 6: Opinions of participants about each career of pharmacy**

Factors	Community pharmacy	Lecturer	Industrial pharmacy	Marketing	Clinical pharmacy	Regulatory affairs
Highest salary	2.7%	2.7%	22.2%	59.5%	3.9%	8.9%
Most prestigious	2.3%	31.1%	14.8%	3.5%	30.4%	17.9%
Highest social value	20.2%	23.7%	13.2%	2.7%	34.6%	5.4%
Highest personal development	3.5%	41.6%	14	3.9%	30.4%	6.6%
Most security	16.7%	44%	6.2%	10.9%	7.4%	14.8%
Most challenging	14.7%	18.7%	25.3%	16.7%	26.1%	8.6%
Require high knowledge	8.2%	28.8%	19.1%	3.1%	36.6%	4.3%
Highest job opportunities	29%	12.8%	31.5%	19.5%	10.1%	14.8%
Keep you updated	7.8%	30%	17.5%	8.6%	23.7%	12.5%
Most stressful	14%	14.6%	20.2%	11.7%	32.3%	7%
High physical effort	19.5%	4.7%	17.1%	26.5%	30.4%	1.9%
Most stable work	50.6%	22.2%	7%	5.4%	4.3%	10.5%
Most flexible	51.4%	17.1%	4.3%	20.2%	3.9%	3.1%
Most familiar to you	69.3%	12.1%	4.7%	5.1%	8.6%	0.4%

Most unfamiliar to you	2.7%	1.6%	8.9%	29.7%	7.4%	69.6%
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Table 6 represent opinions of participants about each careers of pharmacy, 59.5% stated that the marketing field has highest salary, 30.4% from participants stated that clinical pharmacy is most prestigious, 34.6% stated that clinical pharmacy field has highest social value, 41.6% stated that lecturer has highest personal development, the most security career is lecturer as stated by 44% from participants, the most challenging career as stated by 26.1% from participants is clinical pharmacy career, the career require high knowledge is clinical pharmacy stated by 36.6%, the career that have highest job opportunities is industrial pharmacy as stated by 31.5%, 30% from participants stated that lecturer career kept up updated, the most stressful career is clinical pharmacy as stated by 32.3% from participants, the clinical pharmacy as stated by 30.4% from participants require high physical effort, the most stable, most flexible and most familiar career to participants is community pharmacy as stated by 50.6%, 51.4% and 69.3% respectively, the regulatory affairs is most unfamiliar career to 69.6% from participants.

There is a significant statistical association between field intended to work after graduation for participants and study variables such as salary of the career (P-value 0.000), high social value career (P-value 0.040) and most familiar career (P-value 0.001).

#### **Discussion:**

##### **Characteristics of study participants:**

Participants were predominantly aged  $22 \pm 1.8$  may be due to this is a normal age range of final students this year. Females constituted a large portion of the study sample while males were less likely to participate that may be due to increase favorability of pharmacy in females more than males. High dominant numbers of participate (94.2%) were single. Most of the participants in good economic states. And 58.8% of participants were studying in governmental universities and 41.2% private universities. Most of the participants were living in Khartoum city as home town before entering university. Majority of participants (91.4%) had Sudanese certifications as a high school certificate. Most of the participants (31.1%) had good score followed by very good (33.1%) as their last degree.

##### **Factors affecting selection of pharmacy as the first choice in entering university:**

The current study showed that pharmacy was the first choice for 61.1% of participants. While 38.9% mentioned that pharmacy was not their first choice, among them medicine was the first choice in 61% (24% of the total sample) and dentistry in 17% (6.6% of the total sample). This finding is consistent with Keith Wilson et al <sup>(11)</sup> study in which 71% of students mentioned that pharmacy was their first choice while 35.8% and 11.9% of students selected medicine and dentistry respectively. Likewise in study conducted in Sierra Leone <sup>(5)</sup>, 77.9% of students mentioned that pharmacy was their first choice. On the other hand, studies conducted in New Zealand <sup>(12)</sup>, Ethiopia <sup>(13)</sup> and Limpopo <sup>(3)</sup> found (50%, 51% and 47%) respectively of students had chosen pharmacy as their first choice.

There were wide factors can affect students to study pharmacy, the factors will be discussed in order of the most effective and least effective ones. The family was the most effective factor to study pharmacy (46.7%). Our results agree with the study conducted by Peter Bai et al in Sierra Leone <sup>(5)</sup> that found family is the most factor that influences students; that may be because of both studies done in developing countries in the same period. While studies conducted UK <sup>(11)</sup> and New Zealand <sup>(12)</sup> revealed that friends and favourite subject were the most effective factors respectively.

The next effective factor was the students desire to work in the medical profession (44.4%). Similarly in a study conducted in Australia <sup>(14)</sup> by Grace Shen et al found the same factor as the most effective factor.

The least factors affecting student's selection of pharmacy were friends and financial status (8.9% and 9.3%) respectively similar findings were found in Australia <sup>(14)</sup> and New Zealand <sup>(12)</sup>. That may be due to the majority of students participating in this study have good economic status background.

#### **Level of satisfaction, factors affect satisfaction and attitude towards satisfaction:**

Level of satisfaction about studying pharmacy may influence a student's choice of a future pharmacy career. Approximately 53% of the students are satisfied with studying pharmacy while the rest of students ranging from somewhat satisfied (29.2%), don't know their feeling (6.2%) and completely regretting studying pharmacy (11.3%) and will change to a non-pharmacy career upon graduation (24%). Pharmacy favorability is declining in recent years in Sudan, this was indicated by the fact that the acceptance percentage to enter pharmacy was reduced.

In comparison with the study conducted by Keith Wilson in the UK <sup>(11)</sup> that showed most of the students in their study were satisfied. Other studies were done in Sierra Leone <sup>(5)</sup> and Limpopo <sup>(3)</sup> showed that 60% and 72% of students were satisfied respectively.

Overall, reasons lead participants to regret were that they did not find their objectives 51.8% and they described pharmacy as stressful faculty. Other factors addressed by the participants were limited job opportunities (17.3%) and the opinion of pharmacist about pharmacy (17.3%). In contrast, a study conducted in Limpopo <sup>(3)</sup> found the most reasons were pharmacy was not the first choice of students and low pharmacist's salaries.

55.2% of participants who are regretting said is too late to change pharmacy they will continue studying it while only 6.8% change to another faculty rather than the pharmacy. This may be due to that all the participants are in the final year of university they felt there is no time to change pharmacy and start from the beginning. Some of the 24.2% have the intention to change to a non-pharmacy career after graduation. Participant's objectives and their desires in other professions may be reasons that affect them to change pharmacy.

The level of satisfaction was significantly associated with gender and whether pharmacy was their first choice. (P-value =0.001).

Most of the satisfied and somewhat satisfied participants desired to get post-graduation degree (75.6%). Among them, the majority of the students (19.8%) preferred clinical pharmacy as an area to conduct the postgraduate studies followed by 10.1% in industrial pharmacy. While 8% of the students don't know where to conduct postgraduate studies. Public health and regulatory affair were least preferred field (0.4 and 0.8 respectively). This may be because of the few numbers of universities in Sudan which offer postgraduate programs in pharmacy. Furthermore, the most available postgraduate programs are clinical pharmacy and industrial pharmacy. These findings may be linked to the favourite subjects among students, which were found to be: pharmacology, pharmaceutical and clinical pharmacy were the favourite subjects for participants. While public health and pharmaco-informatics were the least regarding students favorability, that may be because they are new disciplines and not taught in most universities.

#### **Career intentions and factors affecting it:**

The most intended careers in the study participants were hospital and marketing (17.9% and 16% respectively). This may be due to they are the most familiar careers and because of the known high salary, especially in marketing. While the least intended careers were regulatory affair and non-pharmacy career this may be due to that regulatory affairs discipline is unfamiliar to many students. Consistently with the study done in Ethiopia by Gebremedhin B et al<sup>(13)</sup> 11% from students tended to sale and marketing. And other studies conducted in Japan<sup>(10)</sup> and Nigeria<sup>(4)</sup> highlighted that 22.7% and 28.9% respectively of students choose hospital pharmacy. In contrast with the study conducted in Sierra Leone<sup>(5)</sup> mentioned that fewer students prefer sale and marketing. There was significantly different in the response of career intention regarding attendance in career advice sessions ( $P = 0.035$ ). While the area of training has no significant impact on career intentions. In comparison to study conducted in Japan<sup>(10)</sup> that mentioned training had a significantly greater influence on the students; the limitation of training area in Sudan compared with Japan may be a reason, another reason may be the duration of training which is extended to one year in Japan.

This study explored factors affecting career intention of participants. Personal desire (98.9%), chances for development (83.3%), working environment (81.3%) and salary (80.9%) were the most factors affecting students career intentions. This is similar to results obtained by Chukwuemeka M et al in Nigeria<sup>(4)</sup> and by Si Modipa et al in Limpopo<sup>(3)</sup> in their study which pointed salary and chance for development as most important factors affecting career intentions. Studies conducted in Malaysia, New Zealand<sup>(12)</sup> and the UK<sup>(11)</sup> showed salary was most effecting factors among students. Conversely in Japan<sup>(10)</sup> salary was the lowest effective factor. However, these results are promising as most students were much concerned with personal desire and a chance for development rather than geographic location (54.9%) and flexibility of work schedule (61.8%).

#### **4.1.5 Students' opinion about each career:**

Student's opinions about each career were as follows: community pharmacy as the most familiar (69.3%), academia as the most prestigious (31.1%), clinical pharmacy as the most stressful (32.3%), marketing and industrial pharmacy as the ones with highest salary (59.5% and 22.2%) and regulatory affairs as the most unfamiliar career (69.6%). In contrast to study conducted by Keiichi N et al<sup>(10)</sup> student's opinions about clinical pharmacy as most self-developing (58.5%) and requires high knowledge (13.8%), and public health as hard work (20%). These opinions may be due to the training program implemented in Japan.

Another study conducted in Limpopo<sup>(3)</sup> mentioned student's opinion about the community as the highest salary (30%) and academic as a person developing career (20%).

There was a significant difference between career intention and salary ( $P$ -value = 0.00). Sudan's level of economic may affect student opinion. Another association exist between career intention and high social value ( $P$ -value = 0.040). That may be due to students who want to be a high level in social life. Career intention was associated with most familiar career to students ( $p = 0.001$ ).

#### **Conclusion:**

- Family, the desire to work in the medical field and a favourite study subject were the most effective factors (46.7%, 44.4% and 32.3% respectively) in the selection of pharmacy as the first choice.
- The pharmacy was the first choice in almost 60% of students.

- Approximately 50% of the students are satisfied with studying pharmacy while the rest of students ranging from somewhat satisfied (29.2%), don't know their feeling (6.2%) and completely regretting studying pharmacy(11.3%) and will change to a non-pharmacy career upon graduation (24%).
- Most of the students (19.8%) preferred clinical pharmacy as an area to conduct postgraduate studies. While 8% of the students don't know where to conduct postgraduate studies.
- The most intended careers were hospital and marketing (17.9% and 16% respectively).
- Personal desire, chances for development, working environment and salary were the most factors affecting student's career intention.
- Students opinions were as follows: community pharmacy as the most familiar to students, academia as the most prestigious, clinical pharmacy as the most stressful, industrial pharmacy and marketing as the ones with the highest salary and regulatory affairs as the most unfamiliar career.

#### **Recommendations:**

- Career advice program should be incorporated into the curriculum.
- Extension of training area and duration to cover more career pathways.
- The motivation of pharmacy studying.

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