



RESEARCH ARTICLE

SUDANESE PHARMACY STUDENTS: CAREER INTENTIONS, EXPECTATIONS AND FACTORS AFFECTING THEIR CHOICES

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Abstract

Objectives: Pharmacy is a profession with wide careers. The desires to study pharmacy affect selection of pharmacy careers. Despite that in the last years pharmacy careers had developed and expanded, majority of the pharmacists end up in hospital or community pharmacy that create imbalance in distribution of pharmacists and shortage in work force. This may be due to career pathways were not clearly addressed as part of the pharmacy curriculum. Objective of present study was to assess final year pharmacy student's 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 of time 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; family was the most effective factor (46.7%) and the desire to work in 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. ($p=0.001$). There was significant different in 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 significant different between career intention and salary ($p=0.00$).

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. Career advice program should be incorporated into the curriculum.

Keywords: Career, intentions, pharmacy students.

INTRODUCTION

In the turn of 20th century, pharmacists' responsibility condenses on preparation and development of medicines¹. 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 care². By tradition hospital and community pharmacy were the standard careers but recently and after the pharmacy has developed, career opportunities has expanded, to include more pharmacy profession and sub-specialization areas for example: Forensic

Pharmacy, Pharmacoeconomics, Pharmaceutical Biotechnology, Industrial Pharmacy, Pharmacoinformatics, Cosmetology, Academic, Journalism, Public Health Pharmacists and Consultancy¹.

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 imbalance of distribution of pharmacists in their job, finding just 16% of registered pharmacists working in public sector while the public sector serves more than 80% of the population³. In Sudan there is 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 2017¹⁰.

Factors influencing 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 UK. Salary, benefits and geographical location were the most significant factors for selecting a career job in Malaysia². Advancement opportunities and salary were the most ranked factors for general careers consideration in Nigeria⁴.

Number of pharmacists and pharmacist's work force:

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 countries⁴. The World Health Organization (WHO) recommends that the ratio of pharmacist to 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 Tanzania⁵. These results are comparable to the situation in Nigeria where the ratio was of 1 pharmacist to 22.000 people⁴. 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 populations, that mean 167 pharmacists were serving 7 million of population with ratio of 1 pharmacist to 42.000 people⁵. 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 labor statistic pharmacists' number projected to increase by 25% between 2010 and 2020, while the increase among all other occupation is only 14.3%⁶. In United Kingdom (UK) the ratio of pharmacists to population is increasing, there is 30% annually rise in pharmacy students number between 1998 and 2003⁷. The number of students in UK higher education sector entering pharmacy is up to 60.7 % over the decades leading up to 2004⁸. 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 profession⁶.

Also in Malaysia there is aggravation in number of pharmacists. The number of pharmacy universities in 1996 it been only 1 Malaysian University, but in 2009 find that 5 public universities and 11 private institution of higher learning have 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 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 salary². 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 opened⁸.

In Japan since 2011 till 2013, 95% of hospital and community pharmacists have a full positive job satisfaction level than other ordinary employees. Study done in UK in which 71% of students selected pharmacy as first choice when they entered the University¹¹. On 2006 in New Zealand 50% of students revealed that pharmacy was their first field of choice¹². 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^{5,3}. Factors can motivate students to study pharmacy were ranging from family, friends, interested in health and medicine to job where socially useful. In UK friends and someone who own pharmacy in family were the most factors affecting student's choice to study pharmacy¹¹. On the other hand favorite subject and interaction with people were mentioned as the main factors to prompt students to choose pharmacy in New Zealand¹², 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 friend doing it and family members own a pharmacy were the least important factors for respondents. In Sierra Leone 66.7 % of students selected favorite subject/teacher followed by 61% family and friends to be the most effective factors. While opportunists for part time work and job where socially useful were the least effective factors⁵. The student satisfaction, factors affecting satisfaction and attitude of satisfaction may be 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 professional in Australia. 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 salaries³. In a study conducted by Keith Wilson *et al.*, in UK most of 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 shown a positive views about pharmacy tended to take second degree in pharmacy¹¹. Sixty of student in sierra Leon stated they are proud to tell other they are studying pharmacy and 75.7% said that pharmacy is ideal job for career in life⁵. 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 was characteristics of pharmaceutical industry. 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 learning¹⁰. Hospital and community pharmacy was recorded the most ranked careers worldwide as what observed in UK, Australia, Japan and Malaysia. There were two studies conducted in UK 2006 and 2008¹¹ 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 and Malaysia² community and hospital pharmacy were the most tended career while the selection of academic career is declined. On the other hand industrial pharmacy was found popular in Japanese students as 31.5% tend to work in industrial field and the percentage is closer to students that prefer community field 34.6%¹⁰. Research field rather than community and hospital pharmacy was an option in 44% of New Zealand school of pharmacy¹². As we moved to developing countries we noticed other career views, as 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 community pharmacy (26.9%, 10.8%, 6%, 5.1%) respectively^{4,5,3}. While (44% to 28.9%) of students in same above countries preferred hospital pharmacy profession^{3,4,5}. Some studies indicated that salary versus opportunities for self-development were the most ranked factor that affect the students. In studies applied in Malaysia, New Zealand and UK salary was most chosen factor^{2,12,1}. While opportunities for self-development was chosen in Japan and Malaysia but has lower effect in UK^{10,2,1}, training and continued learning respectively shown lower affection in Malaysia². In contrast study conducted in Nigeria observed that stability of salary and opportunities for self-development as the most picked factor in controlling career intentions⁴. These findings agree with study conducted in Limpopo which found salary was higher factor for students who selected hospital and community pharmacy while opportunities and research for those who preferred academic field³.

STUDY DESIGN

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

Objective of current study was to assess final year pharmacy student's career intentions, expectations and factors affecting their choices in Khartoum state, September 2017 to April 2018. Specific objective was

to identify the factors affecting students in 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 post graduate studies, to identify students career intentions upon graduation, to identify factors that affect students career intentions, to assess opinion of students about each career of pharmacy.

This study is an observational cross-sectional, study conducted during the period of time 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 questionnaire.

Statistical analysis

Data were entered into Microsoft excel sheet and then exported to Statistical Packages for the Social Sciences (SPSS) version 21. Statistical association was obtained using Chi-square. Data were presented in form of figures and tables.

RESULTS

The mean age of the participants was 22±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.

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

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

Total 58.8% from participants were studying in governmental universities while 41.2% were studying in private ones. 91.4% from participants studied get a Sudanese high school certificate while 8.6% get non-Sudanese one. In the area of home town, 36.2% stated that they were from Khartoum, 22.6% outside Khartoum state, 18.3% from Omdurman, 17.5% from Khartoum North and 5.4% from overseas. In area of last degree or GPAs achieved, 38.1% obtained good, 31.1% obtained very good, 16.7% stated that not bad

and 14% obtained excellent. In area of factors that influenced students to study pharmacy, 46.7% stated that the family, 44.4% from them want to work in medical field, 34.6% stated that pharmacy is prestigious faculty and 32.3% stated that it was school subject as shown in Table 1.

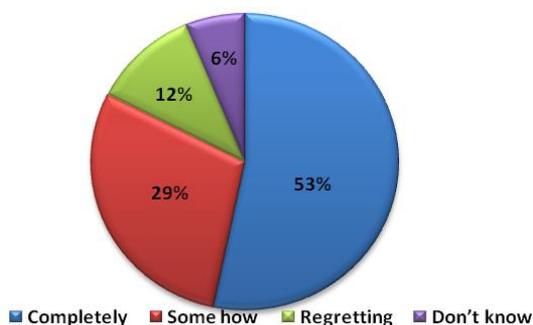


Figure 1: Level of satisfaction of studying pharmacy among participants.

Total 61.1% from participants stated that pharmacy was their first choice when entered University While it wasn't the first choice for 38.9%, among them 24.1% their choice was medicine, 6.6% dentistry while 8.2% want other fields. Only 53.3% from participant's were completely satisfied with studying pharmacy, 29.2% to somehow were satisfied while 11.3% were regretting as shown in Figure 1.

Table 2: Reasons of regretting to study pharmacy among study participants.

Why you regret to study pharmacy?	Percent
Difficult subjects	41.4
Current status of pharmacist is not motivated	24.4
Limited job opportunities	17.3
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

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 2. In area of actions taken by students who regretted studying pharmacy, majority of them (55.2%) stated that it is too late and they will be continue in pharmacy, 24.2% stated that they will change to non-pharmacy career after graduation and 6.8% stated that they will change to another faculty rather than pharmacy as shown in Table 3. Total 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). Total 83.7% from participants did training during faculty time while 16.3% didn't as shown in Figure 2. Total 68.1% from participants did the training in community pharmacy, 11.7% did it in hospital pharmacy while 3.9% did it in industrial field. 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. Total 51.8% from participants didn't attend workshops in pharmacy while 48.2% from them attend workshops as shown on Figure 3.

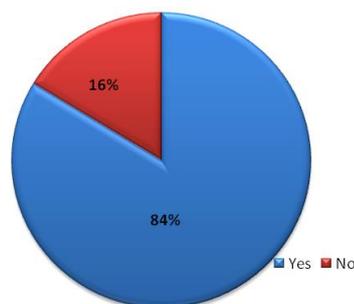


Figure 2: Students did training during studying pharmacy.

Total 74.7% from participants didn't attend career advice lecture while only 25.3% attended this lecture as shown in Figure 3. 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. In area of factors affecting career intention among participants, 81.3% stated that working environment has high effect, 80.9% stated that salary has high impact, 89.9% stated that personal desire has high effect, 83.3% stated that if there is 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 high effect on selection, 61.8% stated that work flexibility schedule has high effect on choice and 54.9% stated geographic location has high effect on their choice. Table 4 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 academia is most prestigious.

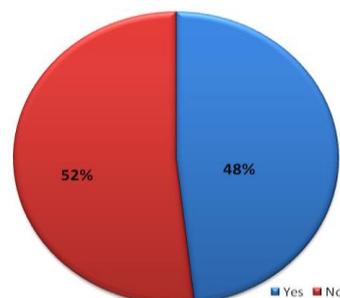


Figure 3: Participants attended workshops in pharmacy.

Table 3: Action will be taken by the participants who regretted studying pharmacy.

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

Table 4: Opinions of participants about each careers 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%

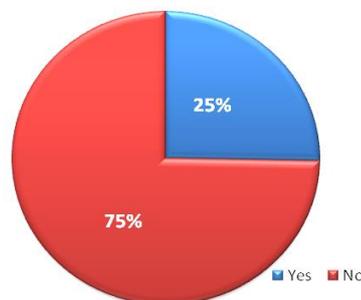
Total 34.6% stated that clinical pharmacy field has highest social value, 41.6% stated that lecturer has highest personal development, the most security career is lecturer as stated by 44% from participants, the most challenging career as stated by 26.1% from participants is clinical pharmacy career, 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 un familiar 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 ± 1.8 may be due to this is a normal age range of final students in 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 participants (94.2%) were single. Most of participants were of good economic states. Total 58.8% of participants were studying in governmental universities and 41.2% private universities. Most of participants

were living in Khartoum city as home town before entering University. Majority of participants (91.4%) had Sudanese certifications as high school certificate. Most of participants (31.1%) had good score followed by very good (33.1%) as their last degree.

**Figure 4: Participants attended career advice session.**

Factors affecting selection of pharmacy as 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 a previous 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 Leone⁵ 77.9% of students mentioned that pharmacy was their first choice. On the other hand studies conducted in New Zealand¹², Ethiopia and Limpopo³ 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 most effective and least effective ones. Family was the most effective factor to study pharmacy (46.7%). Obtained results agree with study conducted by Peter Bai *et al.*, in Sierra Leone⁵ that found family is the most factor that influence students; that may be because of both studies done in developing countries in same period of time. While studies conducted UK¹¹ and New Zealand¹² revealed that friends and favorite subject were the most effective factors respectively. The next effective factor was the students desire to work in medical profession (44.4%). Similarly in study conducted in Australia¹⁴ by Grace Shen *et al.*, found same factor as 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 Australia¹⁴ and New Zealand¹². That may be due 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 student's choice of 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 non-pharmacy career upon graduation (24%). Pharmacy favorability is declining in the recent years in Sudan; this was indicated by the fact that the acceptance percentage to enter pharmacy was reduced. In comparison with study conducted by Keith Wilson in UK¹¹ that showed most of students in their study were satisfied. Other studies done in Sierra Leone⁵ and Limpopo³ 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. Another factors addressed by the participants were limited job opportunities (17.3%) and opinion of pharmacist about pharmacy (17.3%). In contrast study conducted in Limpopo³ found the most reasons were pharmacy was not the first choice of students and low pharmacist's salaries. Some of them 24.2% have the intention to change to non-pharmacy career after graduation. The level of satisfaction was significantly associated with gender and whether pharmacy was their first choice. (p value=0.001). Most of 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 filed (0.4 and 0.8 respectively). This may be because of the few number of universities in Sudan which offer post graduate programs in pharmacy. Furthermore the most available postgraduate programs are clinical pharmacy and industrial pharmacy. These findings may be linked

to the favorite subjects among students, which were found to be: pharmacology, pharmaceutical and clinical pharmacy were the favorite 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 the known high salary especially in marketing. While the least intended career were regulatory affair and non-pharmacy career this may be due to that regulatory affairs discipline is unfamiliar to many students. Consistently with study done in Ethiopia, 11% from students tended to sale and marketing. And other studies conducted in Japan¹⁰ and Nigeria⁴ highlighted that 22.7% and 28.9% respectively of students choose hospital pharmacy. In contrast with study conducted in Sierra Leone⁵ mentioned that less students prefer sale and marketing. There was significant different in response of career intention regarding attendance in career advice sessions ($p=0.035$). While area of training has no significant impact on career intentions. In comparison to study conducted in Japan¹⁰ 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 Chukwumeka M *et al.*, in Nigeria⁴ and by Si Modipa *et al.*, in Limpopo³ in their study which pointed salary and chance for development as most importance factors affecting career intentions. Studies conducted in Malaysia, New Zealand¹² and UK¹¹ showed salary was most effecting factors among students. Conversely in Japan¹⁰ salary was the lowest affective factor. However, these results are promising as most students were much concerned with personal desire and chance for development rather than geographic location (54.9%) and flexibility of work schedule (61.8%).

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 a previous study¹⁰ student's opinions about clinical pharmacy as most self-developing (58.5%) and requires high knowledge (13.8%). These opinions may be due to the training program implemented in Japan. Another study conducted in Limpopo³ mentioned student's opinion about community as highest salary (30%) and academic as personal developing career (20%). There

was significant different between career intention and salary (p value=0.00). Sudan's level 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 want to be in high level in social life. Career intention was associated with most familiar career to students (p value=0.001).

CONCLUSIONS AND RECOMMENDATIONS

- Family, the desire to work in medical field and a favorite study subject were the most effective factors (46.7%, 44.4% and 32.3% respectively) in selection of pharmacy as the first choice.
- 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%).
- Most of the students (19.8%) preferred clinical pharmacy as an area to conduct the 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.
- Career advice program should be incorporated into the curriculum.

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AUTHOR'S CONTRIBUTION

Alhemadey H: collected data and written the manuscript. **Saeed AA:** designed questionnaire and written the manuscript. **Hamid A:** written the proposal of the research. **Mousnad MA:** written the manuscript. All authors revised the article and approved the final version.

DATA AVAILABILITY

The datasets generated during this study are available from the corresponding author upon reasonable request.

CONFLICT OF INTEREST

No Conflict of interest is associated with this work.

REFERENCES

1. Savage LM, Beall JW, Woolley TW. Factors that influence the career goals of pharmacy students. *American J Pharm Edu* 2009;73(2):28. <https://doi.org/10.5688/ajpe779187>
2. Hasan SS, Kwai Chong DW, *et al.* Influences on Malaysian pharmacy students' career preferences. *American J Pharm Edu* 2010; 74(9):166, <https://doi.org/10.5688/aj720350>
3. Modipa SI, Dambisya YM. Profile and career preferences of pharmacy students at the University of Limpopo, Turfloop Campus. *South Africa Edu Health* 2008; 21(3):164. PMID: 19967636
4. Ubaka CM, Ochie UM, Adibe MO. Student pharmacists' career choices: a survey of three Nigerian schools of pharmacy. *Pharmacy Practice* 2013; 11(3):149-155. <https://doi.org/10.1186/1478-4491-7-4>
5. James PB, Batema MNP, Bah AJ, *et al.* Was pharmacy their preferred choice? Assessing pharmacy students' motivation to study pharmacy, attitudes and future career intentions in Sierra Leone. *Health Prof Edu* 2018;(4):139-148
6. Sholy L, Zeenny R. A career, exploration assignment for first-year pharmacy students. *American J Pharm Edu* 2013; 77 (9):195.
7. Hassell K, Seston E, Eden M, Willis S. The UK pharmacy degree: attrition rates and demographics of non-completers. *Pharmacy Edu* 2007; 7(3):249-256. <https://doi.org/10.1080/15602210701589744>
8. Willis Sc, Shann P, Hassell K. Pharmacy career-deciding: making choice a good fit. *J Health Org Manag* 2009; 23(1):85-102. <https://doi.org/10.1108/14777260910942579>
9. Davey A, Evans AM, Stupans I. Factors that influence the choice of career and study options. *Pharm Edu* 2006;6 (1), 21–26. <https://doi.org/10.1080/15602210500523381>
10. Nakagomi K, Hayashi Y, Komiyama T. Survey of attitudes towards career choice among pharmacy students: A Pilot study at a private University in Japan. *Pharm Edu* 2016; 16 (1):146- 157.
11. Wilson K, Jesson J, Langley C, Hatafied K and Clarke L., Pharmacy undergraduate students: career choices and expectations across a four-year programme, London: Royal Pharmacy Society of Great Britain 2006:99
12. Capstick S, Green JA, Beresford R. Choosing a course of study and career in pharmacy student attitudes and intentions across three years at a New Zealand School of Pharmacy. *Pharm Edu* 2007; 7(4): 359–373. <https://doi.org/10.1080/15602210701673811>
13. Beedemariam G, Ebro M, Ageze H, *et al.* Pharmacy students' attitude and future career choices: a survey of four public schools of pharmacy in Ethiopia. *Ethiopian Pharm J* 2014;30(1):57–63, <https://doi.org/10.1016/j.hpe.2017.06.001>
14. Shen G, Fois R, Nissen L and Saini B. Course experiences, satisfaction and career intent of final year per-registration Australian pharmacy students. *Pharmacy Pract* 2014, 12(2): 392. <https://doi.org/10.4321/s1886-36552014000200004>