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RESEARCH ARTICLE

Factors influencing career orientation of graduating pharmacy students in Can Tho, Vietnam

Hoang Ngoc Dao[1], Dieu Phap Le[1], Quang Loc Duyen Vo[2], Mohamed Bahlol[3], Minh Cuong Nguyen[4], Thi Hai Yen Nguyen[1], Thi Tuyet Phung Tran[1], Rebecca Susan Dewey[5], Van De Tran[6]

[1] Faculty of Pharmacy, Can Tho University of Medicine and Pharmacy, Can Tho, Vietnam
[2] Department of Health Sciences, College of Natural Sciences, Can Tho University, Campus II, Can Tho, Vietnam
[3] Specialty of Pharmaceutical Management and Economics, Department of Pharmacy Practice and Clinical Pharmacy, Faculty of Pharmacy, Egyptian Russian University, Badr City, Cairo Governorate, Egypt
[4] Faculty of Pharmacy, Nam Can Tho University, Nguyen Van Cu Street, Can Tho, Vietnam.
[5] School of Physics and Astronomy, University of Nottingham, Nottingham, United Kingdom
[6] Department of Health Organization and Management, Can Tho University of Medicine and Pharmacy, Can Tho, Vietnam

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Correspondence
Van De Tran
Department of Health Organization and Management
Can Tho University of Medicine and Pharmacy
Can Tho
Vietnam
tvde@ctump.edu.vn

Abstract

Background: Career orientation plays a crucial role in both individual and collective success and productivity. Research findings in this area in Vietnam, especially the Mekong Delta, are limited. **Objectives:** This study aimed to explore factors associated with the career orientation of graduating final-year pharmacy students in Can Tho, Vietnam. **Methods:** This cross-sectional study was conducted on final-year undergraduate students majoring in Pharmacy at three universities offering Pharmacy programmes in Can Tho City from June 2022 to June 2023. Principal component analysis and Varimax rotation were used to identify factors associated with career orientation in 520 students. **Results:** Four groups of factors were found to be associated with students' decisions. Job-related factors were found to have the strongest association, followed by educational process factors, personal factors, and family, friends, and society factors. **Conclusion**: Four groups of factors were found to be significantly associated with the career orientation of graduating final-year pharmacy students. These results will inform policymakers and the research community in the future design of evidence-based policies in Vietnam.

Introduction

Career orientation has various definitions, but most of them refer to a set of perceptions, behaviours, and approaches that an individual uses to understand, manage, and pursue a given career path (Rojewski *et al.*, 2019). A misguided career orientation can have a negative impact on an individual's life (Kobia-Acquah *et al.*, 2020). Further, students face multiple challenges when searching for and deciding on their future career (Nicholson *et al.*, 2016; Ran *et al.*, 2022). These challenges may arise from subjective factors such as interests, capabilities, needs, and career goals and are influenced by objective factors such as family, friends, schools, and society (Koçak *et al.*, 2021; Ran *et al.*, 2022). Defining a clear career orientation can be a significant challenge for a student. Students may encounter pressure from their families or society to choose a specific field, even if it doesn't align with their interests or abilities (Hariko & Anggriana, 2019). Moreover, students with multiple interests and talents often struggle to decide which career path is most suitable for them.

As society develops, new professions emerge, and the demand for labour adapts to constantly evolving labour market trends. This creates high levels of competition in many fields, such as the pharmaceutical industry (Ikhile *et al.*, 2018). The pharmaceutical sector is a global and vital health science field (Oladipo *et al.*, 2022; Vietnam Briefing, 2022), showing significant growth prospects. In Vietnam, the pharmaceutical

market was valued at around 10 billion USD in 2020, compared to 5 billion USD in 2015 (Vietnam Briefing, 2022). This represents a 2% yearly increase and a Compound Annual Growth Rate (CAGR) of 6% from 2018 to 2020 (Vietnam Briefing, 2022). The market is projected to reach 16.1 billion USD by 2026. The pharmaceutical industry in Vietnam is one of the fastest-growing markets in Southeast Asia, thanks to its increasing economic growth, rising per capita income, and an ageing population (Vietnam Briefing, 2022). Job opportunities in the pharmaceutical sector are diverse, including drug marketing, distribution, supply, multiple hospital pharmacy roles, drug production, research and development, government drug regulation, teaching, training, and scientific research. For example, in Sierra Leone, it was reported that surveyed pharmacy students cited drug manufacturing as their most appropriate future career preference, followed by roles in hospital pharmacy, research/academia, and regulatory/administrative pharmacy. The least preferred career options were roles in community pharmacy, including marketing and sales (James *et al*., 2018). However, each job has advantages and challenges, and the demand for labour varies between roles. This necessitates pharmacy students to search and select the most appropriate career orientations that suit them. The individual career choices of pharmacy students impact labour allocation in the pharmaceutical sector (Zhang *et al*., 2020).

As employment selection is a bilateral process between employees (i.e. graduating students) and employers, it is essential to understand the career orientation of final-year pharmacy students and the factors influencing this. Multiple studies worldwide have explored the career orientation of pharmacy students, including in Australia (Shen *et al*., 2014), China (Zhang *et al*., 2020), Korea (Han *et al*., 2016), Japan (Komiyama *et al*., 2016), and Jordan (Jarab *et al*., 2021). However, research on this topic in Vietnam is limited, especially in the Mekong Delta, which has abundant human resources, increasing unemployment, and a thriving pharmaceutical sector. Therefore, this study aims to provide information necessary to support graduating pharmacy students in finding suitable career paths and to offer information to managers regarding students' employment-seeking trends.

Methods

Study design and setting

This cross-sectional study was conducted between June 2022 and June 2023. The study population comprised final-year undergraduate students majoring in pharmacy at universities offering pharmacy programmes in Can Tho City in the academic year 2022/2023. In Can Tho, a total of three universities offer undergraduate Pharmacy programmes: one public university, Can Tho University of Medicine and Pharmacy (CTUMP), and two private universities, Nam Can Tho University (NCTU) and Tay Do University (TDU) (Tran *et al*., 2022). This represents a total population of 703 final-year students across the three universities. All final-year students were invited to participate in the study. The research protocol was approved by the Ethics Committee in Biomedical Research (reference: 22.063.SV/PCT-HĐĐĐ).

Data collection was conducted using a combination of paper and online survey tools (Ebert *et al*., 2018; Leeuw, 2005). Paper copies of the questionnaire were distributed directly to final-year students attending CTUMP and NCTU by the investigators, and responses were completed in the classroom during break times, with completed questionnaires being collected after approximately 10-15 minutes. Students who were absent at the time of the survey were excluded. The link to the online survey was distributed to final-year Pharmacy students at TDU as these students had already completed their coursework and were not attending university in person during the study period. The online survey was created using Google Forms. A survey introduction letter containing the survey link was sent to students using Zalo groups, a popular social media application in Vietnam, and Facebook. Reminders were sent two weeks later to increase the response rate, and class representatives were contacted by telephone to provide further reminders.

Ethical approval

The study was approved by the Medical Ethics Council of Can Tho University of Medicine and Pharmacy, Can Tho, Vietnam (reference: 22.063.SV/PCT-HDDD, 10th May 2022). Participants were informed that taking part in the study was voluntary. Survey responses were anonymised at source.

Questionnaire

The questionnaire comprised two sections (Appendix A). The first section included 14 questions related to students' demographics, academic background, employment status (sex, age, permanent residence, university type, academic performance, part-time work), and family characteristics (family income (million VND), family members working in the Pharmacy field, family members working in other healthcare professions besides pharmacy, parental education, and parental occupations).

The second section consisted of 30 questions concerning factors influencing career choices. Most of these questions were constructed based on previous research (Ubaka *et al*., 2013; Zhang *et al*., 2020; Jarab *et al*., 2021; Arbab *et al*., 2022). However, the research team added five new questions about personal factors (self-assessment of academic performance, ability to handle job-related stress, personality traits, personal health, physical appearance, and attributes) to ensure questionnaire validity and to meet the study objectives. These additions were made due to the importance of these factors having been demonstrated previously (Cordina *et al*., 2012).

Based on previous research (Cordina *et al*., 2012; Ubaka *et al*., 2013; Zhang *et al*., 2020; Jarab *et al*., 2021; Arbab *et al*., 2022), factors were temporarily classified into five groups: personal factors (six items), family, friends, and society (six items), the educational programme (six items), development opportunities and benefits (six items), and job conditions (six items). Responses to each question used a 5-point Likert scale, where 1 = not influential at all, 2 = not very influential, 3 = neither influential or not influential, 4 = influential, and 5 = highly influential.

Data analysis

Data were processed using SPSS version 22.0. Descriptive statistics such as frequencies and percentages were used to compare and summarise variables. Means and standard deviations (SD) were used to present averages. Principal component analysis (PCA) and Varimax rotation were used to identify factors associated with career orientation. Data suitability for factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) test (requiring a coefficient ≥ 0.5) and Bartlett's test of sphericity (requiring a $p < 0.05$). In factor extraction, factors with Eigenvalues greater than one were retained regarding the scree plot. The scree plot provided information to identify points of inflexion, which were subjectively determined by identifying the point where the plot showed a noticeable change in slope and then retaining points higher than this inflexion point. In factor rotation, variables had to load significantly on only one factor (> 0.5). A Cronbach's Alpha coefficient higher than 0.7 and corrected item-total correlations greater than 0.3 were considered to demonstrate reliability. Additionally, the variance explained by the obtained factor solution was required to be >50%. Factor scores were calculated as the mean of the scores of the items belonging to that factor. Differences in factor scores associated with demographic characteristics of the Pharmacy students were evaluated using the Mann-Whitney U test or Kruskal-Wallis test, where appropriate. Statistical significance was considered at a threshold of $p < 0.05$.

Results

The population comprised 703 final-year Pharmacy students across three universities, with 520 students agreeing to participate and returning completed questionnaires, resulting in a response rate of 74.0%. Most respondents were female (68.1%), lived in urban areas (61.7%), attended private universities (83.5%), and maintained a good or higher academic performance (87.3%). More than half the students were engaged in part-time work (58.3%). Respondents with family members working in the pharmacy field accounted for 29.8% of the total. More than 70% of the students' parents had an education level below a bachelor's degree and were currently employed (Table I).

Table I: General characteristics of surveyed pharmacy students (n = 520)

Characteristics		N	%
Demographics, academic background, employment status			
Sex	Female	354	68.1
	Male	166	31.9
Age[†]	23	420	82.0
	24-30	92	18.0
Permanent residence	Urban	321	61.7
	Rural	199	38.3
University type	Public	86	16.5
	Private	434	83.5
Academic performance	Good or higher	454	87.3
	Average	66	12.7
Current/previous part-time work	No	217	41.7
	Yes	303	58.3
Family			
Household income (million VND)	< 4.2 (~165 USD)	136	30.4
	4.2 – 8.4 (~165 – 330 USD)	158	35.3
	> 8.4 (~330 USD)	154	34.4
Family member working in the field of Pharmacy	No	365	70.2
	Yes	155	29.8
Family member working in a healthcare field other than Pharmacy	No	341	65.6
	Yes	179	34.4
Father's education	Lower than Bachelor's degree	377	72.8
	Bachelor's degree or higher	141	27.2
Mother's education	Lower than Bachelor's degree	431	83.4
	Bachelor's degree or higher	86	16.6
Father's occupation	Retired/househusband/other	49	9.5
	Working	466	90.5
Mother's occupation	Retired/housewife/other	147	28.4
	Working	370	71.6

Note: [†]The age variable had 8 participants who did not respond

When assessing the suitability of the dataset consisting of 30 items, the Kaiser-Meyer-Olkin (KMO) coefficient was 0.955, well within the acceptable range (≥ 0.5). Bartlett's test of sphericity had a result < 0.001, indicating that the data were suitable for factor analysis. Factor extraction revealed four factors with eigenvalues > 1. The scree plot showed that the inflexion point was in the position of the fifth component, so the first four components were recommended to be retained (Figure 1).

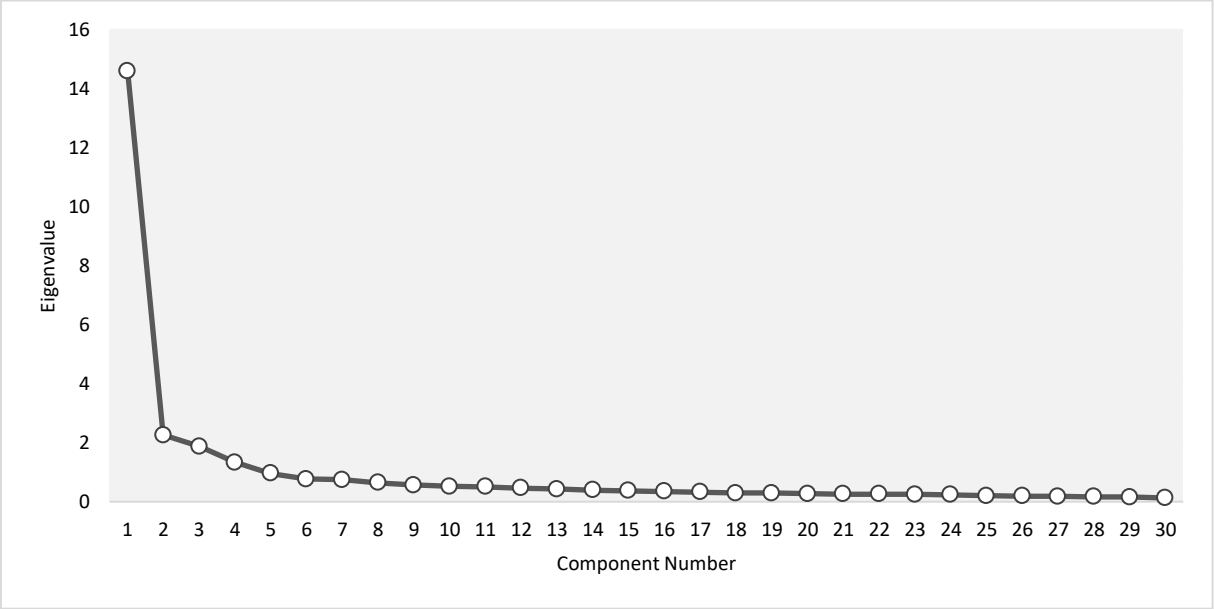

Figure 1: Scree plot representing the eigenvalues of components extracted from factor analysis

After the first round of factor rotation, three variables that did not meet the factor analysis criteria were removed: PL1 and PL2, due to having a loading of > 0.5 on each of the two factors, and XH5, which had factor loadings < 0.5 across all four factors. In the second round of factor rotation, three of the initial 30 variables were eliminated, reducing the number of variables to 27, which were grouped into four newly-defined factor groups: 1) job-related factors (ten items), 2) factors relating to the educational process (six items), 3) personal factors (six items), and 4) factors relating to family, friends, and society (five items), with Cronbach's α coefficients of 0.94, 0.93, 0.88, and 0.85, respectively (Table II).

Table II: Factor loadings and descriptive statistics for factors influencing career orientation of final-year pharmacy students (n=520)

Item no.	Items	Factor 1	Factor 2	Factor 3	Factor 4	Mean (SD)	Disagree n%	Neutral n%	Agree n%
	Factor 1 – Job-related factor								
CV5	Appropriate workspace	0.794				3.82 (0.83)	24 (4.6)	143 (27.5)	353 (67.9)
CV6	Convenience at the workplace	0.776				3.80 (0.86)	26 (5.0)	155 (29.8)	339 (65.2)
CV3	Flexibility in working hours, breaks	0.769				3.79 (0.86)	25 (4.8)	162 (31.2)	333 (64.0)
CV4	Geographical location (working in a major city/rural area/locality of residence)	0.750				3.84 (0.86)	26 (5.0)	142 (27.3)	352 (67.7)
CV2	Friendly working environment	0.742				3.92 (0.85)	18 (3.5)	141 (27.1)	361 (69.4)
CV1	Workload	0.702				3.85 (0.77)	15 (2.9)	144 (27.7)	361 (69.4)
PL5	Insurance benefits, allowances at the workplace (accommodation, transportation, living)	0.699				3.92 (0.86)	25 (4.8)	119 (22.9)	376 (72.3)
PL6	Entertainment options, travel opportunities, outings	0.689				3.64 (0.87)	37 (7.1)	191 (36.7)	292 (56.2)

Item no.	Items	Factor 1	Factor 2	Factor 3	Factor 4	Mean (SD)	Disagree n%	Neutral n%	Agree n%
PL4	Salary structure	0.665				4.01 (0.84)	17 (3.3)	118 (22.7)	385 (74.0)
PL3	Opportunities for starting a business	0.524				3.76 (0.87)	33 (6.3)	154 (29.6)	333 (64.0)
	Factor 2 – Educational process								
DT4	Drawing inspiration from instructors during the learning journey		0.801			3.74 (0.87)	33 (6.3)	167 (32.1)	320 (61.5)
DT5	Invaluable insights from instructors and those who have gone before		0.794			3.78 (0.84)	32 (6.2)	146 (28.1)	342 (65.8)
DT2	Opportunities for internships at working facilities during one's time at school		0.769			3.81 (0.87)	28 (5.4)	156 (30.0)	336 (64.6)
DT3	Practical internship experiences		0.760			3.86 (0.86)	28 (5.4)	138 (26.5)	354 (68.1)
DT6	Participation in school-organised programmes and conferences aiding students in exploring their field		0.756			3.60 (0.86)	44 (8.5)	187 (36.0)	289 (55.6)
DT1	The educational curriculum's intended focus		0.713			3.71 (0.87)	37 (7.1)	174 (33.5)	309 (59.4)
	Factor 3 – Personal factor								
CN5	Personal health			0.762		3.68 (0.93)	37 (7.1)	191 (36.7)	292 (56.2)
CN4	Personality traits			0.714		3.57 (0.86)	44 (8.5)	205 (39.4)	271 (52.1)
CN3	Ability to handle work-related stress			0.707		3.75 (0.91)	33 (6.3)	178 (34.2)	309 (59.4)
CN1	Interest in the job			0.690		3.75 (0.91)	34 (6.5)	162 (31.2)	324 (62.3)
CN2	Personal academic performance			0.602		3.75 (0.83)	25 (4.8)	178 (34.2)	317 (61.0)
CN6	Physical appearance, body shape, personal strengths			0.559		3.58 (0.90)	46 (8.8)	195 (37.5)	279 (53.7)
	Factor 4 – Family, friends, and society								
XH1	Family members' career orientations				0.792	3.45 (0.95)	74 (14.2)	186 (35.8)	260 (50.0)
XH3	Advice from friends				0.762	3.05 (0.93)	132 (25.4)	246 (47.3)	142 (27.3)
XH2	Family members or relatives working in the healthcare field				0.757	3.43 (1.00)	78 (15.0)	193 (37.1)	249 (47.9)
XH4	The social status of the profession (e.g. being highly respected)				0.652	3.42 (0.94)	71 (13.7)	223 (42.9)	226 (43.5)
XH6	Family financial status (e.g. owning a pharmacy, investment)				0.543	3.69 (0.96)	48 (9.2)	159 (30.6)	313 (60.2)
	Factor score, Mean (SD)	3.84 (0.69)	3.75 (0.74)	3.68 (0.71)	3.41 (0.76)				
	Cronbach's Alpha	0.942	0.931	0.882	0.849				
	% of Variance	22.81	18.14	14.08	12.81				

These remaining variables were calculated to explain 67.8% of the variance. All variables had factor loadings > 0.5 on only one factor after the final factor rotation. Overall, the job-related factor group had the strongest association with career choice (factor score = 3.84), followed by factors relating to the educational process (3.75), and personal factors (3.68). The least influential factor groups were family, friends, and society (3.41).

Differences in the mean scores of the factors across demographic characteristics are presented in Table III.

Students attending private universities (mean = 3.47) exhibited significantly stronger associations with factors relating to family, friends, and society compared to those attending public universities (3.12). Students with higher academic achievements exhibited significantly stronger associations with all four-factor groups (job-related factors, the educational process, personal factors, family, friends, and society).

Table III: Mean differences in the influence of factors according to demographic characteristics of pharmacy students (n = 520)

Characteristics		Job-related factor		Educational process		Personal factor		Family, friends, and society	
		Mean (SD)	*p* value	Mean (SD)	*p* value	Mean (SD)	*p* value	Mean (SD)	*p* value
Sex	Female	3.85 (0.69)	0.209	3.75 (0.73)	0.951	3.68 (0.69)	0.919	3.37 (0.72)	0.161
	Male	3.8 (0.69)		3.74 (0.77)		3.68 (0.75)		3.48 (0.83)	
Age	23	3.83 (0.68)	0.537	3.75 (0.75)	0.652	3.67 (0.71)	0.859	3.42 (0.76)	0.490
	24-30	3.88 (0.7)		3.74 (0.72)		3.72 (0.72)		3.40 (0.77)	
Permanent residence	Urban	3.85 (0.69)	0.530	3.78 (0.75)	0.180	3.70 (0.71)	0.367	3.44 (0.75)	0.168
	Rural	3.81 (0.68)		3.69 (0.72)		3.65 (0.70)		3.36 (0.76)	
University type	Public	3.82 (0.59)	0.541	3.65 (0.67)	0.143	3.78 (0.59)	0.194	3.12 (0.79)	**<0.001**
	Private	3.84 (0.7)		3.77 (0.76)		3.66 (0.73)		3.47 (0.74)	
Academic Performance	Good or higher	3.85 (0.69)	**0.042**	3.77 (0.74)	**0.029**	3.71 (0.71)	**0.001**	3.44 (0.74)	**0.004**
	Average	3.71 (0.62)		3.60 (0.73)		3.46 (0.66)		3.16 (0.81)	
Currently/previously part-time work	No	3.87 (0.63)	0.502	3.75 (0.69)	0.605	3.75 (0.67)	0.250	3.41 (0.73)	0.866
	Yes	3.81 (0.72)		3.74 (0.78)		3.63 (0.73)		3.41 (0.77)	
Household Income (million VND)	< 4.2 (~165 USD)	3.89 (0.69)	0.670	3.81 (0.67)	0.531	3.87 (0.67)	**0.001**	3.51 (0.80)	0.445
	4.2 – 8.4 (~165 – 330 USD)	3.81 (0.63)		3.72 (0.75)		3.61 (0.66)		3.40 (0.65)	
	> 8.4 (~330 USD)	3.8 (0.78)		3.78 (0.81)		3.61 (0.76)		3.36 (0.82)	
Family member working in the field of Pharmacy	No	3.8 (0.68)	0.068	3.72 (0.73)	0.117	3.65 (0.71)	0.092	3.34 (0.73)	**0.001**
	Yes	3.91 (0.7)		3.82 (0.77)		3.74 (0.71)		3.56 (0.81)	
Family member working in a healthcare field other than Pharmacy	No	3.83 (0.65)	0.349	3.74 (0.69)	0.645	3.66 (0.68)	0.351	3.37 (0.75)	0.172
	Yes	3.85 (0.76)		3.76 (0.84)		3.71 (0.75)		3.47 (0.77)	
Father's education	Lower than Bachelor's degree	3.82 (0.66)	0.384	3.73 (0.73)	0.182	3.66 (0.68)	0.237	3.39 (0.72)	0.204
	Bachelor's degree or higher	3.87 (0.74)		3.81 (0.77)		3.74 (0.77)		3.47 (0.84)	
Mother's education	Lower than Bachelor's degree	3.82 (0.69)	0.232	3.73 (0.75)	0.259	3.66 (0.7)	0.147	3.39 (0.74)	0.093
	Bachelor's degree or higher	3.93 (0.66)		3.84 (0.72)		3.79 (0.74)		3.51 (0.83)	
Father's occupation	Retired/househusband/other	3.88 (0.59)	0.791	3.69 (0.7)	0.566	3.65 (0.71)	0.686	3.38 (0.65)	0.678
	Working	3.83 (0.7)		3.76 (0.75)		3.68 (0.71)		3.41 (0.77)	
Mother's occupation	Retired/housewife/other	3.93 (0.67)	**0.029**	3.76 (0.74)	0.629	3.78 (0.64)	0.057	3.41 (0.71)	0.875
	Working	3.8 (0.69)		3.75 (0.75)		3.64 (0.73)		3.41 (0.77)	

Note: Mann-Whitney U test and Kruskal-Wallis test were used

Discussion

All final-year pharmacy students across three universities in Can Tho, Vietnam, were allowed to participate in the study, with a response rate of 74%. More than half the respondents reported having professional work experience and had been engaged in part-time work. Factors influencing career orientation after graduation comprised four factors relating to 1) their job, 2) the educational process, 3) personal factors, and 4) family, friends, and society. Responses showed that the job-related factor group had the

strongest impact on career choice (mean 3.84; ±SD 0.69). Conversely, the least influential factor group was family, friends, and society (mean 3.41; ±SD 0.76). The educational process factor group and personal factor group had means (±SD) of 3.75 (0.74) and 3.68 (0.71), respectively. Attending private universities and performing well academically were found to be significantly associated with all factor groups.

Job-related factors

Among the four factors, job-related factors had the strongest association with the career choices of final-year Pharmacy students (mean 3.84; ±SD 0.69). This indicates that the respondents exhibited a high level of seriousness when considering their future careers. When evaluating each item within this factor, respondents considered salary package (mean = 4.01; ±SD 0.84) to be the most important factor when selecting a job, which aligns with the findings of previous studies conducted in developed and developing countries such as Nigeria (Ubaka *et al*., 2013), Saudi Arabia (Alhomoud *et al*., 2019), and Malaysia (Hasan *et al*., 2010). The Vietnamese economy has been severely harmed by the COVID-19 pandemic. By 2020, the economic growth rate had slowed to 2.9%, affecting approximately 32 million people. Of these, 69% saw a reduction in income, 40% had to reduce their working hours, and 14% were forced to leave their job or were dismissed (Nguyen *et al*., 2023). Furthermore, the opinion of last-year pharmacy students in Can Tho, Vietnam is influenced by most respondents living in urban areas and thus experiencing higher living costs and an expectation of achieving financial success after graduation. Consequently, they may feel pressured by this requirement to attain financial success. After salary, the more strongly associated factors were a friendly work environment and benefits such as insurance and allowances (3.92; ±SD 0.86). Although these findings vary slightly in order of influence compared to findings from pharmacy students in Jordan (Jarab *et al*., 2021), the components are also considered significant contributors.

In contrast, leisure activities, travel opportunities, and outings were the least influential components (3.64), in agreement with the findings in Jordanian students, where work-related travel or leisure factors were found to have a relatively low impact (Jarab *et al*., 2021). This suggests that most students prioritise securing a job with favourable conditions and higher income over leisure activities or other personal interests.

Educational process factors

The most strongly associated group of factors following job-related factors was those relating to the educational process (mean 3.75; ±SD 0.74). Within this factor group, the most strongly associated factor was internship experience (3.86; ±SD 0.86). In agreement with findings from Pharmacy students in Jordan (Al-qudah *et al*., 2019) and pharmacy interns in Saudi Arabia (Thabit *et al*., 2023), internship experience not only provides knowledge but also allows students to gain a deeper understanding of the professional experience, its pressures and responsibilities, and lays a strong foundation for student's future careers. This demonstrates that pharmacy is not only a scientific or theoretical specialty, but also a knowledge-based profession (Waterfield, 2010).

The following were highly associated: recommendations from lecturers/mentors (n=342; 65.8%) and the influence of inspirational lecturers during the learning process (n=320; 61.5%), both of which were found to have a significant impact. This suggests that students value advice from experienced individuals and encouragement from their lecturers. Lecturers have connections within the pharmaceutical industry, provide professional career guidance, and have a clear understanding of industry trends.

In contrast, the influence of the curriculum content of the university in Vietnam was lower (n=309; 59.4%) in opposition to the findings of a study conducted in Khartoum, Sudan, where they found curriculum content to be highly influential (70%) (Arbab *et al*., 2022). Students may prioritise choosing a career that aligns with their interests, capabilities, and passions and suits their health/medical condition or learning capacity rather than strictly adhering to the university's curriculum. This could explain why this factor had a relatively lower influence within the education factors group. Additionally, students in Saudi Arabia found that the influence of the university course was even lower (17.6%) (Al-qudah *et al*., 2019).

The factor with the weakest association within the education factors group was participation in university-organised programmes/conferences (n=289; 55.6%). This is in agreement with the findings from the study conducted on Jordanian students (50%). This may be because conferences often focus on promoting individual employers and lack essential industry information. Students may perceive such conferences as time-consuming and as providing limited benefits. Conferences typically discuss specific fields such as pharmacy and testing, and the participation of large companies can create pressure, making students feel inadequate in a highly competitive job market. The flashy introductions at conferences may not provide

students with a clear picture of the job through practical experiences. Similarly, students in Saudi Arabia found the influence of seminar conferences to be even lower (16.1%) (Al-qudah *et al*., 2019).

Personal factors

Within the personal factors group, personal work preferences (mean 3.68; ±SD 0.71), the ability to withstand work-related pressure, and one's academic performance were the components with the strongest association with the career orientation of students. This high level of influence can be attributed to academic performance, indicating a commitment to investing in knowledge and skills and future career development opportunities. The pharmaceutical field provides students multiple opportunities for specialised study and research based on their interests and strengths.

Stress has both psychological and physiological effects, which may differ depending on the individual or the work environment (Geslani & Gaebelein, 2013). Anxiety, depression, and increases in illness have all been linked to high-stress levels (Glaser & Kiecolt-Glaser, 2005). Moreover, each student has varying levels of pressure tolerance, even when placed in the same work environment. Therefore, students will also consider their ability to handle pressure alongside personal preferences and academic performance. Stress is an increasing issue within the workforce of professional pharmacists worldwide (Yong *et al*., 2020; Yong, 2021). Respondents expressed that the influence of personal health/medical conditions had a moderate impact on their career choice (mean 3.68; ±SD 0.93). Pharmacy students often encounter hazardous chemicals or work in high-intensity environments, requiring physical and mental well-being. Students with poorer health or those prone to stress tend to be more concerned about this factor. Furthermore, a correlation between career aspirations and anxiety and depression in students has been identified (Nguyen & Nguyen, 2020). This underscores the importance of mental and physical health when pharmacy students make career choices related to their mental and physical well-being.

Physical appearance, body shape, and personal talents (mean 3.58; ±SD 0.90) had a relatively weaker association with career choice. In many professions, physical appearance, body shape, or personal talents can be advantageous, particularly in roles that involve communication or customer interaction. However, the pharmaceutical field is diverse and does not typically require specific physical attributes (Cu, 2022). Nevertheless, more than half of the surveyed students (n=279; 53.7%) indicated this factor influenced their decision. This may be attributed to society's increasing emphasis on appearance, which impacts career competition (Cu, 2022).

Family, friends, and social factors

After graduation, each student faces a critical phase where they must make decisions about their future. The labour markets are impacted by the choice of students (Zorlu & Mulder, 2011). Some graduates may already have an income from part-time work or internships, but most still rely on their family's financial support. Therefore, family financial influence will influence a student's decision (mean = 3.69; ±SD 0.96). Additionally, having family members or relatives working in the healthcare field significantly influences a student's career decision. Support and encouragement from the family are considered strong motivating factors, as demonstrated by the findings from other studies (Anderson *et al*., 2008). This underscores the importance of the role of a student's parents in their career selection process. Conversely, some studies have found that not all students are influenced by their parents when making career decisions (Sharif & Sharif, 2014).

The least influential factor was advice from friends (n=142; 27.3%). This finding correlates with that of a study by Arbab and colleagues (26%) (Arbab *et al*., 2022) but higher than that reported by a study conducted in Saudi Arabia (16.5%) (Alhomoud *et al*., 2019). This low influence of friends suggests that despite starting from the same point at graduation, each student has their plans and perspective in life. Although many factors influence their decisions, the independence of thought indicates that advice from friends is not prioritised over other factors. This could also be attributed to competition and peer pressure.

Differences in the influence of factors by demographic characteristics

When comparing associations between respondents of different sexes, there was no significant difference in the strength of association between the four factors found in this study. This differs from the findings of Jarab (Jarab *et al*., 2021), which showed that job-related factors such as allowances, working hours, work environment, and workload were much more important for female respondents. This may be explained by the trend in Vietnam for most final-year students being unmarried, meaning that women have equal access to jobs without being constrained by family and childcare responsibilities (Jarab *et al*., 2021).

Students from private schools are more influenced by family, friends, and social factors than public school students. This might be because private school

students often consider the wishes and expectations of their parents when choosing a career. They may opt for a career that will make their parents proud as they pay students' university tuition fees or a career that will allow them to reciprocate this financial support to their family. Canadian parents were found to be influential in their children's choice of occupation and career development (Young & Friesen, 1992).

Students with higher academic achievements are significantly influenced by factors in all four groups. This may be due to students with high academic performance having more opportunities and career choices and, therefore, needing to decide which path suits them best. These decisions are often based on personal passions and interests, along with their own life goals. Additionally, high-achieving students tend to be highly motivated and have a strong desire for success in their career (Zeb, 2016). This makes them more likely to consider multiple factors when choosing a career and to ensure that it aligns with their goals and values. High-achieving students often exhibit great commitment and enthusiasm, and this relationship has long-term effects on outcomes such as completing university and improving job opportunities (Reyes *et al*., 2023).

Family, especially parents, often strongly influence students' career decisions. Suppose the mother of a student focuses on homemaking or retires early to take care of the family. In that case, this can make the student feel more responsible for the family and prioritise earning money as their primary goal. This can lead to the student prioritising career development (Young & Friesen, 1992). This is consistent with the report that students whose mothers had retired or been homemakers were more influenced by job-related factors. The study also found that students from lower-income families were more influenced by personal factors. Students from low-income families often do not face as much pressure from their parents to choose a high-income career, allowing them to focus on pursuing their passions and interests.

Implications to practice

Universities should establish specialised courses or organise in-depth discussions on career fields that can be pursued after graduation and the corresponding working conditions. This is crucial not only for final-year students but also for first-year students, helping them gain a comprehensive understanding of the realities and career trends in the pharmaceutical field. Inviting representatives from pharmaceutical manufacturing, business, and management companies to participate in discussions is also vital, providing students with opportunities for direct interaction and questioning. Lastly, organising regular discussions between students and academic advisors, who regularly communicate with students, is essential for discussing career-related issues on a scheduled basis each semester.

Limitations and future research

Care must be taken when generalising the findings of this study to other nations or contexts. The information was gathered in a single city to examine the real-world effects of factors influencing career orientation after graduation of final-year pharmacy students in Can Tho city, as an example of a city in Vietnam. This is beneficial for understanding the topic under investigation within a particular city, where policymakers must address imbalances in the workforce and unemployment through interventions designed to address the highlighted need.

Moreover, the survey was conducted in Can Tho and may not be generalisable across Vietnam. Future work is needed to explore the associations characterised in this study across multiple cities throughout Vietnam and other nations.

Some socio-demographic factors of respondents were not included in the present survey, such as chronic disease/health status, marital status, and parental status. These factors may also impact the decisions made by final-year pharmacy students following graduation and should be considered or included in future work. Furthermore, like many other studies, the use of self-assessment questionnaires may influence the outcomes of this research.

Due to limited human resources, sample collection needed to be conducted sequentially at three universities: CTUMP, NCTU, and TDU. This factor resulted in an extended sample collection time. During such an extended period, students could have changed their perceptions of career influences and the use of both printed and online survey formats, which could have impacted the results of this study.

Conclusion

Four factors were found to be significantly associated with the career orientation of graduating final-year pharmacy students. These findings will undoubtedly influence the evolving opinions of final-year pharmacy students and, crucially, will inform policymakers and the international research community of the factors influencing current and future students. This understanding will assist in the design of evidence-

based policies needed to address the increasing demand on the workforce.

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Conflicts of Interest

The authors have no conflicts of interest to declare.

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Appendix A: Questionnaire: Factors influencing career orientation of graduating pharmacy students in Can Tho, Vietnam

A. Information of students

Sex

□ Female

□ Male

Year of birth: __ __ __ __

Permanent Residence

□ Urban

□ Rural

Academic Performance

□ Excellent

□ Good

□ Fair

□ Average

□ Poor

□ Very poor

Currently/previously part-time work

□ Yes - related to the Pharmacy field

□ Yes - but not related to the Pharmacy field

□ No

Household income (million VND): __ __

Family member working in a healthcare field

□ Medicine

□ Dentistry

□ Pharmacy

□ Other healthcare fields

□ None

Father's education

□ Secondary school or lower

□ High school

□ Vocational school, college

□ Graduate

□ Postgraduate

Mother's education

□ Secondary school or lower

□ High school

□ Vocational school, college

□ Graduate

□ Postgraduate

Father's occupation

□ Government official, office worker

□ Farming, laborer, worker

□ Business

□ Househusband

□ Retired

□ Unemployed

Mother's occupation

□ Government official, office worker

□ Farming, laborer, worker

□ Business

□ Housewife

□ Retired

□ Unemployed

B. Factors influencing career orientation

Below are statements about the factors influencing the career choices of final-year Pharmacy students. Please indicate the extent to which each factor influences you by marking an "x" in the appropriate box:

Code	Item	1-not influential at all	2-not very influential	3-neither influential nor not influential	4-influential	5-highly influential
Personal factors						
CN1	Interest in the job	□	□	□	□	□
CN2	Personal academic performance	□	□	□	□	□
CN3	Ability to handle work-related stress	□	□	□	□	□
CN4	Personality traits	□	□	□	□	□
CN5	Personal health	□	□	□	□	□
CN6	Physical appearance, body shape, personal strengths	□	□	□	□	□
Family, friends, and society						
XH1	Family members' career orientations	□	□	□	□	□
XH2	Family members or relatives working in the healthcare field	□	□	□	□	□
XH3	Advice from friends	□	□	□	□	□
XH4	The social status of the profession (e.g. being highly respected)	□	□	□	□	□
XH5	The workforce demand in the pharmaceutical industry	□	□	□	□	□
XH6	Family financial status (e.g. owning a pharmacy, investment)	□	□	□	□	□
Educational programme						
DT1	The educational curriculum's intended focus	□	□	□	□	□
DT2	Opportunities for internships at working facilities during one's time at school	□	□	□	□	□
DT3	Practical internship experiences	□	□	□	□	□
DT4	Drawing inspiration from instructors during the learning journey	□	□	□	□	□

DT5	Invaluable insights from instructors and those who have gone before	□	□	□	□	□
DT6	Participation in school-organised programmes and conferences aiding students in exploring their field	□	□	□	□	□
Development opportunities and benefits						
PL1	Opportunities for career advancement and personal development	□	□	□	□	□
PL2	Opportunities for on-the-job training	□	□	□	□	□
PL3	Opportunities for starting a business	□	□	□	□	□
PL4	Salary structure	□	□	□	□	□
PL5	Insurance benefits, allowances at the workplace (accommodation, transportation, living)	□	□	□	□	□
PL6	Entertainment options, travel opportunities, outings	□	□	□	□	□
Job conditions						
CV1	Workload	□	□	□	□	□
CV2	Friendly working environment	□	□	□	□	□
CV3	Flexibility in working hours, breaks	□	□	□	□	□
CV4	Geographical location (working in a major city/rural area/locality of residence)	□	□	□	□	□
CV5	Appropriate workspace	□	□	□	□	□
CV6	Convenience at the workplace	□	□	□	□	□