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RESEARCH ARTICLE

# Attitudes of pharmacy graduates at the early career stage: A pilot survey at a private university in Japan

Keiichi Nakagomi[1], Yukikazu Hayashi[2]

[1] Liberal Arts, Research Center, Faculty of Pharmacy, Musashino University, Shinmachi, Nishitokyo-shi, Tokyo, Japan
[2] Business Development Division, A2 Healthcare Corporation, Koishikawa, Bunkyo-ku, Tokyo, Japan

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**Correspondence**
Faculty of Pharmacy
Musashino University
Nishitokyo-shi
Tokyo
Japan
*k_nakago@musashino-u.ac.jp*

## Abstract

**Background:** Pharmacy graduates' attitudes toward their work at the early career stage, their career status, job satisfaction, and future plans have not been surveyed in Japan. **Methods:** Postcards were sent to 514 pharmacy graduates from a University in Tokyo, Japan, asking graduates to answer an online cross-sectional questionnaire. **Results:** Of the 86 respondents, 15% changed their jobs within three years, and the number of pharmacists working in the "community pharmacy" sector notably increased. Respondents working in non-pharmacy sectors were more satisfied with their jobs than those in the pharmacy sector. Furthermore, job satisfaction impacted the respondents' future work plans, and the distribution of job satisfaction varied by current career sectors. **Conclusion:** In response to the global social and economic situations, pharmacy education should consider various fields and skills. Career guidance should be incorporated into the pharmacy curriculum. Further studies on this case are required worldwide to prepare pharmacists for their future roles.

## Introduction

The turnover of inexperienced young people at an early career stage negatively impacts their future career development. Recently, in Japan, approximately 30% of university graduates entering the workforce left their new jobs within three years of graduation because their perceptions did not match the actual work. Consequently, this tendency has become a social problem (Ministry of Health, Labour, and Welfare of Japan, 2021). According to a US report, pharmacists with zero-to-five years of experience have difficulty finding another job; therefore, most pharmacists expect to stay with their current employer for at least three years (Gaither *et al.,* 2014). There are no reports on whether pharmacy graduates experience a similar scenario in Japan.

Job satisfaction is vital in any career. A comprehensive review of 140 articles on pharmacist job satisfaction recently published (Carvajal & Popovici, 2018) showed that being a female or young pharmacist indicates a higher level of satisfaction and that opportunity for career development increases job satisfaction. Similar results regarding job satisfaction among community and hospital pharmacists have been reported in Japan. (Nakagomi et al., 2011; Nakagomi, Takahashi & Hayashi, 2013). Some studies have extensively explained the differences between pharmacy career sectors (DiPiro, 2011; Gaither *et al.,* 2014; Gaither *et al.,* 2015; Hashimi, Malik & Hussain, 2016; Meilianti *et al.,* 2022). However, no study addressed job satisfaction in pharmacy career sectors in Japan, including the pharmaceutical industry and public health sectors.

With this background, this pilot study aimed to explore the work status of pharmacists from all pharmacy sectors at the early career stage (i.e., five to ten years after their recruitment), including career status, job satisfaction, and future work plans. Investigating this issue can help pharmacy graduates and students

enhance their education and career prospects in the future.

## Methods

### *Study design*

A self-administered cross-sectional study was conducted among all pharmacy graduates of Musashino University (2008-2014 class) from December 2018 to January 2019. The survey focused on pharmacy graduates' current work situation in the early career stage.

### *Questionnaire*

The questions were taken from previous studies on the attitudes of pharmacists toward work in communities and hospitals (Nakagomi *et al.,* 2011; Nakagomi, Takahashi & Hayashi, 2013) and the career choices of pharmacy students (Nakagomi, Hayashi & Komiyama, 2016). The items comprised work attitudes, career preferences, and study field preferences.

Questions about work attitudes were drafted based on the factors that affect job satisfaction among hospital pharmacists (Sansgiry & Ngo, 2003). The questions were reviewed, revised, and determined by co-researchers who were managers of large chain community pharmacies and pharmacy directors of hospitals (Nakagomi *et al.,* 2011; Nakagomi, Takahashi & Hayashi, 2013). Items related to career choices were developed and revised by researchers and co-researchers based on interviews with pharmacy students who had finished job hunting (Nakagomi, Hayashi & Komiyama, 2016). Questions about study field preferences were constructed based on the feedback of pharmacists who attended a continuing education seminar held by the University where one of the researchers was working. This research focused on grasping a comprehensive understanding of future study directions from the available data. It did not intend to create a questionnaire tool and prove its validity.

The questionnaire focused on pharmacists' current demographic and work situations such as (1) gender, (2) marital status, (3) career choice (multiple answers), (4) first career sector after graduation, (5) current career sector, (6) level of satisfaction with the current job, (7) plans for future jobs, (8) reason for changing jobs (multiple answers), and (9) the field of study for further professional development (multiple answers).

### *Data collection process and analysis*

All 514 pharmacy graduates from the University (2008-2014 class) were invited to participate in the survey. Postcards were sent to all graduates to seek their informed consent to participate in the survey, specifying that answering the questionnaire was voluntary. They were informed that the data would only be used for research and educational purposes. The participants responded to the cross-sectional survey via the internet. The data were directly sent to the Musashino University Business Support Co., Ltd. (Tokyo) for data processing. Depending on the data, analyses were performed using Pearson Chi-square tests, Fisher's exact test, Wilcoxon rank-sum test (U-test), or the Kruskal-Wallis test (SPSS 27 IBM [Japanese]). A p-value of less than .05 was defined as statistically significant a priori.

## Results

### *Summary of respondents*

Of the 514 pharmacy graduates of the 2008-2014 class approached, 86 agreed to participate (16.7%). This study was a pilot study aiming at exploring work attitudes and interests in various pharmacy sectors at the early career stage. Thus, there was no expected response rate.

Table I shows the summary of respondents. Various statuses of the participants are as follows: male (34.9%, n=30), female (65.1%, n=56), single (44.2%, n=38), and married (55.8%, n=48).

Of the respondents, 48.8% (n=42), 22.1% (n=19), 22.1% (n=19), and 7.0% (n=6) were engaged in community pharmacy, hospital pharmacy, industry, and public health service, respectively. Industry includes pharmaceutical-related companies and contract research organisations (clinical research etc.).

Of the 86 pharmacy graduates, 30 (34.9%) changed their profession. Of the 30 career changers, 13 (43.3%), representing 15.1% (13/86) of the total sample, experienced turnover within three years of their first job.

Job satisfaction in the current career was rated out of 100 points (indicating the highest satisfaction) and categorised into six segments: 80-100, 70-79, 60-69, 50-59, 30-49, or 0-29 points. The most selected category was 70–79 points (36.1%, n=31), followed by 80-100 points (27.9%, n=24) and 60-69 points (24.4%, n=21).

Responses to the question of whether respondents planned to stay in their current careers revealed that half of them were staying in the job either until retirement (15.1%, n=13) or for a considerable period (more than five years) (33.7%, n=29). In contrast, 29.1%(n=25) planned to stay in the job for a short period (less than five years), and 22.1%(n=19) were undecided (i.e., those who tended to look for short-term work in the future).

**Table I: Summary of respondents**

| Demographic characteristics item | Category | Total N = 86 (%) |
|---|---|---|
| **Gender** | Male | 30 (34.9) |
| | Female | 56 (65.1) |
| **Marital status** | Single | 38 (44.2) |
| | Married | 48 (55.8) |
| **First career sector** | Community pharmacy | 32 (37.2) |
| | Hospital pharmacy | 23 (26.8) |
| | Industry | 26 (30.8) |
| | Public health service | 5 (5.2) |
| **Experience of career change** | Unchanged | 56 (65.1) |
| | Changed | 30 (34.9) |
| **Experience of career change after graduation** | < 3 years | 13 (15.1) |
| | > 3 years | 17 (19.8) |
| **Current career sector** | Community pharmacy | 42 (48.8) |
| | Hospital pharmacy | 19 (22.1) |
| | Industry | 19(22.1) |
| | Public health service | 6 (7.0) |
| **Job satisfaction of current career** | 80–100 points | 24 (27.9) |
| | 70–79 points | 31 (36.1) |
| | 60–69 points | 21 (24.4) |
| | 50–59 points | 7 (8.1) |
| | 30–49 points | 2 (2.3) |
| | 0–29 points | 1 (1.2) |
| **Future work plan at current workplace** | Staying until retirement | 13 (15.1) |
| | Staying long-term (more than five years) | 29 (33.7) |
| | Staying short-term (less than five years) | 25 (29.1) |
| | Undecided | 19 (22.1) |

***Choice of Career (multiple answers)***

More than 60% of respondents considered the following features for a career (multiple answers): work contents (including work responsibility, job description, and work style) (80.2%, 69/86), working location (72.1%, 62/86), salary (68.6%, 59/86), and work schedule (65.1%, 56/86) (Table II). A significant difference was found in gender ($p$<0.001) and current career sector ($p$=0.001).

**Table II: Choice of career (multiple answers)**

| Consideration | Total | Gender | | Current career sector | | | |
|---|---|---|---|---|---|---|---|
| | | Male | Female | Community pharmacy | Hospital pharmacy | Industry | Public health service |
| | N=86 | N=30 | N=56 | N=42 | N=19 | N=19 | N=6 |
| Work contents | 69 | 21 | 48 | 30 | 18 | 16 | 5 |
| Working location | 62 | 15 | 47 | 31 | 16 | 10 | 5 |
| Work schedule | 56 | 16 | 40 | 33 | 10 | 8 | 5 |
| Salary | 59 | 21 | 38 | 33 | 8 | 16 | 2 |
| Career sector | 35 | 10 | 25 | 21 | 5 | 7 | 2 |
| Utilization of own skills | 26 | 4 | 22 | 9 | 7 | 8 | 2 |
| Welfare program | 38 | 9 | 29 | 21 | 5 | 9 | 3 |
| Organization culture | 39 | 9 | 30 | 20 | 9 | 9 | 1 |
| Prospects | 18 | 5 | 13 | 10 | 1 | 5 | 2 |
| Reputation | 13 | 3 | 10 | 5 | 4 | 2 | 2 |
| Business stability | 16 | 4 | 12 | 8 | 3 | 4 | 1 |
| Employee relationship | 22 | 3 | 19 | 18 | 2 | 2 | 0 |
| Employee training | 23 | 5 | 18 | 14 | 6 | 3 | 0 |
| Evaluation system | 5 | 1 | 4 | 3 | 0 | 2 | 0 |
| Social value | 16 | 5 | 11 | 7 | 0 | 7 | 2 |
| $p$-value | | <0.001* | | 0.001* | | | |

$p$-value: Pearson Chi-square test *: $p < 0.05$

***Career change***

The ratios of career changes were as follows: male (30.0%, 9/30), female (37.5%, 21/56), single (23.7%, 9/38), and married (43.7%, 21/48). More than 40.0% (n=11) of respondents who chose industry as their first career has changed jobs (Table III). Career change within three years of starting work did not differ significantly between gender, marital status, and first career sector (i.e., community pharmacy, hospital pharmacy, industry, and public health).

**Table III: Career change**

| Item | | Gender | | Marital status | | First career sector | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Category** | **n** | **Male** | **Female** | **Single** | **Married** | **Community pharmacy** | **Hospital pharmacy** | **Industry** | **Public health service** |
| Unchanged | 56 | 21 | 35 | 29 | 27 | 20 | 16 | 15 | 5 |
| Changed | 30 | 9 | 21 | 9 | 21 | 12 | 7 | 11 | 0 |
| **Total** | **86** | **30** | **56** | **38** | **48** | **32** | **23** | **26** | **5** |
| ***p*-value** | | **0.487*** | | **0.053*** | | **0.307*** | | | |
| < Three years after starting work | 13 | 4 | 9 | 4 | 9 | 6 | 3 | 4 | 0 |
| > Three years after starting work | 17 | 5 | 12 | 5 | 12 | 6 | 4 | 7 | 0 |
| **Total** | **30** | **9** | **21** | **9** | **21** | **12** | **7** | **11** | **0** |
| ***p*-value** | | **1.000†** | | **1.000†** | | **0.804*** | | | |

* Pearson Chi-square test † Fisher's exact test

***Reasons for a career change (multiple answers)***

Table IV illustrates the various reasons for a job change. Regardless of gender or occupation, two main reasons were reported by the 30 respondents who changed jobs, i.e., dissatisfaction with work contents (n=14) and marriage or childbirth (n=12). Marital status was a significant reason for the turnover ($p$=0.011). There were no differences between males and females or the first work fields.

**Table IV: Reasons for a career change (multiple answers)**

| Item | Total | Gender | | Marital status | | First career sector | | |
|---|---|---|---|---|---|---|---|---|
| **Category** | | **Male** | **Female** | **Single** | **Married** | **Community pharmacy** | **Hospital pharmacy** | **Industry** |
| Uneasiness /dissatisfaction | 30 | 9 | 21 | 9 | 21 | 12 | 7 | 11 |
| Employer matters | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Salary | 4 | 2 | 2 | 1 | 3 | 2 | 1 | 1 |
| Working location | 3 | 1 | 2 | 1 | 2 | 3 | 0 | 0 |
| Coworker trouble | 5 | 2 | 3 | 1 | 4 | 3 | 1 | 1 |
| Work contents dissatisfaction | 14 | 4 | 10 | 4 | 10 | 5 | 4 | 5 |
| See no future | 4 | 2 | 2 | 2 | 2 | 2 | 1 | 1 |
| No job security | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No reasons | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 1 |
| Own health problems | 2 | 2 | 0 | 1 | 1 | 2 | 0 | 0 |
| Marriage/childbirth | 12 | 2 | 10 | 0 | 12 | 4 | 3 | 5 |
| Nursing care | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Start business | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Advance education | 2 | 1 | 1 | 2 | 0 | 1 | 0 | 1 |
| Others | 8 | 3 | 5 | 5 | 3 | 5 | 1 | 2 |
| ***p*-value** | | **0.486** | | **0.011*** | | **0.836** | | |

*p*-value: Pearson Chi-square test *: $p < 0.05$

***Comparison between careers before and after changing jobs***

Table V showcases transitions in the work sector. Of the 30 participants who changed jobs, 17 (56.7%) remained in the same field, of whom 11 changed positions within the community pharmacy sector. The remaining 13 (43.3%) found new jobs in different sectors, of whom 11 (84.6%) worked in community pharmacies (six from industry and five from the hospital sector). Hence, 22 (73.3%) of the 30 job changers chose the career of community pharmacist; 22 (52.4%) of the 42 currently working in the sector experienced a career change.

**Table V: Comparison between careers before and after changing jobs**

| Change between | Career sector | | N=30 | |
|---|---|---|---|---|
| | Before | After | N | N (%) |
| Same career sector | Community pharmacy | Community pharmacy | 11 | 17 (56.7) |
| | Hospital pharmacy | Hospital pharmacy | 2 | |
| | Industry | Industry | 4 | |
| Different career sector | Community pharmacy | Hospital pharmacy | 1 | 13 (43.3) |
| | Hospital pharmacy | Community pharmacy | 5 | |
| | Industry | Community pharmacy | 6 | |
| | Industry | Public health service | 1 | |

***Job satisfaction by career sector***

Table VI presents job satisfaction in each career sector. Job satisfaction varied significantly across occupations ($p$=0.026). Satisfaction with high proportion was as follows: public health services (n=5) in the range of 80-100 points, community pharmacy (n=19) and industry (n=8) in the 70-79 segment, and hospital pharmacy (n=6) in the 60-69 category. The sectors that achieved more than 70 cumulative points for job satisfaction were public health services (n=5), industry (n=15), community pharmacy (n=26), and hospital pharmacy (n=9).

**Table VI: Job satisfaction by career sector**

| Current career sector | Job satisfaction | | | | | | N |
|---|---|---|---|---|---|---|---|
| | 80–100 points | 70–79 points | 60–69 points | 50–59 points | 30–49 points | 0–29 points | |
| Community pharmacy | 7 | 19 | 11 | 4 | 1 | 0 | 42 |
| Hospital pharmacy | 5 | 4 | 6 | 2 | 1 | 1 | 19 |
| Industry | 7 | 8 | 3 | 1 | 0 | 0 | 19 |
| Public health service | 5 | 0 | 1 | 0 | 0 | 0 | 6 |

Kruskal–Wallis test $p$=0.026

***Future work plans by current career sector***

Results for future work plans indicated significant differences in the career sectors ($p$=0.009) (Table VII). Mode segment of future work plans was as follows: public health services (n=4) in "staying until retirement", industry (n=8) in "staying more than five years, community pharmacy (n=15) in "staying less than five years", and hospital pharmacy (n=7) in "undecided" about staying. Hence, half of the respondents working in public health services and industry indicated a positive commitment to their jobs. In contrast, the other half from the community pharmacy and hospital pharmacy sectors showed an uncertain attitude toward their work, indicating that job satisfaction is related to the current working field.

**Table VII: Future work plans by current career sector**

| Current career sector | Future work plans | | | | |
|---|---|---|---|---|---|
| | Staying until retirement | Staying more than five years | Staying less than five years | Undecided | N |
| Community pharmacy | 6 | 13 | 15 | 8 | 42 |
| Hospital pharmacy | 1 | 6 | 5 | 7 | 19 |
| Industry | 2 | 8 | 5 | 4 | 19 |
| Public health service | 4 | 2 | 0 | 0 | 6 |

Kruskal–Wallis test $p$ =0.009

***Future work plans and job satisfaction***

Future work plans differed according to the job satisfaction level ($p$=0.010) (Table VIII). Of the total respondents who scored 80–100 points (n=24), seven respondents informed that their future plans were "staying until retirement", while 10 respondents informed that they would like to stay more than five years. Looking at the respondents who scored 70-79 points on their job satisfaction score (n=31), six of them demonstrated they would like to stay until retirement while 12 respondents would like to stay more than five years. From respondents whose job satisfaction scored 60–69 points (n=21), 11 respondents indicated that they would like to stay less than five years, while five respondents indicated that they were undecided. For those who scored 50-59 points (n=7), two of them indicated that they would like to stay less than five years and three of them were "undecided".

**Table VIII: Future work plans and job satisfaction**

| Job satisfaction | Future work plans | | | | |
|---|---|---|---|---|---|
| | Staying until retirement | Staying more than five years | Staying less than five years | Undecided | N |
| 80–100 points | 7 | 10 | 3 | 4 | 24 |
| 70–79 points | 6 | 12 | 8 | 5 | 31 |
| 60–69 points | 0 | 5 | 11 | 5 | 21 |
| 50–59 points | 0 | 2 | 2 | 3 | 7 |
| 30–49 points | 0 | 0 | 1 | 1 | 2 |
| 0–29 points | 0 | 0 | 0 | 1 | 1 |

Kruskal–Wallis test $p$ =0.010

***The difference between categories regarding job satisfaction and future work plans***

Regarding job satisfaction and plans for future work, differences between gender, marital status, current occupation, and job satisfaction were examined in Table IX.

A significant difference in job satisfaction was observed, depending on the current career sector ($p$=0.026). Future work differed significantly in marital status ($p$=0.004), current career sector ($p$=0.009), and job satisfaction ($p$=0.010).

**Table IX: The difference between categories regarding job satisfaction and future work plans (N = 86)**

| Item | Category | Job satisfaction | Future work plans |
|---|---|---|---|
| Gender | Male / Female | 0.876* | 0.304* |
| Marital status | Single / Married | 0.296* | 0.004* |
| Current occupation | Community pharmacy / Hospital pharmacy / Industry / Public health service | 0.026 ** | 0.009 ** |
| Job satisfaction | 80–100/70–79/60–69/ 50–59/30–49/0–29 points | — | 0.010 ** |

*: Wilcoxon rank-sum test (U-test) **: Kruskal–Wallis test

***Preferences of study fields for a continuing career (multiple answers)***

Table X indicates the study fields that were chosen by respondents for continuing their careers. The top three reported study fields were drug information (76.7%, 66/86), disease (72.1%, 62/86), and pharmacotherapy (69.8%, 60/86).

The preferences for the study field were significantly different across current career sectors ($p$<0.001).

**Table X: Preferences of study fields for a continuing career (multiple answers)**

| Consideration | Total | Gender | | Current career sector | | | |
|---|---|---|---|---|---|---|---|
| | | Male | Female | Community pharmacy | Hospital pharmacy | Industry | Public health service |
| | N=86 | N=30 | N=56 | N=42 | N=19 | N=19 | N=6 |
| Drug information | 66 | 22 | 44 | 35 | 14 | 14 | 3 |
| Disease | 62 | 20 | 42 | 32 | 15 | 12 | 3 |
| Pharmacotherapy | 60 | 21 | 39 | 29 | 17 | 12 | 2 |
| Physio anatomy | 10 | 3 | 7 | 4 | 4 | 2 | 0 |
| Nursing | 14 | 4 | 10 | 7 | 4 | 3 | 0 |
| Long-term care | 22 | 8 | 14 | 13 | 4 | 4 | 1 |
| Health care system | 41 | 19 | 22 | 15 | 8 | 13 | 5 |
| Other pharmacy fields | 14 | 7 | 7 | 3 | 1 | 5 | 5 |
| Social legal system | 21 | 9 | 12 | 8 | 2 | 6 | 5 |
| Literature | 3 | 2 | 1 | 1 | 0 | 1 | 1 |
| Psychology | 23 | 8 | 15 | 14 | 4 | 4 | 1 |
| Philosophy | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Management | 29 | 15 | 14 | 11 | 7 | 9 | 2 |
| Religion | 4 | 2 | 2 | 2 | 1 | 1 | 0 |
| Politics | 7 | 5 | 2 | 2 | 1 | 2 | 2 |
| ***p*-value** | | **0.125** | | **<0.001*** | | | |

*p*-value: Pearson Chi-square test *: $p < 0.05$

## Discussion

Of the respondents, 48.8% (n=42), 22.1% (n=19), 22.1% (n=19), and 7.0% (n=6) were engaged in community pharmacy, hospital pharmacy, industry, and public health service, respectively. According to a survey among Japanese Pharmacist (n=311,289) (2018), 38.7% (n=120,545) of pharmacists were male, and 61.3% (n=190,744) were female; those who worked in community pharmacies were 52.6% (n=163,717) (excluding the owner), followed by 19.3% (n=59,956) in hospital pharmacies, 13.3% (n=41,303) in the industry, and 2.1 % (n=6,661) in public health services (Ministry of Health, Labour and Welfare of Japan, 2018). Industry includes pharmaceutical-related companies and contract research organisations (clinical research etc.). People in public health services are employed by the central or local government for research or public health administration. Regarding the gender distribution and career sector, our data were similar to the Japanese data.

As for the response rate, this survey had a 16.7% response rate, higher than the 10.0% (149/1491) of the 2021 class alumni survey done by our university in March 2022. Based on these facts, and despite the low response rate and the small sample size, this pilot survey gives valuable information to pharmacy students to help them choose their careers.

Short-term turnover of new graduates has become one of the social issues in Japan because graduates are not benefitting in their early career stage. In this survey, the turnover rate for pharmacists within three years of graduation was 15.1%, which is lower than the average rate (31.2%) for all national industries (Ministry of Health, Labour and Welfare of Japan, 2021). Fresh pharmacy graduates seem to be in a better situation than their counterparts from other majors in starting their initial careers. Young pharmacists in the US easily change their jobs, and excessive turnover hinders their career advancements. Further, increased recruiting costs result in poor performance in the workplace (Carvajal & Popovici, 2018). Even pharmacists with zero to five years of experience in the United States have difficulty finding another job; most pharmacists expect to stay with their current employer for at least three years (Gaither *et al.,* 2014), which reflects their recent attitude toward work. Consistent with the US report, the turnover rate of all respondents in this study was more than 34.5%, and 83.3% of job changers were engaged in pharmacy sectors, particularly community pharmacy (73.3%). This finding is considered to represent the labour mobility of pharmacists in this study. Pharmacy graduates have work mobility, and the community pharmacy sector absorbs these job changers in our data.

Job satisfaction is essential in any career. Surveys on job satisfaction of community or hospital pharmacists worldwide suggest that pharmacists are generally satisfied with their jobs. A survey reported that most

Swedish pharmacists were satisfied with their jobs (Mattsson & Gustafsson, 2020), while community pharmacists in Iraq were moderately satisfied (Ibrahim *et al.,* 2021), and Vietnamese pharmacists were generally satisfied, except for their salaries (Nguyen-Thi *et al.,* 2021). Despite job satisfaction, a mismatch between job value and wages has been previously reported in the literature (Nakagomi *et al.,* 2011; Nakagomi, Takahashi & Hayashi, 2013), which is consistent with the results from Vietnam. Furthermore, a study among hospital pharmacists in Ethiopia reported a lack of satisfaction among half of the respondents who felt they were overqualified for the job (Berassa, Chiro & Fanta, 2021).

An overview of job satisfaction reveals that pharmacists engaged in sectors such as industry or public health, which indirectly deal with patients, had a higher level of satisfaction than those who worked in fields with direct patient services, such as community pharmacy or hospital pharmacy (Gaither *et al.,* 2014; Gaither *et al.,* 2015; Carvajal & Popovici, 2018; Hashimi, Malik & Hussain, 2016; Schommer *et al.,* 2018; Meilianti *et al.,* 2022). The reasons underlying this finding are that non-pharmacy pharmacists are more autonomous, organised, and satisfied than community pharmacists and that, probably, there is diversity in their work responsibilities (Schommer *et al.,* 2018). Currently, pharmacy students in the US show an increased interest in pursuing a career in the pharmaceutical industry, particularly in drug information departments, where they can use their expertise (Nguyen, 2020). In Arab countries, job satisfaction was high among pharmacists in the pharmaceutical industry sector (Al-Muallem & Al-Surimi, 2019; Al-Jumaili *et al.,* 2022). Similarly, pharmacist medical representatives in Pakistan were highly satisfied with their work and had an ideal disposition (Butt *et al.,* 2021). Our study indicates that the pharmacy graduates engaged in the pharmaceutical industry sector were more satisfied than those from the community or hospital sectors.

In some countries, many new pharmacy graduates start working in the community pharmacy and hospital pharmacy sectors, as shown by the data from the EU, the US, and Japan (American Association of Colleges of Pharmacy [AACP], 2021; Bates *et al.,* 2018; Ministry of Education, Culture, Sports, Science, and Technology [MEXT], 2021). Career preferences of new pharmacy graduates differ between social and healthcare environments in each country. For example, in Japan, the employment rate of fresh pharmacy graduates in the community pharmacy sector has increased from 40.6% (2012) to 56.1% (2020) (recalculated based on MEXT, 2021). This trend is still ongoing (Council on Pharmaceutical Education [CPE], 2022). This increase seems to be due to the attractive salary and employers' vigorous recruitment activities to tackle the shortage of community pharmacists. Also, the cause is believed to be the success of the six-year pharmacy programme, which has begun in 2006 and focuses on patient-centred pharmacy practice. These circumstances might also lead students to prefer direct contact with patients.

More than 80% of pharmacy graduates in the US consider working fields that involve direct services to patients as their first career choice (AACP, 2021). In the UK, pharmacy students choose a community or hospital pharmacy as their career aspiration (Hanna, Askin & Hall, 2016). However, community pharmacies can no longer be considered an alternative labour sector for pharmacists if they fail to get into the residency programme, owing to the recent reduction of the retail pharmacy sector (Lebovitz & Rudolph, 2020).

In some countries, such as Saudi Arabia, Malaysia, or China, hospital pharmacy is more popular than community pharmacy (Alhomoud *et al.,* 2019; Balkhi *et al.,* 2020; Ibrahim *et al.,* 2022; Zhang & Bian, 2020). Hospital pharmacies have a limited number of workplaces in Saudi Arabia despite their popularity. As the number of pharmacy students increases, the community pharmacy sector, which has been unpopular until now, might emerge as a significant future sector (Almaghaslah *et al.,* 2021). In South Africa, the hospital pharmacy field is popular among pharmacy students, followed by the pharmaceutical industry (Modipa & Dambisya, 2008). A Nigerian study found that the occupation preferences of pharmacy students are dispersed among hospitals, pharmacies, and the pharmaceutical industry, by approximately 20% each (Ubaka et al., 2013).

Factors affecting career choices have been discussed in studies conducted in Saudi Arabia, China, Iraq, and Sudan (Ahmed & Jumaa, 2020; Alhemadey *et al.,* 2020; Alhomoud et al., 2019; Balkhi *et al.,* 2020; Zhang & Bian, 2020). The relevant factors in these studies were salary, working conditions, cultural atmosphere, self-promotion, and career development.

Future work plans were found to be related to job satisfaction in this study. Our results reflect the finding of a previous study showing that high-level job satisfaction motivates the future longer work plans of respondents (Nakagomi, Hayashi & Komiyama, 2017). These results also confirm those of Saudi Arabia, where the prediction for attrition was based on satisfaction and engagement (Al-Muallem & Al-Surimi, 2019).

Continuous career development is associated with and increases job satisfaction (Carvajal & Popovici, 2018; Mattsson & Gustafsson, 2020). Our study indicates that different fields of knowledge are required for career development, depending on the occupation.

Similar to our research, the literature found that many new pharmacy graduates start working in sectors where they can directly contact patients, such as in community pharmacies or hospital pharmacies, and exhibit low job satisfaction, seemingly due to a mismatch in personal job selection. Career guidance should be provided at the university to avoid this mismatch. One of the references in the US described job disposition, satisfaction level, and future work plans for pharmacy professions, "The Career Pathway Evaluation Program" (Schommer, Sogol & Brown, 2007; Schommer, Sogol & Brown, 2019). The university should provide information to all students on the merits and disadvantages of pharmacy education and related careers.

Career advice should be part of pharmacy education beyond the stages of orientation or introduction (Alhemadey *et al.,* 2020). An Australian study highlighted the need to offer an opportunity for pharmacy students to understand the pharmaceutical industry as a career option with the collaboration of university and industry (Tan *et al.,* 2020). Some curricula and the usual pharmacy programme are being discussed worldwide.

In addition, better educational opportunities can be offered to pharmacy students interested in pursuing a career in the pharmaceutical industry and as an effective response to the additional elective course as part of pharmaceutical industry practice (Hartman et al., 2014; Jacob & Peasah, 2019). Reports from Malaysia showed that pharmacy students need exposure to pharmaceutical industry programmes to pursue a career in this field (Ibrahim *et al.,* 2022). Furthermore, it was stressed that the expertise of pharmacists could be used in drug information departments of the pharmaceutical industry in the US (Guillot & Fung, 2010); thus, various training sessions focusing on drug information have been proposed in pharmacy schools (Nguyen, 2020). In some countries, the pharmaceutical industry may suffer from a shortage of pharmacists (Saleh et al., 2015).

Pharmacy curricula should adapt to the needs of pharmacy students and the specific social needs of each country. In Japan, the Council on Pharmaceutical Education (CPE) has provided a "Pharmacy Education Core Curriculum in Pharmacy" as of 2006, focusing on pharmacy practice, including the pharmaceutical industry and public health service sectors. A specialised curriculum can be included in each university. Our university offers a career guidance curriculum comprising an overview of the community pharmacy, hospital pharmacy, pharmaceutical industry, contract research organisations, and public health sectors in 16 required classes, considered helpful for student career choices.

Today, pharmacy students need a broader and more diverse curriculum that involves clinical and pharmaceutical industry skills, including the innovative use of advanced medicines, such as regenerative medicine, antibody medicine, or gene therapy based on scientific knowledge. Moreover, effective communication between pharmacy graduates and healthcare professionals is also required.

***Limitations***

Pharmacy graduates were surveyed from just one private pharmacy school, and the sample for the study was small. Therefore, the results cannot be generalised to all Japanese pharmacy students. However, no studies could be found in Japan on the early career stage, including job satisfaction and future work in various pharmacy sectors. For this reason, despite its small sample, this study is believed to be valuable in comparison with overseas research. Further, the social system, economic environment, and policymaking might influence pharmacy education, career preferences of pharmacy graduates, and work attitudes in each country.

## Conclusion

The turnover rate of pharmacy graduates within three years was lower than that of other industries in Japan. However, half of the community pharmacists changed careers. The respondents in non-pharmacy sectors were more satisfied with their jobs than those in pharmacy, with job satisfaction affecting work plans. Career choice and development should be guided through continuing education and integrated curricula because preferences change depending on career sectors. Further studies in other countries are necessary to confirm these findings.

## Ethics approval

This study was approved by the Institutional Ethical Committee of the Research Center for Liberal Education, Musashino University (No. 2018-001).

## Conflict of Interest

The authors declare no conflict of interest.

## Disclosure statement

This study is not supported by any fund or organisation. Selected findings were presented at the 141st Annual Meeting of the Pharmaceutical Society of Japan (Hiroshima) on March 29, 2021.

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