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Cluster analysis of pharmacists' work attitudes

Keiichi Nakagomi PharmD[1] | **Yukikazu Hayashi MS[2]** | **Takako Komiyama PharmD[3]**

[1]Faculty of Pharmacy, Musashino University, Tokyo, Japan

[2]Development Strategy Division, A2 Healthcare Corporation, Tokyo, Japan

[3]School of Pharmacy, Kitasato University, Tokyo, Japan

Correspondence
Keiichi Nakagomi, Faculty of Pharmacy, Musashino University, Tokyo, Japan.
Email: k_nakago@musashino-u.ac.jp

Abstract

Background: Few studies in Japan use clustering to examine the work attitudes of pharmacists. This study conducts an exploratory analysis to classify those attitudes based on previous studies to help staff pharmacists and their management to understand their mutually beneficial requirements.

Methods: Survey data collected in previous studies from 1 228 community pharmacists and 419 hospital pharmacists were analyzed using Quantification Theory 3 and clustering.

Results: Among community pharmacists, two clusters, namely 30- to 34-year-old married males and married males aged over 35 years, reported the highest job satisfaction, intending to remain in their jobs for 5 years or more or until retirement. Conversely, one cluster of 35- to 39-year-old single females reported the lowest job satisfaction and intended to remain for less than 5 years or were undecided. Among hospital pharmacists, one cluster of 22- to 25-year-old single males reported the highest job satisfaction and intended to remain for more than 5 years. Conversely, one cluster of 30- to 34-year-old married males reported the lowest job satisfaction and a period of working undetermined.

Conclusions: This study used clustering to explore how pharmacists of different ages, marital statuses, and experience felt regarding their work. Job satisfaction and human relationships are significant in considering future work plans of practicing pharmacists. Pharmacy staff, supervisors, and managers of community or hospital pharmacies must recognize features of pharmacists' work attitudes for offering high-quality service to patients.

KEYWORDS
cluster analysis, community pharmacist, hospital pharmacist, job satisfaction, pharmacist survey, work attitude

1 | INTRODUCTION

In general, we are interested in colleagues' work attitudes related to their occupations or jobs. Pharmacists, their management, and pharmacy students are no exception. Pharmacists require reasonable job satisfaction to offer good service to their patients.[1,2] A few studies on pharmacists' work attitudes have been conducted in Japan. Community pharmacists are somewhat dissatisfied with their situation, and the study of gender and experience revealed significant differences in job satisfaction.[3] Hospital pharmacists express dissatisfaction with their workplace situations; however, they consider their jobs to be worthwhile occupations.[4] Conversely, previous studies expressed a considerably higher level of job satisfaction for community and hospital pharmacists as compared with other workers.[5,6] Overseas research with regard to work attitudes among pharmacists has revealed pharmacists to be satisfied with their jobs,[7] and job satisfaction has been described as an important factor influencing

pharmacists' perspectives on the quality of work-life.[8] Future work plans are affected by various individual and organizational factors.[9]

We summarize our previous studies regarding work attitudes of pharmacists, particularly regarding job satisfaction and future work plans. In the studies, specific items were not found although relationships between job satisfaction and questionnaire items were sought. However, relationships between future work plans and several questionnaire items were recognized for both types of pharmacists.[5,6] For community pharmacists, factors possibly affecting future work plans of remaining until retirement or for less than 5 years included employment status, gender, age, number of years employed, and job satisfaction.[5] For hospital pharmacists, the factors were age, number of years employed, job satisfaction, and reasons for dissatisfaction.[6] The results of our study might support the assertion that work attitudes could be indicated differently depending on individual background.[3,9]

There have been a few reports regarding work attitudes among pharmacists in Japan; however, cluster-analyzed reports regarding them could not be found. All this led us to explore the groups in our samples through clustering. Therefore, this study conducts an exploratory analysis to classify the work attitudes of community and hospital pharmacists based on previous studies to help staff pharmacists and management understand mutually beneficial requirements.

2 | METHODS

2.1 | Samples of the original pharmacist survey

The original survey of community pharmacists was conducted from December 2007 to January 2008 (Kraft, Medical Pharmacy, Nihon Chozai, and Pfercos—four large chain pharmacies—with approximately 600 widely dispersed pharmacies of various sizes. An accurate number could not be identified because several pharmacies opened or closed during the survey period).[5] The original survey of hospital pharmacists was conducted from January 2010 to March 2010 (Tokushukai Hospital Group, with 66 hospitals of various sizes, the number of beds in which ranged from 30 to 600).[6]

These community and hospital pharmacies were chosen due to the possible variety of pharmacists employed, annual hiring of many new pharmacy graduates, and dynamic workplace environments. Chain pharmacies featured well-known companies, sophisticated operations, and good employment education and were widespread. Group hospitals featured a variety of operation styles, higher or lower numbers of beds, and nationwide locations. Even though chain pharmacies and group hospitals were managed by their head offices or headquarters, each was actually operated by a supervising pharmacist, director of pharmacy, or hospital president. Although the data collected did not completely represent all Japanese pharmacists, the data were assumed to represent pharmacists' various work attitudes.

2.2 | Procedure of original survey

We considered that our previous two studies were not applicable to "Ethical Guidelines for Medical and Health Research Involving Human Subjects,"[10] because the studies were not medical and health researches involving human subjects, and treated unlinkable anonymization. This judgment has been supported by our Institutional Ethical Committee.

The survey's review (involving the questionnaire and its implementation) was discussed and approved ethically and practically by the four pharmacies' headquarters. A similar review was held and approved at a meeting of all Tokushukai Hospital Group's pharmacy directors. Subsequently, supervisors or directors of each community and hospital pharmacy explained that pharmacists' participation was voluntary, respondents would not be asked to sign their names to the survey, the workplace name would not be included, and the data would be used only for research purposes. Completed answer sheets were sealed and delivered directly to the investigator. Data were input for processing by INTAGE, Inc. (Tokyo) (for community pharmacists) and by ESUMI Co., Ltd. (Tokyo) (for hospital pharmacists). The input data and original data were confirmed using a double-check system.

2.3 | Original survey questionnaire

Self-administered surveys of cross-sectional studies of pharmacists were designed with reference to previous Japanese studies,[3] overseas studies,[7] and some ideas by several pharmacy managements. Demographic items included employment status, gender, marital status, age, number of years employed in the current workplace, number of pharmacists in the workplace, number of workplace changes, and number of pharmacies served since graduation (Table 1). Questions relating to work attitude and how this impacted being a community or hospital pharmacist were addressed; the reasons for choosing the current workplace (ranked to top three); most important work-related concerns; degree of job satisfaction; reasons for dissatisfaction, if any, with the current workplace; future work plans, if any; and for those who had relocated to the current workplace, reasons for leaving the previous workplace (ranked to top three; Table 2). Missing answers were excluded from the data analysis in both surveys.

2.4 | Data extracted for this study

To classify samples that demonstrated a majority of pharmacists' work attitudes, data were extracted from regular employment samples. We assumed that five items, namely the number of pharmacists in the current workplace, number of workplace changes, number of pharmacies served since graduation, primary reason for being a community or hospital pharmacist, and reasons for leaving the previous workplace, did not meet our purpose of analysis at this time. Categories excluding the above five items were selected. Fifty-one categories (answers) from eight items (questions) were selected: gender/marital status (four categories for ease of recognition: single male, married male, single female, and married female); age (five categories); number of years employed in the current workplace (five categories); reasons for choosing the current workplace (ten categories); most important

TABLE 1 Demographic characteristics of respondents (original survey)

Demographic characteristics item	Category	Community pharmacist (%)	Hospital pharmacist (%)
Employment status	Regular	1,270 (80.1)	429 (97.5)
	Nonregular	315 (19.9)	11 (2.5)
Gender	Male	499 (31.5)	177 (40.2)
	Female	1,086 (68.5)	263 (59.8)
Marital status	Single	955 (60.3)	308 (70.0)
	Married	630 (39.7)	132 (30.0)
Age	22-25	376 (23.7)	137 (31.1)
	26-29	446 (28.2)	130 (29.5)
	30-34	328 (20.7)	72 (16.4)
	35-39	162 (10.2)	47 (10.7)
	>40	273 (17.2)	54 (12.3)
Years employed in the current workplace	<1	364 (23.0)	45 (10.2)
	2-3	460 (29.0)	145 (33.0)
	4-5	264 (16.7)	85 (19.3)
	6-9	354 (22.3)	75 (17.0)
	>10	143 (9.0)	90 (20.5)
Number of pharmacists in the current workplace	<4	735 (46.4)	76 (17.3)
	5-9	603 (38.0)	84 (19.1)
	10-14	202 (12.7)	65 (14.8)
	>15	45 (2.8)	215 (48.9)
Number of workplaces changed since graduation	1	808 (51.0)	321 (73.0)
	2	309 (19.5)	66 (15.0)
	3	225 (14.2)	23 (5.2)
	4	129 (8.1)	17 (3.9)
	>5	114 (7.2)	13 (3.0)
Number of pharmacies worked at since graduation	1	1,103 (69.6)	359 (81.8)
	2	275 (17.4)	51 (11.6)
	3	136 (8.6)	18 (4.1)
	4	41 (2.6)	9 (2.1)
	>5	30 (1.9)	2 (0.5)

work-related concerns (eight categories); degree of job satisfaction (five categories); reasons for dissatisfaction with the current workplace (ten categories); and future work plans (four categories).

Data from 1 228 community pharmacists and 419 hospital pharmacists who had answered the eight items completely were extracted from previous studies and then analyzed.

2.5 | Analytical method of this study

Quantification Theory 3 is an analysis method for grasping category data's mutual relationships without an external criterion, demonstrating the similarity between the categories in the item (category score: distance among items) and similarity between the samples (sample score: distance among samples).[11] This is one method of classifying samples based on the similarity of answers to items (questions) in several categories.[12] This Quantification Theory 3 assumes that samples and categories with similar answer patterns might be located in roughly proximate areas and possess similar characteristics.[12] Clustering (Ward's method) classifies complex multivariate data, grouping the samples according to sample scores on a multidimensional axis (distance among samples). The analysis conducted is a so-called sample cluster analysis, which is clustered in multidimensional space by the score of each sample that is calculated using each category's score on the basis of the category score calculated using Quantification Theory 3.

In this study, a hierarchical analysis was not considered as data were unidentified (no pharmacist or workplace names), and the sample of approximately 600 community pharmacies and 66 hospital pharmacies was large. Therefore, the effect on pharmacy environment appeared to be small.

TABLE 2 Summary of work attitude (original survey)

Item/category	C (%)	H (%)	Item/category	C (%)	H (%)
Main reason for being a C/H	n=1,579	n=435	Reasons for dissatisfaction	n=1,529	n=430
1. Practical utilization of pharmacist license	42.8	9.0	1. Salary	27.5	23.0
2. Salary	3.3	0.2	2. Employment terms and conditions	29.0	22.1
3. Opportunity for personal development	15.1	32.4	3. Lack of personal development	2.7	2.8
4. Desire to work in health care field	21.7	46.9	4. Evaluation by supervisor	1.4	1.6
5. Continuous learning	8.7	8.0	5. Employee training system	1.6	7.2
6. Easy work	0.9	0.0	6. Interpersonal relationships	3.6	5.3
7. Others	7.6	3.4	7. Workplace circumstances	6.2	7.2
			8. Hard work	13.4	17.2
Reasons for choosing current workplace[a]	n=1,580	n=440	9. Work content issues	6.3	5.8
1. Well-known large group	36.5	19.8	10. Others	8.3	7.7
2. Policy and mission	7.8	15.5			
3. Listed organization	1.6	0.0	Future work plans	n=1,568	n=437
4. Salary	2.0	1.1	1. Stay until retirement	7.6	5.5
5. Employment terms and conditions	15.3	5.0	2. Stay for long term (more than 5 years)	30.1	26.3
6. Opportunity for personal development	7.0	20.7	3. Stay for less than 5 years	26.0	35.5
7. Employee training system	11.5	1.1	4. Undecided	36.3	32.7
8. Convenient commute	10.0	17.7			
9. Recommendation from senior or friend	4.2	9.5	Reasons for turnover[b]	n=711	n=106
10. Others	4.1	9.5	1. Salary	6.9	5.7
			2. Employment terms and conditions	20.3	11.3
Most important work-related concerns	n=1,578	n=439	3. Lack of personal development	14.5	32.1
1. Salary	5.8	3.4	4. Evaluation by supervisor	0.7	0.0
2. Work content	33.2	42.1	5. Employee training system	1.7	0.9
3. Employment stability	6.5	5.2	6. Interpersonal relationships	7.2	8.5
4. Work schedule	6.0	3.6	7. Workplace circumstances	0.8	0.9
5. Work and family life balance	20.3	17.3	8. Work content issues	7.5	4.7
6. Workplace circumstances	1.6	1.6	9. Family issues	27.4	17.9
7. Interpersonal relationships	25.6	24.8	10. Others	13.0	17.9
8. Others	1.0	1.8			
Job satisfaction	n=1,581	n=440			
1. 80-100 points	17.8	15.2			
2. 70-79 points	42.8	36.1			
3. 60-69 points	27.3	30.2			
4. 50-59 points	8.6	12.5			
5. <50 points	3.5	5.9			

C, community pharmacist; H, hospital pharmacist.
[a]Listed reasons ranked first from top three.
[b]Listed reasons ranked first from top three.

ESUMI Co., Ltd. (Tokyo) conducted data analysis using Quantification Theory 3 to calculate category classifications and sample scores (EXCEL Quantification Theory Ver. 3.0, ESUMI), on which a cluster analysis (Ward's method) was then performed (EXCEL Multivariate Analysis Ver. 6.0, ESUMI). Quantification Theory 3 was used in clustering.

3 | RESULTS

3.1 | Procedure of Quantification Theory 3

Quantification Theory 3 was used to explore relationships among categories of community pharmacists and among those of hospital

pharmacists.

The process of Quantification Theory 3 was the following (for ease of understanding, the word "dimension" has been used instead of "axis," which is used in Quantification Theory 3):

1 Numerical values were assigned to samples and categories.
2 The Pearson coefficient correlation between samples and categories was calculated to maximize itself on ten dimensions.
3 Close numbers in each category score express "similar" or "resembling," a strong mutual relationship, measured as short Euclidean distances. Conversely, large Euclidean distances indicate "different" or "disagreeing," a weak mutual relationship. This distance indicates relative distance but not absolute distance.

Quantification Theory 3 methods and clustering are interpreted subjectively to explore the similarities between samples on the basis of the analyst's intention or objective.[11,12] Thus, the number of dimensions in Quantification Theory 3 and the number of groups in clustering vary depending on the analyst's decisions, and the interpretation of analysis results can also vary depending on the analyst.

3.2 | Correlation coefficient and category score by Quantification Theory 3

For community pharmacists, the correlation coefficients for dimensions 1-10 using Quantification Theory 3 analysis were from r=0.5530 to r=0.3832 (Table 3); for hospital pharmacists, those for dimensions 1-10 were from r=0.5862 to r=0.3995 (Table 4). A category of listed organization was excluded from the analysis of hospital pharmacists because there was no sample. Correlation coefficients from 0.3 to 0.5 could be interpreted as weak[13] and those from 0.4 to 0.7 as fair.[14] We adapted the results of dimensions 1-6 for community and hospital pharmacists by using the same condition as for the obtained values that were greater than 0.4. In addition, Tables 3 and 4 show the category scores by the Quantification Theory 3 analysis.

3.3 | Example of interpretation regarding dimension of category scores

Examples of interpretation regarding dimensions 1 and 2 can be described on the basis of category scores (Tables 3 and 4) as follows. Dimensions 3 to 6 were not interpreted because category scores of each dimension were used as parts for clustering procedure.

We defined dimension 1 as the age-related indicator. For community pharmacists, larger category scores in dimension 1 indicated years employed in the current workplace (over 10 years, category score (cs) =3.0734); age (over 40 years, cs=2.9026); reasons for choosing the current workplace (salary, cs=2.7719); future work plans (remain until retirement, cs=2.3868); gender/marital status (married male, cs=2.1987); and most important work-related concerns (work and family life balance, cs=1.9664), whereas smaller category scores indicated age (22-25 years, cs=−1.7087); years employed in the current workplace (<1 year, cs=−1.2586); reasons for choosing the current

workplace (training system, cs=−1.0473); most important work-related concerns (workplace circumstances, cs=−0.9678); future work plans (remain for less than 5 years, cs=−0.9652); and gender/marital status (single female, cs=−0.9174).

For hospital pharmacists, higher category scores in dimension 1 expressed future work plans (remain until retirement, cs=2.8812); age (over 40 years, cs=2.7504); years employed in the current workplace (over 10 years, cs=2.5491); reason for choosing the current workplace (salary, cs=2.4256); gender/marital status (married male, cs=2.2941); and age (35-39 years, cs=1.9749), whereas lower category scores expressed the most important work-related concerns (workplace circumstances, cs=−1.4653); age (22-25 years, cs=−1.4632); years employed in the current workplace (2-3 years, cs=−1.2855); gender/marital status (single female, cs=−1.0139); reasons for choosing the current workplace (training system, cs=−0.8604); and the most important work-related concerns (work schedule, cs=−0.8327). It seems that dimension 1 for community and hospital pharmacists could be related to age.

We defined dimension 2 as the happiness-related indicator. For community pharmacists, higher category scores in dimension 2 indicated job satisfaction (80-100 points, cs=2.4660); reasons for choosing the current workplace (policy and mission, cs=2.3321); the most important work-related concerns (employment stability, cs=2.3229); dissatisfaction (workplace circumstances, cs=2.1703); and future work plans (remain for more than 5 years, cs=1.8494, remain until retirement, cs=1.6643), whereas smaller category scores indicated satisfaction (<50 points, cs=−2.6656, 50-59 points, cs=−2.3771); the most important work-related concerns (work schedule, cs=−2.2533); reasons for choosing the current workplace (convenient commute, cs=−2.1929); dissatisfaction (lack of personal development, cs=−1.8888); and gender/marital status (married female, cs=−1.5360).

For hospital pharmacists, higher category scores in dimension 2 expressed the most important work-related concerns (workplace circumstances, cs=3.1859); years employed in the current workplace (less than one year, cs=3.1040); reasons for choosing the current workplace (training system, cs=2.5081); job satisfaction (80-100 points, cs=2.3588); reasons for choosing the current workplace (salary, cs=1.8927); and reasons for choosing the current workplace (employment terms, cs=1.8006), whereas lower category scores expressed the most important work-related concerns (salary, cs=−2.4762); job satisfaction (<50 points, cs=−2.1654); dissatisfaction (interpersonal relationships, cs=−1.8435); years employed at the current workplace (6-9 years, cs=−1.7423); the most important work-related concerns (others, cs=−1.5778); and job satisfaction (50-59 points, cs=−1.3685). These results imply that dimension 2 for community and hospital pharmacists is related to a feeling of happiness.

3.4 | Procedure of cluster analysis

The obtained category scores of the six dimensions were applied to each sample to calculate the sample scores, which were then classified using cluster analysis. The sample score is obtained as the sum

TABLE 3 (a) Community pharmacist: correlation coefficient and (b) Community pharmacist: category score

Axis	Eigenvalue	Contribution (%)	Cumulative contribution (%)	Correlation coefficient
(a)				
1	0.3058	5.7	5.7	0.5530
2	0.2222	4.1	9.8	0.4714
3	0.2000	3.7	13.5	0.4472
4	0.1725	3.2	16.8	0.4153
5	0.1684	3.1	19.9	0.4103
6	0.1643	3.1	22.9	0.4053
7	0.1588	3.0	25.9	0.3985
8	0.1537	2.9	28.8	0.3920
9	0.1512	2.8	31.6	0.3888
10	0.1469	2.7	34.3	0.3832

Category	Dim. 1	Dim. 2	Dim. 3	Dim. 4	Dim. 5	Dim. 6	Dim. 7	Dim. 8	Dim. 9	Dim. 10
(b)										
Single male	−0.6272	1.4212	0.3629	1.3093	−0.6999	−0.7192	1.2324	0.4893	0.1061	−0.5335
Married male	2.1987	1.0757	0.3680	0.4138	1.8512	−0.1080	−1.1092	0.2110	−0.6730	0.5973
Single female	−0.9174	−0.6103	−0.2786	−0.4373	0.1475	−0.1084	−0.8749	−0.3782	0.1612	0.5002
Married female	1.9063	−1.5360	−0.0552	−1.2051	−1.4210	1.7872	2.2617	0.2622	0.0011	−1.5530
22-25 y old	−1.7087	0.0329	−1.8146	0.0832	−0.0151	0.2744	0.0632	−0.0277	−0.4090	0.1718
26-29 y old	−0.5288	−0.0158	1.9708	0.4093	−0.7596	0.1445	0.2112	0.1386	0.5159	−0.2000
30-34 y old	1.0792	0.2533	0.7803	−1.2088	2.5890	−0.3265	0.0604	−0.0644	0.4159	−0.6031
35-39 y old	1.9164	0.2101	−1.1544	−0.1961	0.1309	−1.6308	−1.9072	0.1058	−3.7528	1.4453
40 y old <	2.9026	−0.7120	−1.7265	1.0014	−2.7527	0.7049	0.5516	−0.3206	1.7019	0.1830
< 1 y (Year)	−1.2586	0.5399	−2.0029	−0.5345	0.6385	−0.2993	0.4162	−0.6061	0.7538	0.2962
2-3 y (Year)	−0.7511	−0.4751	−0.4801	0.3493	−0.2617	0.7162	0.3528	1.0796	−1.1836	−0.0806
4-5 y (Year)	−0.0593	0.0320	2.5263	0.9299	−1.4880	0.6490	−0.5096	−0.0415	1.4574	0.9840
6-9 y (Year)	1.0840	0.1666	1.6558	−1.2069	1.3512	−0.5732	0.2800	−0.4534	−0.3007	−1.0646
10 y < (Year)	3.0734	−0.3279	−2.6105	1.7335	−1.6073	−1.3747	−2.1038	−0.7721	0.0197	0.4934
Well-known large company (Reason)	−0.3906	0.0015	0.6769	0.9538	0.2863	0.2371	−0.0344	−0.0121	0.1256	−0.9770
Policy and mission (Reason)	0.4082	2.3321	0.5117	−1.2194	−1.8044	0.4870	0.2623	0.5085	0.9995	2.4354
Listed organazation (Reason)	−0.8495	1.1878	−3.1262	2.3166	3.9505	−1.5187	7.6342	−0.3531	1.8997	1.0955
Salary (Reason)	2.7719	−0.5245	−1.8918	5.6175	4.1458	4.7581	−4.1029	1.8563	−2.4016	2.7629
Employment terms (Reason)	0.4745	−0.6194	−1.4100	−2.9815	0.4671	0.2433	−1.4883	1.8235	2.1804	−1.7285
Personal development (Reason)	−0.4570	0.5595	0.8174	0.0858	−0.1136	−0.2409	−0.2668	−2.0404	−1.8863	1.5900
Training system (Reason)	−1.0473	−0.1090	−0.4782	−0.7641	0.5188	0.0919	0.3307	−0.4498	−0.3106	0.3017
Convenient commute (Reason)	1.3250	−2.1929	−1.1261	−0.9247	−1.8253	2.2356	1.0383	−1.1500	−0.9302	1.5336
Recommendation from others (Reason)	1.9227	0.8095	−1.2602	1.5252	−2.5292	−4.6158	−1.9304	−1.6190	0.9345	−1.2923
Others (Reason)	1.0385	−1.3120	1.0922	−1.1472	0.2369	−4.2989	1.0698	2.7432	−3.0503	1.7373
80-100 pt. (Satisfaction)	0.4217	2.4660	−1.1562	−0.5734	0.7700	0.1395	1.0550	−0.7284	0.3584	0.6444

(Continues)

TABLE 3 (Continued)

Category	Dim. 1	Dim. 2	Dim. 3	Dim. 4	Dim. 5	Dim. 6	Dim. 7	Dim. 8	Dim. 9	Dim. 10
70-79 pt. (Satisfaction)	−0.1536	0.5965	0.1696	−0.4650	−0.7160	0.0781	−0.1836	0.5163	−0.0644	−0.3224
60-69 pt. (Satisfaction)	−0.0499	−0.9902	0.1993	0.7973	0.2409	0.1247	−1.2407	−0.4589	0.1146	−0.6312
50-59 pt. (Satisfaction)	0.0810	−2.3771	0.3134	−0.3569	0.8534	1.2652	1.0897	−0.4286	−0.9118	1.6649
< 50 pt. (Satisfaction)	0.3049	−2.6656	0.1842	2.1332	1.2059	−5.2039	4.6574	1.4017	0.6813	1.8724
Salary (Dissatisfaction)	−0.3453	0.2079	−0.0387	−0.6304	−0.2828	1.1028	−0.3950	1.3222	0.4321	0.9007
Employment terms (Dissatisfaction)	0.1198	−0.3249	0.3914	0.5602	−0.0188	−0.1803	0.0980	−1.9234	−0.9452	−0.7133
Lack of personal development (Dissatisfaction)	0.1256	−1.8888	1.1799	1.2048	0.2573	−4.9001	0.6559	2.8259	0.0111	2.9712
Evaluation by supervisor (Dissatisfaction)	1.7784	−1.3256	−1.3243	6.1151	1.7505	1.7063	−0.8726	6.9729	−2.8489	−2.4190
Training system (Dissatisfaction)	−0.5804	0.3963	0.1661	−4.4299	1.7842	−3.1552	−6.5788	−0.8516	5.0872	−4.2982
Interpersonal relationships (Dissatisfaction)	0.1509	−1.5165	−0.8760	−1.4026	−0.7376	−4.9437	1.6627	3.6995	−0.1224	−0.7807
Workplace circumstances (Dissatisfaction)	−0.8726	2.1703	−1.5246	0.0771	0.2818	0.0403	0.3166	−0.8229	−0.7353	−1.5985
Hard work (Dissatisfaction)	−0.0409	−0.3068	0.2123	0.9474	0.1304	0.4258	0.3707	−0.6030	0.9215	−0.1684
Work content issues (Dissatisfaction)	0.7603	1.0928	−0.2678	−0.8733	−1.1738	0.3569	0.1111	2.1651	−2.3520	−0.2435
Others (Dissatisfaction)	0.6910	0.1410	−0.3217	−1.4219	1.4786	−0.3404	0.1830	0.1161	3.4988	2.5066
Salary (Important)	0.5917	−0.1120	0.0286	3.5972	3.3672	1.8877	−0.6732	3.6961	1.9385	1.0315
Work content (Important)	−0.0958	0.3392	0.2605	−0.2055	−0.6245	−0.8078	−0.3915	−0.0660	0.2158	0.0833
Employment stability (Important)	−0.4527	2.3229	0.1469	1.3056	0.6743	0.4850	0.6803	−1.8541	−1.5699	0.7757
Work schedule (Important)	−0.2982	−2.2533	−0.8525	1.1173	1.7894	0.0571	0.2052	−3.9818	1.7588	−1.0807
Work and family life balance (Important)	1.9664	−0.7023	−0.3546	−1.4349	0.4053	1.4752	2.1095	−0.1013	−0.9905	−1.1383
Workplace circumstances (Important)	−0.9678	−0.2472	−2.0442	−0.5773	0.7343	−0.0765	−4.0208	2.9153	0.2639	−4.6684
Interpersonal relationships (Important)	−0.7123	−0.2748	0.0232	−0.4231	−0.7684	−0.2063	−0.3925	0.4353	−0.3837	0.1486
Others (Important)	0.5202	−0.6410	0.9832	−0.0222	1.7100	0.5869	2.9310	−1.7720	5.3569	8.9558
Stay until retirement (Future)	2.3868	1.6643	−1.6824	1.7991	−0.7846	−0.4037	0.6900	−0.1154	2.7006	−1.3288
Stay for more than 5 y (Future)	0.1847	1.8494	0.3231	−0.3874	−0.0193	0.5157	0.0584	0.1601	−0.7217	0.0189
Stay for less than 5 y (Future)	−0.9652	−1.0781	−0.2679	0.5797	0.1175	−0.2575	0.4286	0.4600	−0.0265	−1.3150
Undecided (Future)	0.0942	−1.2202	0.2742	−0.4907	0.0916	−0.1889	−0.5487	−0.4967	0.1187	1.3288

Dim, Dimension; Year, Years employed in the current workplace; Reason, Reasons for choosing current workplace; Satisfaction Level of satisfaction; Dissatisfaction, Reasons for dissatisfaction; Important, Most important work-related concerns; Future, Future work plans.

TABLE 4 (a) Hospital pharmacists: correlation coefficient and (b) Hospital pharmacists: category score

Dimesion	Eigenvalue	Contribution (%)	Cumulative contribution (%)	Correlation coefficient
(a)				
1	0.3436	6.5	6.5	0.5862
2	0.2774	5.3	11.8	0.5267
3	0.2260	4.3	16.1	0.4754
4	0.1976	3.8	19.9	0.4445
5	0.1923	3.7	23.6	0.4386
6	0.1858	3.5	27.1	0.4310
7	0.1801	3.4	30.5	0.4244
8	0.1662	3.2	33.7	0.4076
9	0.1626	3.1	36.8	0.4032
10	0.1596	3.0	39.8	0.3995

Category	Dim. 1	Dim. 2	Dim. 3	Dim. 4	Dim. 5	Dim. 6	Dim. 7	Dim. 8	Dim. 9	Dim. 10
(b)										
Single male	−0.4098	1.2133	1.0162	0.1099	0.0195	−0.1244	−0.9299	−0.1963	0.7187	−0.0402
Married male	2.2941	−0.3568	−0.9770	0.3467	1.0210	−1.2659	−0.8884	0.3398	−0.2588	−0.2216
Single female	−1.0139	−0.4098	−0.3234	−0.3367	0.0058	−0.0216	0.4010	−0.0693	−0.0618	−0.0679
Married female	1.8227	0.0168	1.2638	0.8488	−2.1197	2.9444	1.8454	0.1599	−0.8650	0.9031
22-25 yold	−1.4632	1.1423	−0.4440	−0.3028	−0.7238	−1.0604	−0.0051	0.5834	0.0175	−0.2458
26-29 y old	−0.7218	−1.0798	0.6012	−0.0925	1.2221	1.6308	0.0697	−0.3524	−0.1166	0.8344
30-34 y old	1.0820	−0.7282	1.6134	1.9023	−1.1970	−0.8242	−0.3321	−0.6949	−0.5513	−1.1004
35-39 y old	1.9749	−0.1501	−2.2597	1.1689	1.0707	−1.6560	−0.4619	1.7538	0.5980	1.3888
40 yold <	2.7504	0.9218	−0.6127	−2.7973	−0.5625	1.3304	0.7534	−1.3564	0.5168	−1.3126
< 1 y (Year)	−0.6859	3.1040	1.5308	1.2312	1.3254	−0.3169	1.2676	−0.6120	0.5113	1.1755
2-3 y (Year)	−1.2855	0.3929	−0.9049	−0.3897	−1.0577	−0.6612	−0.6187	0.0330	−0.3117	0.0758
4-5 y (Year)	−0.5215	−1.1379	1.3355	−1.1850	1.0242	1.5654	0.6843	0.4330	0.0279	−0.3006
6-9 y (Year)	0.6688	−1.7423	0.7512	2.2300	−0.0432	−0.2164	−0.4197	−0.3885	−0.1655	0.4916
10 y < (Year)	2.5491	0.4144	−1.3102	−0.7852	0.1154	−0.0992	0.0744	0.1766	0.3928	−0.9011
Well-known large company (Reason)	−0.6118	−0.1310	−0.5864	−0.5949	0.3246	0.0699	−0.2975	2.1440	−0.4792	0.0631
Policy and mission (Reason)	0.0439	0.9068	0.7744	−0.5016	−0.5511	−0.2326	−0.1438	−0.8464	0.9481	−2.4441
Salary (Reason)	2.4256	1.8927	−3.5531	−6.2062	−0.3018	0.9509	−9.7162	−5.3253	−2.5355	7.3906
Employment terms (Reason)	0.9048	1.8006	−0.3656	−0.8347	1.4066	2.0203	1.3972	0.1508	−1.5361	0.3905
Personal development (Reason)	−0.4640	0.3145	−0.2069	1.5017	0.3657	0.3772	−1.0859	−0.3005	0.8385	−0.8069
Training system (Reason)	−0.8604	2.5081	0.9257	2.7636	−2.6305	2.1134	0.8259	4.1287	9.6610	11.3803
Convenient commute (Reason)	0.0982	−0.5625	−1.0533	0.3037	0.1526	−0.2367	1.7593	−0.1150	−2.0538	0.3912
Recommendation from others (Reason)	0.9098	−0.9758	0.1875	−0.9172	1.5783	−1.2160	0.3339	−2.5630	1.0102	2.0644
Others (Reason)	0.5997	−0.9896	2.4956	−0.2891	−2.6045	−0.0672	−0.0078	0.4197	0.2947	0.7859
80–100 pt. (Satisfaction)	0.0487	2.3588	1.5114	0.1545	0.4941	−0.0101	0.7857	0.9306	−0.6942	−0.3217
70-79 pt. (Satisfaction)	0.0290	0.4792	−0.4681	0.2735	0.0988	0.4309	−1.2325	−0.0037	−0.2673	0.4152

(Continues)

TABLE 4 (Continued)

Category	Dim. 1	Dim. 2	Dim. 3	Dim. 4	Dim. 5	Dim. 6	Dim. 7	Dim. 8	Dim. 9	Dim. 10
60-69 pt. (Satisfaction)	−0.1546	−0.7113	−1.0161	0.3825	−0.1964	0.1608	0.8931	−1.0214	0.7738	−0.0790
50-59 pt. (Satisfaction)	−0.2294	−1.3685	0.5980	−1.4462	−1.3275	0.0626	0.6388	1.9790	−0.0676	−0.9927
< 50 pt. (Satisfaction)	1.0544	−2.1654	3.1003	−0.9147	2.1570	−3.6308	−0.8255	−1.2978	−0.6122	0.9659
Salary (Dissatisfaction)	0.5550	−0.2341	−0.3420	0.5380	0.7576	0.3977	−1.3798	1.5629	−0.2765	−0.7207
Employment terms (Dissatisfaction)	−0.3286	−0.4369	−1.2608	0.2964	−0.8773	−0.4567	1.2192	−0.8073	−0.0098	−0.5773
Lack of personal development (Dissatisfaction)	−0.5670	−0.9330	0.7774	0.4793	0.5462	2.1355	−0.7402	−2.1850	0.2365	−1.9936
Evaluation by supervisor (Dissatisfaction)	0.7611	0.1537	1.6780	1.0678	−4.7507	2.4945	0.9087	3.2986	9.3032	4.5863
Training system (Dissatisfaction)	−0.7567	−0.4159	1.2328	−0.3995	−1.8567	−1.3069	0.5617	2.1507	−1.7589	−0.2932
Interpersonal relationships (Dissatisfaction)	−0.7831	−1.8435	1.0349	−2.6292	2.0099	0.1558	−0.8223	1.6740	0.4233	0.1252
Workplace circumstances (Dissatisfaction)	−0.5944	1.7700	0.1122	0.9217	3.3607	1.2647	1.4266	0.1333	0.5937	1.0796
Hard work (Dissatisfaction)	0.0248	−0.2992	−0.5615	−0.3262	−0.6831	0.0603	−0.7166	−1.7072	1.2371	0.6046
Work content issues (Dissatisfaction)	−0.0575	1.7729	1.5678	0.9034	−1.3585	1.2726	−1.2492	−1.2377	−3.9704	0.2114
Others (Dissatisfaction)	1.1913	1.5827	2.1786	−1.5084	0.8663	−2.3725	1.7792	−0.5952	−0.3442	1.1623
Salary (Important)	0.1219	−2.4762	1.5941	−2.0406	3.5335	0.6026	−2.3621	4.3411	−0.9709	−0.3183
Work content (Important)	−0.0411	0.2298	0.2387	0.1941	0.1881	0.2174	−0.6713	−0.0117	1.3917	−1.1282
Employment stability (Important)	0.7095	1.6116	−0.8157	−2.9976	−2.2419	−1.8533	−0.1667	1.9022	−0.5635	3.0698
Work schedule (Important)	−0.8327	−1.3648	−2.0919	0.4445	−0.5637	2.1285	1.3243	−0.9175	−1.7324	−2.0869
Work and family life balance (Important)	1.3813	−0.6544	−0.2875	1.6516	−1.2672	0.5459	0.9300	0.9046	−1.1461	1.6562
Workplace circumstances (Important)	−1.4653	3.1859	−0.0328	−0.1014	0.7191	2.8940	−5.7286	−3.8495	−5.5152	4.3954
Interpersonal relationships (Important)	−0.7556	0.1428	−0.4097	−0.5132	0.7418	−0.5867	1.4571	−1.0013	−0.5910	0.3113
Others (Important)	−0.2356	−1.5778	5.8809	0.0526	−2.8518	−4.4997	−4.1715	−2.8262	−2.3740	−0.3957
Stay until retirement (Future)	2.8812	1.6194	1.3147	−3.5651	−1.2187	2.5619	0.0148	−0.3642	−0.1702	−0.5023
Stay for more than 5 y (Future)	0.3242	1.3089	−0.1828	1.3624	0.4599	0.4019	0.0550	0.4935	−0.6674	−0.6243
Stay for less than 5 y (Future)	−0.6744	−0.8658	−0.4620	−0.3968	−0.6191	0.5182	−0.8380	−0.3859	−0.0013	0.4920
Undecided (Future)	0.0123	−0.3756	0.4671	−0.0620	0.5521	−1.3995	0.9360	0.0995	0.5969	0.0388

Dim, Dimension; Year, Years employed in the current workplace; Reason, Reasons for choosing current workplace; Satisfaction Level of satisfaction; Dissatisfaction, Reasons for dissatisfaction; Important, Most important work-related concerns; Future, Future work plans.

of the category scores of the samples, divided by the number of the corresponding categories, that is, by deriving the average of the category scores of each sample. The cluster analysis was conducted by trial and error—one step at a time. We divided the original samples considering gender, marital status, age (up to 35 years), and sample size (the smallest sample size became approximately 5% of the original samples). Consequently, samples of community and hospital pharmacists were split into nine clusters each to easily and comprehensibly explain the features of each cluster, including attributes and work attitude.

Considering all samples as one cluster, the average proportion of each category in each item is calculated. We defined the categories as the features of groups whose proportion exceeded more than approximately 5% when compared with the average proportion of each category—similar to concept of a radar chart. Feature categories found in each cluster are shown in Table 5.

3.5 | Cluster of community pharmacists

For community pharmacists, it was indicated that two clusters, 30- to 34-year-old married males and married males aged above 35 years, reported the highest job satisfaction, intending to remain for more than 5 years or until retirement. In contrast, one cluster, 35- to 39-year-old single females, reported the lowest job satisfaction and intended to remain for less than 5 years or were undecided.

Each community pharmacist cluster's principal features are described as follows. Features of cluster 1 (n=192) indicated that single male and female pharmacists in their early 20s expected a well-organized education; were discontented with the salary or workplace circumstances; reported 70-100 points in job satisfaction; and intended to remain for more than 5 years.

Features of clusters 2 (n=119) and 3 (n=114) indicated single males in their late 20s. Cluster 2 expressed personal development; 70-79 points in job satisfaction; dissatisfaction with work content issues; and the intent to remain for more than 5 years. In contrast, cluster 3 expressed concerns with salaries and work schedules; 50-69 points in job satisfaction; and the possibility of leaving jobs within the next 5 years. Features of clusters 1 and 2 exhibited employment stability as an important concern.

Features of clusters 4 (n=201) and 5 (n=43) indicated married men aged above 30 years of age. They expressed 80-100 points in job satisfaction and regarded concerns on work–life balance as an important factor. Cluster 4 indicated subjects in their early 30s who intended to remain for more than 5 years. In contrast, cluster 5 indicated subjects in their late 30s who intended to remain until retirement.

Features of cluster 6 (n=141) showed single females in their early 20s with 50-69 points in job satisfaction; dissatisfaction with salary; and an intent to remain for less than5 years or were undecided. Features of cluster 7 (n=174) designated single and married females in their late 20s with 50-69 points in job satisfaction; dissatisfaction with employment conditions; and concern regarding interpersonal relationships at the workplace. They did not indicate clear future work plans.

Features of cluster 8 (n=139) showed single females in their late 30s expressing concern regarding workplace relationships; less than 50 points in job satisfaction; dissatisfaction with a lack of personal development and interpersonal relationships; and the possibility of leaving within the next 5 years or a period of working undetermined. Features of cluster 9 (n=105) indicated married females over 35 years of age stating the reasons for choosing the current workplace as good working conditions and easy commuting. This cluster designated work–life balance as being important to consider, planned to remain until retirement, or were undecided, and had 50-69 points in job satisfaction.

3.6 | Cluster of hospital pharmacists

For hospital pharmacists, it was found that one cluster, 22- to 25-year-old single males, reported the highest job satisfaction, intending to remain for more than 5 years. However, one cluster, 30- to 34-year-old married males, reported the lowest job satisfaction and undecided a period of working at workplace.

The major features of hospital pharmacist clusters are described as follows. Features of cluster 1 (n=32) indicated bachelor males in their early 20s who reported 80-100 points in job satisfaction; expectations for training and compatible workplace policies; and plans to remain for more than 5 years. But they expressed dissatisfaction with workplace circumstances. Features of cluster 2 (n=31) indicated a mix of new and skilled single males in their late 20s and reported 70-79 points in job satisfaction. They indicated an expectation of personal development; dissatisfaction with the salary and workplace circumstances; and the intention to remain for more than 5 years.

Features of cluster 3 (n=27) indicated married males in their early 30s who reported <59 points in job satisfaction; dissatisfaction with employment education and human relationships at the workplace; and salary concerns. They did not indicate clear future work plans. Features of cluster 4 (n=44) showed married men in their 30s who reported 60-69 points in job satisfaction and dissatisfaction with salary and considered work–life balance as an important factor. They intended to remain for more than 5 years.

Features of cluster 5 (n=91) indicated single females in their early 20s who reported 60-69 points in job satisfaction; were dissatisfied with employment conditions and education; and considered interpersonal relationships to be an important factor. Features of cluster 6 (n=59) indicated single females in their late 20s who showed 50-59 points in job satisfaction. They revealed dissatisfaction with human relationships in the workplace. Features of cluster 7 (n=33) indicated a mix of new and skilled single female pharmacists with a 60-69 points in job satisfaction. They gave convenient commuting as the reason for choosing the current workplace and considered the work schedule as being important. Clusters 5, 6, and 7 indicated the possibility of leaving within 5 years.

Features of cluster 8 (n=60) showed married females in their early 30s who had 60-69 points in job satisfaction and considered concern for work–life balance to be important. Reasons for choosing the current workplace included personal development and dissatisfaction

TABLE 5 Cluster analysis of community pharmacists and hospital pharmacists

Community pharmacist (n=1,228)

Cluster	1	2	3	4	5	6	7	8	9
n	192	119	114	201	43	141	174	139	105
Gender	Male & female	Male	Male	Male	Male	Female	Female	Female	Female
Marital status	Single	Single	Single	Married	Married	Single	Single & married	Single	Married
Age (years)	22-25	26-29	26-29	30-34	35<	22-25	26-29	35-39	35<
Year (years)	<1	4-5	2-3	6-9	10<	<3	4-9	–	10<
Reasons	LC, ETS	WKL, PM, OPD	WKL, LC, SLY	ETC.	RSF	ETS, CC	WKL, ETS	RSF, Other	ETC, CC
Job satisfaction	70-100	70-79	50-69	80-100	80-100	50-69	50-69	<50	50-69
Dissatisfaction	WPC, SLY	WCI	ETC., ETS	Other	ETC., WCI	SLY	ETC.	LPD, IR	–
Important	IR, EMS	WCO, EMS	SLY, WS	WLB	WCO, WLB	WCO, IR	IR	WCO, IR	WLB
Future (years)	5↑	5↑	5↓	5↑	URT	5↓, UND	UND	5↓, UND	UTR, UND

Hospital pharmacist (n=419)

Cluster	1	2	3	4	5	6	7	8	9
n	32	31	27	44	91	59	33	60	42
Gender	Male	Male	Male	Male	Female	Female	Female	Female	Male & female
Marital status	Single	Single	Married	Married	Single	Single	Single	Married	Married
Age (years)	22-25	26-29	30-34	30-39	22-25	26-29	26-29	30-34	40<
Year (years)	<1	1<, 4-5	4-9	6<	2-3	4-5	2-3, 6-9	6-9	10<
Reasons	PM, ETS	ETC., OPD	RSF, Other	CC	WKL	WKL	CC	OPD, Other	PM, Salary. ETC.
Job satisfaction	80-100	70-79	<59	60-69	60-69	50-59	60-69	60-69	70-79
Dissatisfaction	WPC, WCO, Other	SLY, WPC	ETS, IR, Other	SLY	ETC., ETS	IR	ETC.	EM	SLY, HW
Important	WPC, IR	WCO	SLY, Other	WLB	IR	SLY, IR	WS	WLB	EMS
Future (years)	5↑	5↑	UND	5↑	5↓	5↓, UND	5↓	5↑	URT

The above categories were selected, the proportion of which exceeded 5% when compared with the average proportion of each category in each item. Year, Years employed in the current workplace; Reasons, Reasons for choosing current workplace; CC, Convenient commute; ETC, Employment terms and conditions; ETS, Employee training system; LC, Listed company; OPD, Opportunity for personal development; PM, Policy & mission; RSF, Recommendation from senior or friend; SLY, Salary; WKL, Well-known large company/hospital; Dissatisfaction, Reasons for dissatisfaction; EM, Evaluation of myself; ETC, Employment terms and conditions; ETS, Employee training system; HW, Hard work; IR, Interpersonal relationships; LPD, Lack of personal development; SLY, Salary; WCI, Work content issues; WCO, Work content; WPC, Workplace circumstances; Important, Most important work-related concerns; EM, Evaluation of myself; EMS, Employment stability; IR, Interpersonal relationships; SLY, Salary; WCO, Work content; WLB, Work and family life balance; WPC, Workplace circumstances; WS, Work schedule; Future, Future work plans; 5↓, Stay for less than five years; 5↑, Stay for long term (more than five years); URT, Until retirement; UND, Undecided.

with evaluation toward them by management. Features of cluster 9 (n=42) designated married males and females over 40 years old who had a 70-79 points in job satisfaction and a concern over their employment stability and who considered the salary unsatisfactory. Clusters 8 and 9 planned to remain for at least 5 years or until retirement.

4 | DISCUSSION

Retention of pharmacists is very important for pharmacy management. Staff turnover makes it difficult for the remaining pharmacists. Pharmacists with low levels of satisfaction intended to leave their jobs within the next 5 years [5,6] This tendency is also described in overseas studies.[15,16] In our study, clusters of job satisfaction remain at levels of less than 69 points, and future work plans to remain for less than 5 years or unclear are exhibited by four clusters of community pharmacists: clusters 8 (35- to 39-year-old single females), 3 (26- to 29-year-old single males), 6 (22- to 25-year-old single females), and 7 (26- to 29-year-old single/married females) in the order of low-level job satisfaction. There are also four clusters among hospital pharmacists: clusters 3 (30- to 34-year-old married males), 6 (26- to 29-year-old single females), 5 (22- to 25-year-old single females), and 7 (26- to 39-year-old single females).

The four clusters of community pharmacists indicate ages below 39 years. Focusing on the dissatisfaction category, cluster 1 indicates a lack of personal development and interpersonal relationships, that is, internal factors. Clusters 3, 6, and 7 indicate salary, employment terms and conditions, or employee training systems, that is, external factors. It seems that pharmacists in cluster 8 might change their degree of job satisfaction or future work plans in response to career development and good relationships among colleagues.

Four clusters of hospital pharmacists showing ages below 34 years (clusters 3, 6, and 5) indicate dissatisfaction with interpersonal relationships, that is, internal factors. The very stressful daily practice at the hospital pharmacy might affect this. Conversely, clusters 3 and 7 indicate employment terms and conditions or the employee training system, that is, external factors—just as community pharmacists expressed. Forming good human relationships with each other at a pharmacy might not only be able to change the level of job satisfaction or plans regarding future work but also influence the medical teams that pharmacists work with.

Some studies outside Japan might support this study with regard to job satisfaction and future work plans. Increasing the degree of job satisfaction appears to decrease the incidence of seeking alternative employment.[16] One of the reasons for remaining in a job is good human relationships among pharmacy coworkers.[17] Conditions with family-friendly flexible work hours might be more effective in retaining a steady workforce than increasing salaries.[18] Increasing pharmacists' motivation affected job satisfaction and intention to leave work places.[15] However, it was indicated that it is characteristic for pharmacists to be inclined to change workplaces because of stress or a desire for change.[17]

We confirmed that pharmacists' attitudes toward work varied depending on their age, marital status, and experience.[3,9] Clustering work attitudes among pharmacists has been reported in a few studies outside Japan. Practicing pharmacists were classified into five groups based on the relationship between job satisfaction and turnover: The "unsatisfied group" was 20 times more likely than the "satisfied group" to leave current employment within one year.[19] Motivation factors of young pharmacists in the Ukraine were divided into two clusters, which were to work at being motivated to operate a privately owned pharmacy.[20] The level of occupational satisfaction among pharmacists with PharmD degree was lower than that among pharmacists with bachelor's degree.[21] References to our clustering work attitudes among pharmacists could not be found in Japanese studies.

Pharmacists can be practicing daily, calmly, and sincerely, focusing on good patient care as medical professionals. However, each one works with specific expectations, concerns, and levels of satisfaction or dissatisfaction, depending on age, marital status, and experience. For good medical service to patients, pharmacists need to be satisfied with their jobs.[1] It is expected that, then, staff pharmacists, supervising pharmacists, and pharmacy or hospital managements will ensure an atmosphere of positive, mutual work attitudes for smooth daily operation.

According to Dr. Hayashi, "Quantification does not mean finding numerical values but giving them patterns on the operational point of view in a proper sense.[11] In this sense, quantification has no absolute meaning but relative meaning to our purpose."[11] "For example, 'Kan' (efficient subjective judgment of experts) will be able to be analyzed and treated quantitatively and so to become a common property to us."[11]

We attempted to explore the pharmacists' work attitudes using clustering. This might not be sufficient, but we hope that this study will serve as a basis for further study.

4.1 | Limitations

These samples do not represent the Japanese community and hospital pharmacies in their entirety. Quantification Theory 3 and cluster analysis are very useful methods in exploratory analysis for grasping a group's features. However, the classification of groups and the interpretation of each group are affected by the analyst and are not absolute or objective. This study is essentially a pilot study for further research.

5 | CONCLUSIONS

This study used clustering to examine how pharmacists of different ages, marital statuses, and experience felt regarding their work. The relationship between job satisfaction and future work plans was clarified. Job satisfaction and human relationships are significant in considering future work plans of practicing pharmacists. Pharmacy staff, supervisors, and managers of community or hospital pharmacies must recognize features of pharmacists' work attitudes for offering high-quality service to patients.

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CONFLICT OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

REFERENCES

1. Onda M, Matsuda T, Yamakado K. Factors influencing pharmacist job satisfaction in hospitals – observations based on comparison among professionals. Jpn J Soc Pharm. 2007;25:9–18.
2. Morifuji C. Employee satisfaction. (in Japanese) Pharma Next. 2008;60:57–59.
3. Okumoto K, Sanagawa H, Armstrong EP, Makimura M. Assessment of Japanese pharmacists' perceptions towards community pharmacy. Jpn J Pharm Health Care Sci. 2006;32:146–53.
4. Saitoh H, Umemura M. Report of results regarding survey of introducing pharmacists' specialist – hospital pharmacist association oncology study. (in Japanese) Aichi Prefecture J Hosp Pharm. 2003;31:53–6.
5. Nakagomi K, Kameya T, Fukai K, Yamada N, Kanno N. Survey of attitude toward work among pharmacists working in large chain community pharmacies in Japan. Jpn J Pharm Health Care Sci. 2011;37:97–103.
6. Nakagomi K, Takahashi S, Hayashi Y. Survey of attitudes toward work among pharmacists working in large group hospitals. Gen Med. 2013;14:23–31.
7. Mott DA, Doucette WR, Gaither CA, Pedersen CA, Schommer JC. Pharmacists' attitude toward worklife: results from a national survey of pharmacists. J Am Pharm Assoc. 2004;44:326–36.
8. Mott DA. Pharmacist job turnover, length of service, and reasons for leaving. 1983–1997. Am J Health Syst Pharm. 2000;57:975–84.
9. Gaither CA, Nadkarni A, Mott DA, et al. Should I stay or should I go? The influence of individual and organizational factors on pharmacists' future work plans. J Am Pharm Assoc. 2007;47:165–73.
10. Ministry of Health, Labour and Welfare. Ethical Guidelines for Medical and Health Research Involving Human Subjects. Available at: http://www.mhlw.go.jp/file/06-Seisakujouhou-10600000-Daijinkanbouk-ouseikagakuka/0000080278.pdf. Accessed October 18, 2016.
11. Hayashi C. Multidimensional quantification. I Proc Japan Acad. 1954;30:61–5.
12. Hayashi C, Suzuki T. Quantitative approach to a cross-societal research; a comparative study of Japanese character Part II. Ann Inst Statist Math. 1975;27:1–32.
13. Institute of Statistical Analysis, Inc. Quantification Theory 3. Available at: http://istat.co.jp/ta_commentary/method3_03. (in Japanese) Accessed February 24, 2016.
14. Koshio S. Analysis of Psychological Research Data by SPSS and Amos: Factor Analysis and Covariance Structure Analysis. (in Japanese) Tokyo: Tokyotosho; 2004: 29.
15. Seston E, Hassell K, Ferguson J, Hann M. Exploring the relationship between pharmacists' job satisfaction, intention to quit the profession, and actual quitting. Res Social Adm Pharm. 2009;5:121–32.
16. Gaither CA. Career commitment: a mediator of the effects of job stress on pharmacists' work-related attitudes. J Am Pharm Assoc. 1999;39:353–61.
17. Maio V, Goldfarb NI, Hartmann CW. Pharmacists' job satisfaction: variation by practice setting. P&T. 2004;29:184–90.
18. Gidman W, Day J, Hassell K, Payne K. Delivering health care through community pharmacies: are working conditions deterring female pharmacists' participation? J Health Serv Res Policy. 2009;14:141–9.
19. Hardigan P, Sangasubana N. A latent class analysis of job satisfaction and turnover among practicing pharmacists. Res Social Adm Pharm. 2010;6:32–8.
20. Anzenberger P, Popov SB, Ostermann H. Factors that motivate young pharmacists to work in rural communities in the Ukraine. Rural Remote Health. 2011;11:1509.
21. Munger AM, Gordon E, Hartman J, Vincent K, Feehan M. Community pharmacists' occupational satisfaction and stress: a profession in jeopardy? J Am Pharm Assoc. 2013;53:282–96.