education sciences

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What Are the Important Qualities and Abilities of Future Doctors? A Nationwide Attitude Survey in Japan

Junji Otaki [1,*], Yoko Watanabe [2], Yoshimi Harada [1] and Hiroshi Mitoma [1]

[1] Department of Medical Education, Faculty of Medicine, Tokyo Medical University, Tokyo 160-0023, Japan
[2] College of Creative Studies, Niigata University, Niigata 950-2181, Japan
* Correspondence: jotaki@tokyo-med.ac.jp

Abstract: What qualities and abilities are appropriate for a person who plans to become a doctor? To answer this question, it is meaningful to understand the opinions of the general public, since they are important stakeholders in the training of doctors. As part of a national door-to-door questionnaire survey, participants were asked about 16 qualities and abilities they considered suitable for becoming a doctor. Of the 1200 people interviewed, 1190 responded. The ratio of affirmative answers was the highest (92.2%) for the "Accurately judges situations" element, followed by "Cares about others' feelings" (87.4%), "Understands the reality of medical care and welfare" (87.2%), and "Resistant to mental stress" (86.2%). "High academic ability", which is currently the most important factor in the actual selection of students, ranked ninth among the sixteen elements (71.8%). Aside from academic ability, the general public places importance on other factors in selecting students for admission to medical schools. This study provides a valuable reference for medical schools regarding admission policies and applicant selection processes.

Keywords: medical education; qualities and abilities; entrance examination; medical school; academic ability; general public's attitudes; nationwide survey; questionnaire

Citation: Otaki, J.; Watanabe, Y.; Harada, Y.; Mitoma, H. What Are the Important Qualities and Abilities of Future Doctors? A Nationwide Attitude Survey in Japan. *Educ. Sci.* **2024**, *14*, 533. https://doi.org/10.3390/educsci14050533

Academic Editors: Daniel Muijs, Sandra Raquel Gonçalves Fernandes, Marta Abelha and Ana Teresa Ferreira-Oliveira

Received: 16 November 2023
Revised: 7 May 2024
Accepted: 13 May 2024
Published: 14 May 2024

1. Introduction

Selecting students for medical schools is a crucial process because most successful applicants will eventually become doctors, and they must possess the qualities deemed important by the public they will serve. In a reference book for medical school teachers, McManus and Sondheimer state that the objective of the selection process is to "choose the best student" and to pick the student best suited for the mission of the medical school [1]. Even though the mission varies depending on the school, it is important to confirm that applicants have the basic academic skills and study habits that will enable them to keep up with their studies after admission. It is also important to select individuals with the qualities and abilities suitable for becoming a doctor. These are common objectives in selecting applicants for medical school.

Internationally, various methods are used in medical entrance exams, including academic ability tests and soft skill measurement. Research is ongoing to examine the advantages and disadvantages of each method. Discrimination by conventional exams against diverse groups has also been highlighted as an issue requiring resolution [2].

Furthermore, if the pool of applicants is small, few will possess the necessary abilities, and an imbalance in those abilities will occur. Thus, the number of successful applicants suitable for the mission may not reach the admission quota. In Japan, the number of applicants to dental schools has decreased to approximately twice the admission capacity, and the actual number of admissions is below capacity in some dental schools [3]. Hence, in the selection process, sufficiently talented individuals should be enticed to take the entrance examinations [4].

Our study indicates that numerous high school students in Japan hesitate to apply to medical school because they are economically disadvantaged or live in areas far from the

city [5]. This phenomenon reflects the competitive situation in Japan, where each university administers its own academic examinations, and those in an environment with special measures to prepare for such examinations have an advantage. In the selection process for medical schools, economic and residential disparities reduce the candidate population. Additionally, candidates are not evaluated on parameters other than their academic ability. This questions what qualities and abilities should be emphasized. Furthermore, how much weight should be placed on academic ability compared with other qualities and skills? In Japan, all citizens except those in economic poverty financially support medical care through insurance premiums, taxes, and, occasionally, co-payments. In addition, patients' trust in the abilities of medical professionals is vital. Therefore, we considered the general public an important stakeholder in healthcare and deemed it meaningful to seek the opinions of the general public regarding this issue.

The Canadian Medical Education Directives for Specialists (CanMEDS) framework [6] is an internationally recognized framework for identifying the competencies required of medical professionals. In undergraduate medical education, the Model Core Curriculum for Medical Education in Japan stipulates the "Basic Qualities and Abilities Required of a Physician [7]". The committee responsible for its development included a representative from a patient advocacy group. However, no information existed indicating that the committee had surveyed the opinions of patients and the general public. To the best of our knowledge and review of the literature, there has been no survey conducted in Japan such as that in this study ascertaining the opinions of the general public. This survey aims to understand the Japanese public's attitude toward the qualities and abilities required for future doctors, which will serve as basic information when considering selection methods for future medical school entrance exams.

2. Materials and Methods

2.1. Survey Procedures

The survey for the current study was part of the National Omnibus Survey (NOS) [8] by Nippon Research Center Ltd. (NRC), Tokyo, Japan, which is conducted regularly by the NRC. According to the population data reported in the 2015 census, the NOS had nine regional blocks (Hokkaido, Tohoku, Kanto, Hokuriku, Tokai, Kinki, Chugoku, Shikoku, and Kyushu) and four divisions by city size (major cities [21 in total], places with populations of 150,000 or more, those with a population of less than 150,000, and rural areas). These were divided into 36 strata, and the number of survey points (200 in total) in each stratum was determined proportional to the population. Specific survey points were assigned to each stratum using the equal interval extraction method based on the residential map database. At each survey point, 30 households were selected using the same random sampling method. Subsequently, the NOS investigator visited the selected households and asked residents to participate in the survey, and six people who agreed were surveyed. These six people were selected according to the gender and age composition of each regional block population. In the absence of suitable participants within the survey point, other samples were selected from households in the same municipality. From 27 November to 9 December 2020, NRC investigators visited the participants individually. Questionnaires were given to respondents and collected later.

This survey was conducted after receiving ethical approval from the Institutional Review Board of Tokyo Medical University (T2020-0215) on 17 October 2020.

2.2. Survey Items

Table 1 shows the items and categories surveyed as attributes of the respondents.

Similar studies were not found; thus, we conducted an exploratory investigation. We examined whether attitudes differ depending on region, residential city size, medical professional experience, age, gender, economic status, and academic background.

Table 1. Items and categories surveyed as attributes of the respondents.

Region	
Region	**Prefecture**
Hokkaido	Hokkaido
Tohoku	Aomori, Iwate, Miyagi, Akita, Yamagata, and Fukushima
Kanto	Ibaraki, Tochigi, Gunma, Saitama, Chiba, Tokyo, Kanagawa, Yamanashi, and Nagano
Hokuriku	Niigata, Toyama, Ishikawa, and Fukui
Tokai	Gifu, Shizuoka, Aichi, and Mie
Kinki	Shiga, Kyoto, Osaka, Hyogo, Nara, and Wakayama
Chugoku	Tottori, Shimane, Okayama, Hiroshima, and Yamaguchi
Shikoku	Tokushima, Kagawa, Ehime, and Kochi
Kyushu	Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima, and Okinawa
Residential city size	
21 major cities: Tokyo Special Ward and 20 ordinance-designated cities	
Population of 150,000 or more (excluding 21 large cities)	
Population of less than 150,000	
Towns and villages	
Medical professional experience	
Currently engaged in a medical profession	
Previously engaged in a medical profession	
Students aiming to become medical professionals	
No experience in the medical profession	
Age (in years)	
15–19	
20–29	
30–39	
40–49	
50–59	
60–69	
70–79	
Gender	
Man	
Woman	
Annual household income	
Less than JPY 3 million (less than USD 28,850) *	
JPY 3–4 million (USD 28,850–38,460)	
JPY 4–5 million (USD 38,460–48,080)	
JPY 5–6 million (USD 48,080–57,690)	
JPY 6–7 million (USD 57,690–67,310)	
JPY 7–8 million (USD 67,310–76,920)	
JPY 8–10 million (USD 76,920–96,150)	
JPY 10–12 million (USD 96,150–115,380)	
JPY 12 million or more (USD 115,380 or more)	
Highest education attained	
Elementary or junior high school	
High school	
Junior college or vocational school	
University or graduate school	

* The exchange rate at the time of the survey was approximately JPY 104 to USD 1.

Based on past research [1,2,5,9–12], discussions at international symposiums [13], and discussions among authors, we developed 16 possible elements that indicated the vital qualities and abilities for becoming a doctor (Table 2). The elements were listed to respondents with the question, "What elements do you think indicate the qualities and

abilities that are important for becoming a doctor?" We excluded elements that most people seem to attach importance to, such as "obey the law", "behave ethically", and "do no harm to others".

Table 2. Sixteen elements indicating the qualities and abilities suitable for becoming a doctor.

(1) Accurately judges situations
(2) Cares about others' feelings
(3) Physically strong
(4) Demonstrates leadership
(5) Resistant to mental stress
(6) Strong desire to contribute to society
(7) High academic ability (determined by the score deviation in the written tests of the entrance examination)
(8) Understands the reality of medical care and welfare
(9) High-level communication skills
(10) Experience of illness or disability
(11) Experience working as a member of society
(12) Experience working as a volunteer
(13) Participates in events and extracurricular activities
(14) Excels in other areas such as art or sports
(15) Shows consideration for vulnerable people
(16) Experience living in regions with few doctors

In Japan, mock examinations for university entrance examinations by preparatory schools are widely conducted, and the results are generally shown as the deviation of one's score from the scores of all examinees. This way of measuring "high academic ability" does not fully capture cultivated academic ability. To clarify this, we added the annotation "determined by the score deviation in the written tests of the entrance examination" to element (7).

A total of 1200 people were asked whether they thought each element was important. Respondents answered based on a 7-point Likert scale: 1 = "Strongly disagree", 2 = "Disagree", 3 = "Somewhat disagree", 4 = "No opinion", 5 = "Somewhat agree", 6 = "Agree", and 7 = "Strongly agree".

2.3. Analysis

We tabulated and examined the responses by combining replies of "strongly agree", "agree", and "somewhat agree" as positive answers and calculated their ratio to the total number of answers. We scored the 7-point Likert scale at 1-point intervals (1 = strongly disagree, 7 = strongly agree) and calculated their mean and standard deviation.

In analyzing the proportion of positive answers, the percentage was calculated using the total number of positive answers as the numerator and the total number of survey subjects (1200) as the denominator. The number of responses other than positive answers was the sum of "No opinion", negative answers, and non-answers. When scoring the responses and calculating their average value, we excluded non-respondents.

2.3.1. Comparison among Elements

Regarding the ratio of positive answers and mean scores, we tested the hypothesis that no difference between the elements existed. Differences in ratios were tested by the paired-sample proportion test, and differences in mean scores were tested by the *t*-test. The significance level was set at 5% for both tests.

2.3.2. Comparison among Categories

Regarding the ratio of positive answers for each element, we also tested the hypothesis that no difference existed between the categories. Differences were tested by the paired-sample proportion test. The significance level was set at 5%, and Bonferroni correction was applied depending on the number of category combinations.

In addition, we combined certain categories of region and categories of medical professional experience that had few respondents. We condensed the annual household income and educational background into two categories to divide the respondents equally for comparison purposes. The combined categories are listed in Table 3.

Table 3. Categories integrated for analysis.

Regions (nine categories combined into five)
Hokkaido + Tohoku Kanto Hokuriku + Tokai Kinki Chugoku + Shikoku + Kyushu
Medical professional experience (four categories combined into two)
Currently engaged + previously engaged + students aiming to become medical professionals → Have experience in the medical profession No experience in the medical profession
Annual household income (nine categories combined into two)
Less than JPY 5 million (USD 48,080 *) JPY 5 million or more
Highest education attained (four categories combined into two)
Elementary/junior high school + high school → high school or lower Junior college/vocational school + university/graduate school → higher than high school

* The exchange rate at the time of the survey was approximately JPY 104 to USD 1.

2.3.3. Factor Analysis

A factor analysis was conducted to determine whether the tendencies of responses to the 16 elements could be grouped into several factors. The principal factor method was used for factor extraction, and the varimax method with Kaiser's normalization was used for rotation. The statistical analysis software NRC-CORE (version 1.3.13) was used for these analyses except for the mean value differences, for which IBM SPSS Statistics Analysis (version 28.0.0) was adopted.

3. Results

3.1. Respondents' Attributes

Responses were received from 1190 people. The attributes of all respondents are shown in Table 4.

Table 4. Respondents' attributes. (n = 1200 *).

Region †
Hokkaido + Tohoku: 132 (11.0%) Kanto: 444 (37.0%) Hokuriku + Tokai: 192 (16.0%) Kinki: 192 (16.0%) Chugoku + Shikoku + Kyushu: 240 (20.0%)
Residential city size
Twenty-one major cities—Tokyo Special Ward and 20 ordinance-designated cities: 348 (29.0%) Population of 150,000 or more (excluding 21 large cities): 378 (31.5%) Population of less than 150,000: 372 (31.0%) Towns and villages: 102 (8.5%)

Table 4. *Cont.*

Medical professional experience †
Having experience in the medical profession: 118 (9.8%) No experience in the medical profession: 1047 (87.3%) No answer: 35 (2.9%)
Age (in years)
15–19: 74 (6.2%) 20–29: 148 (12.3%) 30–39: 187 (15.6%) 40–49: 221 (18.4%) 50–59: 186 (15.5%) 60–69: 224 (18.7%) 70–79: 160 (13.3%)
Gender
Man: 592 (49.3%) Woman: 608 (50.7%)
Annual household income †
Less than JPY 5 million (USD 48,080 ‡): 471 (39.3%) JPY 5 million or more: 591 (49.3%) No answer: 138 (11.5%)
Highest educational qualification attained †
High school or lower: 562 (46.8%) Higher than high school: 632 (52.7%) No answer: 6 (0.5%)

* Including 10 people who answered questions about attributes but did not answer our questions. † Some categories were combined (see Table 3). ‡ The exchange rate at the time of the survey was approximately JPY 104 to USD 1.

3.2. Aggregate Results for All Respondents

Table 5 shows the aggregate results for all respondents.

Table 5. Ratio of positive respondents and mean score for each element.

Elements Indicating the Qualities and Abilities Suitable for Becoming a Doctor	Positive Responses *		Mean ± SD of the Score
	Number (Total = 1200 †)	Ratio (%)	
(1) Accurately judges situations	1106	92.17 ‡	6.24 ± 0.96 §
(2) Cares about others' feelings	1049	87.42 ‡	6.04 ± 1.11 §
(3) Physically strong	1022	85.17 ‡	5.85 ± 1.15 §
(4) Demonstrates leadership	822	68.50	5.25 ± 1.31
(5) Resistant to mental stress	1034	86.17 ‡	5.90 ± 1.12 §
(6) Strong desire to contribute to society	948	79.00 ‡	5.72 ± 1.26 §
(7) High academic ability ‖	862	71.83	5.33 ± 1.29
(8) Understands the reality of medical care and welfare	1046	87.17 ‡	5.92 ± 1.13 §
(9) High-level communication skills	981	81.75 ‡	5.76 ± 1.23 §
(10) Experience of illness or disability	391	32.58	4.15 ± 1.45
(11) Experience working as a member of society	472	39.33	4.36 ± 1.45
(12) Experience working as a volunteer	526	43.83	4.43 ± 1.45
(13) Participates in events and extracurricular activities	475	39.58	4.30 ± 1.42

Table 5. *Cont.*

Elements Indicating the Qualities and Abilities Suitable for Becoming a Doctor	Positive Responses *		Mean ± SD of the Score
	Number (Total = 1200 †)	Ratio (%)	
(14) Excels in other areas such as art or sports	208	17.33	3.61 ± 1.39
(15) Shows consideration for vulnerable people	992	82.67 ‡	5.79 ± 1.26 §
(16) Experience living in regions with few doctors	556	46.33	4.57 ± 1.51

* Positive responses include respondents who selected 5 = "Somewhat agree", 6 = "Agree", and 7 = "Strongly agree". † Including 10 people who answered questions about attributes but did not answer our questions. ‡ The ratio is significantly higher than that of "(7) High academic ability". § The mean value is significantly higher than that of "(7) High academic ability". ‖ Determined by the score deviation in the written tests of the entrance examination (see Table 2).

The element with the highest ratio of positive answers was "Accurately judges situations" (92.2%), followed by "Cares about others' feelings" (87.4%), "Understands the reality of medical care and welfare" (87.2%), "Resistant to mental stress" (86.2%), and "Physically strong" (85.2%). "High academic ability", which is currently the most important factor in the actual selection of students, ranked ninth (71.8%) among the sixteen items. The same trend was observed in the ratio of "strongly agree" responses to the total affirmative responses. "High academic ability" ranked 10th (19.9%). Furthermore, almost the same ranking was derived for the average values obtained by scoring the responses.

3.3. Results of the Stratified Analysis

Table 6 shows the main results of the stratified analysis of the ratios of positive answers. The hypothesis that no difference existed between the categories of the element was rejected in 41 combinations with Bonferroni-corrected significance levels.

Few elements showed significant differences in terms of region, and no definite trend was observed. Regarding residential city size, the ratio of positive answers for the element of "High academic ability" was significantly higher in other groups than in rural areas. For those with experience in the medical profession, significantly higher ratios of positive answers were found in five elements compared with those with no experience. For the age category, six elements tended to receive more positive opinions among those aged 60 years and above. By gender, women scored significantly higher than men on 10 elements for the ratio of positive answers. In terms of annual household income, the ratio of positive answers for three elements was significantly higher in the group of JPY five million or more. Regarding the highest education attained, no significant differences were observed.

Table 6. Elements with significant differences in positive answer ratio according to respondents' categories of attributes.

Respondents' Attributes	Elements *	Differences between Categories †	*p*-Value	Level of Significance ‡
Region	(5)	Kinki (92.19%) > Hokuriku + Tokai (82.29%)	0.0037	0.005
		Kinki (92.19%) > Chugoku + Shikoku + Kyushu (82.08%)	0.0022	
	(8)	Kanto (89.19%) > Chugoku + Shikoku + Kyushu (81.25%)	0.0038	
	(13)	Kinki (50.00%) > Kanto (34.91%)	0.0004	
Residential city size	(1)	Twenty-one major cities (93.68%) > towns and villages (85.29%)	0.0067	0.0083
	(7)	Twenty-one major cities (71.26%) > towns and villages (54.90%)	0.0019	
		Population of 150,000 or more § (76.72%) > towns and villages (54.90%)	0.00001	
		Population of less than 150,000 (72.04%) > towns and villages (54.90%)	0.001	

Table 6. *Cont.*

Respondents' Attributes	Elements *	Differences between Categories †	*p*-Value	Level of Significance ‡
Medical professional experience	(2)	Have experience (95.76%) > no experience (86.82%)	0.005	0.0167
	(9)	Have experience (94.92%) > no experience (80.61%)	0.0001	
	(10)	Have experience (43.22%) > no experience (31.23%)	0.0084	
	(12)	Have experience (56.78%) > no experience (42.31%)	0.0028	
	(13)	Have experience (52.54%) > no experience (37.92%)	0.0021	
Age (in years)	(2)	60–69 (91.96%) > 20–29 (79.73%)	0.0006	0.0023
	(3)	50–59 (89.25%) > 30–39 (77.01%) 60–69 (90.63%) > 20–29 (78.38%) 60–69 (90.63%) > 30–39 (77.01%)	0.0016 0.0009 0.0001	
	(4)	60–69 (76.34%) > 30–39 (61.50%)	0.0011	
	(6)	50–59 (84.95%) > 20–29 (70.27%) 50–59 (84.95%) > 30–39 (68.98%) 60–69 (86.61%) > 20–29 (70.27%) 60–69 (86.61%) > 30–39 (68.98%) 70–79 (85.00%) > 20–29 (70.27%) 70–79 (85.00%) > 30–39 (68.98%)	0.0012 0.0003 0.0001 0.00001 0.0002 0.0005	
	(9)	60–69 (87.05%) > 15–19 (70.27%) 60–69 (87.05%) > 20–29 (73.65%)	0.0009 0.0011	
	(16)	60–69 (54.91%) > 30–39 (39.57%) 70–79 (56.88%) > 30–39 (39.57%)	0.0019 0.0013	
Gender	(1)	Woman (94.08%) > man (90.20%)	0.0125	0.05
	(2)	Woman (90.30%) > man (84.46%)	0.0023	
	(3)	Woman (88.32%) > man (81.93%)	0.0018	
	(4)	Woman (73.68%) > man (63.18%)	0.0001	
	(5)	Woman (89.97%) > man (82.26%)	0.0001	
	(6)	Woman (83.55%) > man (74.32%)	0.0001	
	(7)	Woman (76.32%) > man (67.23%)	0.0005	
	(8)	Woman (89.97%) > man (84.29%)	0.0033	
	(9)	Woman (84.70%) > man (78.72%)	0.0073	
	(15)	Woman (85.03%) > man (80.24%)	0.0282	
Annual household income	(9)	JPY 5 million or more ‖ (85.79%) > less than JPY 5 million (79.41%)	0.0060	0.0167
	(11)	JPY 5 million or more (43.15%) > less than JPY 5 million (35.88%)	0.0163	
	(15)	JPY 5 million or more (86.29%) > less than JPY 5 million (80.25%)	0.0082	

* See Table 2 for the contents of elements. † Some categories were combined, as presented in Table 3. ‡ After Bonferroni correction, i.e., 0.05/number of tests for difference in proportions. § Excludes 21 large cities. ‖ The exchange rate at the time of the survey was approximately JPY 104 to USD 1.

3.4. Results of the Factor Analysis

To determine whether the tendencies of responses to the 16 elements could be grouped into several factors, we conducted a factor analysis. Table 7 shows the results of it. We analyzed the responses of 1173 people who answered all 16 elements.

The 16 items could be grouped into two factors, with 10 elements having a relatively strong relationship with the first factor. That group included "Accurately judges situations", "Cares about others' feelings", "Understands the reality of medical care and welfare", "Resistant to mental stress", "Physically strong", "Shows consideration for vulnerable people", "High-level communication skills", "Strong desire to contribute to society", "Demonstrates

leadership", and "High academic ability". These elements had excellent behavior, attitude, and mental and physical functioning in common. The remaining six elements had a relatively strong relationship with the second factor including "Experience living in regions with few doctors", "Experience working as a volunteer", "Experience working as a member of society", "Participates in events and extracurricular activities", "Experience of illness or disability", and "Excels in other areas such as art or sports". A common feature among them was asking about past experiences.

Table 7. Results of the factor analysis. (n = 1173).

Mean Score	Elements *	Factor	
		1	2
6.24	(1) Accurately judges situations	0.799	0.002
6.04	(2) Cares about others' feelings	0.765	0.131
5.92	(8) Understands the reality of medical care and welfare	0.774	0.148
5.90	(5) Resistant to mental stress	0.785	0.131
5.85	(3) Physically strong	0.717	0.166
5.79	(15) Shows consideration for vulnerable people	0.668	0.261
5.76	(9) High-level communication skills	0.727	0.269
5.72	(6) Strong desire to contribute to society	0.712	0.234
5.25	(4) Demonstrates leadership	0.668	0.261
5.33	(7) High academic ability †	0.455	0.116
4.57	(16) Experience living in regions with few doctors	0.263	0.609
4.43	(12) Experience working as a volunteer	0.203	0.847
4.36	(11) Experience working as a member of society	0.193	0.770
4.30	(13) Participates in events and extracurricular activities	0.193	0.845
4.15	(10) Experience of illness or disability	0.159	0.700
3.61	(14) Excels in other areas such as art or sports	0.047	0.714

* Sorted in descending order of mean score. †: Determined by the score deviation in the written tests of the entrance examination.

4. Discussion

4.1. Main Findings

This survey revealed public attitudes in Japan regarding the important elements of the qualities and abilities of prospective physicians. The ability to judge situations (92.2%) and empathy (87.4%) had a high ratio of positive answers. Approximately 70% of the respondents considered academic ability measured by the achievement test as contributory to the qualities of a future doctor; however, this element ranked ninth among the sixteen elements studied here. For the mean values obtained by scoring the responses, "High academic ability" (5.76) was ranked ninth among sixteen elements.

In the stratified analysis, those with experience in the medical profession, who were older than 50 years, or who were women tended to have more positive opinions on non-academic elements. For those living in places other than rural areas, the ratio of positive answers for the element of "High academic ability" was significantly higher. Regarding the factor analysis results (Table 7), the elements included in the first factor tended to have higher average scores than those included in the second factor. This suggests that in Japan, a "high level of various abilities" is considered more important in becoming a doctor than a "high level of experience".

4.2. Comparison with Previous Studies

4.2.1. Qualities and Abilities to Be Measured in Entrance Examinations

In the aforementioned book for medical school teachers, McManus and Sondheimer list intellectual ability, learning style and motivation, communicative ability, and personality as canonical traits in medical school enrollment selection [2]. In Japan, the Ministry of Education, Culture, Sports, Science, and Technology issued a notice titled "University Admissions Selection Guidelines", which specifies consideration of the following factors in

the selection of new students: (1) basic knowledge and skills; (2) ability to think, judge, and express them; and (3) independence and attitude to collaborate with diverse people [14]. In general, each medical school indicates in its admission policy the qualities and abilities it considers in the selection process. For example, the Admissions Policy of the University of Tokyo states that to gain admission, they expect students "to have sound ethics, a well-grounded sense of responsibility, an independent nature, and the ability to take action" [15]. However, there have been no reports to date on public-opinion surveys regarding the qualities and abilities desired in those who become doctors.

4.2.2. Current Status and Significance of Academic Ability Tests in Entrance Examinations

Similar to other countries, Japan has a nationally standardized academic examination for university entrance conducted by the National Center for University Entrance Examinations [16]. However, Japan does not have a standardized medical examination like the United States, Australia, Canada, and the Caribbean Islands, who hold a standardized Medical College Admission Test (MCAT) valid for most medical schools. As mentioned, Japanese medical schools often develop their own academic achievement tests, which tend to include extremely difficult examination questions to facilitate score differentiation among candidates.

Regarding the value placed on academic achievement tests, Tachibanaki suggests that the degree of trust and dependence on "learning capital" is quite high, not just for medical school entrance examinations in Japan [17]. Learning capital is a concept advocated by Kariya [18]. It describes higher expectations of individual efforts to learn and the resulting competitiveness rather than parental and other cultural and social backgrounds. However, several studies conducted by medical schools in Japan have reported no correlation between students' rankings in entrance examinations and their academic performance after admission [19–21].

4.2.3. Decreasing Number of Applicants for Medical Schools

We did not find any official data on the total number of applicants for medical schools in Japan. However, data on the number of applicants for the first round of entrance examinations of national universities, which is taken by most medical applicants [22], can be used as a surrogate index. The number was around 20,000 in 2013 and 2014 and gradually decreased to 15,000 applicants in 2020 [22]. The ratio of the number of applicants divided by the admission capacity has fallen to 4.0. This diminution cannot be explained solely by the decline in Japan's young population. The population of 18-year-olds, which constitutes most test takers, has decreased from 1.2 million in 2011 to 1.14 million in 2021 [23], which is an approximate rate of decline of 5%, whereas the decline rate in medical school admissions is 25%. Compared to this, according to the Association of American Medical Colleges (AAMC) data, the number of first-time applicants to medical schools in the United States increased by approximately 43.5% from 32,587 in 2011 to 46,758 in 2021 [24].

As mentioned, certain individuals planning to take the medical school entrance examinations in Japan are disadvantaged because of their family's financial situation and place of residence and consequently forgo considering medical school even before taking the entrance examination [5]. To reduce the adverse effects of such disparities on medical school entrance examinations and to increase the number of applicants, we propose that academic examinations be limited to the confirmation of basic academic abilities through standardized tests that are not specific to each university. If the standardized examination can guarantee necessary academic abilities, medical schools should use the results to determine the cutoff and not conduct any further ranking of students. Subsequently, in the final pass/fail decision stage, the candidate should ideally be evaluated in the context of qualities and abilities—rather than than academic ability—suitable for becoming a doctor.

Philosopher Michael Sandel wrote, "The most compelling reasons for a lottery of the qualified is to combat the tyranny of merit. Setting a threshold of qualification and letting chance decide the rest would restore some sanity to the high school years" [25]. In the

Netherlands, the once-abolished lottery-based selection system has been reinstated for medical entrance exams [26]. The impact on the number of medical school applicants and educational disparities should be evaluated if Japan introduces a system wherein successful students are selected by lottery from those confirmed to have a certain level of ability. Other factors may contribute to the decrease in the number of medical school applicants, and this should be studied in the future.

4.3. Clinical Implications

Most medical students in Japan eventually graduate and pass the national licensure examination for medical doctors [27]. In other words, pass/fail judgments based on academic achievement tests, which are currently used in entrance examinations, are likely somewhat useful in judging whether students can maintain their studies after admission [28]. However, given little correlation between academic achievement rankings on entrance examinations and grades after enrollment, ranking students based on achievement tests might not be appropriate [19–21].

This study revealed that several qualities must be emphasized as equal to, if not more important than, academic ability. In addition, respondents in their teens or those not living in rural areas tended to have positive attitudes toward academic ability. This may suggest that people in the city associate professional competencies with taking up opportunities to develop academic abilities that are more abundant in the urban environment.

To enable students in disadvantaged environments to apply for medical school, inequality may be minimized by evaluating academic ability only at the first stage of the selection process using the national common test and assessing other qualities in the advanced tests held at each school. Instead of ranking students based on their scores, it may be preferable to refer to past entrance examination databases and decide the score level that generally guarantees students' ability to keep up with their studies after admission. Subsequently, as the second step, we can measure qualities and abilities other than academic ability based on the admission policy and judge the "pass/fail" status based on these qualities and abilities.

This study revealed the elements that indicate qualities and abilities that should be evaluated in medical school entrance examinations aside from academic ability. Methods other than written tests such as the Multiple Mini Interview (MMI) and situational judgement tests (SJTs) are excellent for objectively evaluating various qualities [9,10,29]. In particular, the ability to judge a situation accurately and the sensibility of compassion, which were emphasized by the general public in this survey, may be incorporated into the MMI and SJTs. However, focusing on elements other than academic ability may create new barriers for applicants. Such influences must be considered.

4.4. Limitations

As indicated in the Methods section, this study did not adopt random sampling. According to the population data, we set 200 survey points in 36 strata divided by regional blocks and divisions of city size, and convenience sampling was conducted within each survey point. Strict proportional distribution was not possible by age group and gender because the number of respondents at each survey point was limited to six. The respondent distribution by age and gender in the 2020 National Census figures (Table 8) slightly differs from ours. Notably, most respondents were non-medical persons, and their responses might have been different if they had more information about healthcare delivery issues, such as the urban/rural divide and actual training processes.

As the 16 elements of the qualities and abilities suitable for becoming a doctor were newly developed by the authors, their validity and reliability are subject to further review. This survey did not address any reasonable accommodation for applicants with various disabilities in taking medical school entrance examinations. Therefore, the results should be interpreted cautiously.

Table 8. Estimated population by the 2020 National Census (in thousands).

Total population
126,146 thousand
Age (in years) *
15–19: 5707 (4.5%) 20–29: 12,703 (10.1%) 30–39: 14,213 (11.3%) 40–49: 18,345 (14.5%) 50–59: 16,677 (13.2%) 60–69: 15,678 (12.4%) 70–79: 16,254 (12.9%)
Gender
Men: 61,350 (48.6%); women: 64,797 (51.4%)

* The numbers and percentages do not add up to the total population and 100% because those under the age of 15 and over 80 were excluded from the study.

In the analysis of the seven-level data that measured the degree of agreement or disagreement with the importance of the studied elements, the three positive levels were grouped, and the ratio was calculated or replaced with an equidistant scale. Owing to this data processing method, some opinions of the respondents may not be accurately reflected. Furthermore, the factor analysis showed that a "high level of various abilities" is considered important. However, this survey did not distinguish how such abilities are developed through learning and experience.

Despite the aforementioned limitations, the results of this survey represent opinions that were fairly evenly collected throughout Japan and will serve as a useful reference when considering how to select medical students for future admission. Future research should examine the specific factors that prevent people from applying to medical school and what types of people are applying less. Therefore, individuals who are considering whether to apply for medical school should be surveyed, and subsequent measures for improvement should be undertaken.

5. Conclusions

We conducted a nationwide questionnaire survey to examine the general public's attitudes toward important elements that indicate the qualities and abilities suitable for becoming a doctor. Among the 16 elements analyzed, the ratio of affirmative responses was the highest (92.2%) for "Accurately judges situations", followed by "Cares about others' feelings" (87.4%). "High academic ability", which is currently the most important factor in the actual selection of students, ranked ninth (71.8%).

This is a valuable study that clarified the qualities and abilities that the general public expects from medical students who will become doctors. This investigation is important as basic material for reconsidering the selection process for admission to medical schools, which emphasizes academic ability. We believe it will be useful in other countries in terms of the effects of declining birthrates and educational disparities.

Author Contributions: Conceptualization: J.O., Y.W., Y.H. and H.M.; data curation: J.O.; formal analysis: J.O.; funding acquisition: J.O.; investigation: J.O., Y.W., Y.H. and H.M.; methodology: J.O. and Y.W.; project administration: J.O; resources: J.O., Y.W., Y.H. and H.M.; supervision: J.O.; validation: J.O., Y.W., Y.H. and H.M.; visualization: J.O.; writing—original draft: J.O.; writing—review & editing: J.O., Y.W., Y.H. and H.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research was supported by a Grant-in-Aid for Scientific Research (JSPS KAKENHI Grant Numbers 16H05208 and 23H03135) (URL: https://www.jsps.go.jp/english/e-grants/ accessed on 10 November 2023). J. O. received these grants. The funder had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of Tokyo Medical University (protocol code T2020-0215 on 17 October 2020).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The raw data are publicly available in the file exchange system of the University Hospital Medical Information Network (UMIN). To download the file, visit "https://upload.umin.ac.jp/fileshare/registrant.cgi" accessed on 10 November 2023. The file name is "Raw data of NOS(2020) attitude survey about important qualities and abilities of future Doctors.xlsx".

Acknowledgments: We thank all respondents for participating in this survey. We appreciate Machiko Shibahara for her valuable advice.

Conflicts of Interest: The authors declare no conflicts of interest.

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