An analysis of student essays on medical leadership and its educational implications in South Korea

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To examine medical students’ perceptions of leadership and explore their implications for medical leadership education. We conducted a qualitative analysis of the essays submitted by students in the medical leadership course from 2015 to 2019. We categorised the essays by the characteristics of the selected model leaders (N = 563) and types of leadership (N = 605). A statistically significant proportion of students selected leaders who were of the same gender as themselves (P < 0.001), graduate track students chose leaders in science (P = 0.005), while; military track students chose leaders in the military (P < 0.001). Although the highest proportion of students chose politicians as their model leaders (22.7%), this number decreased over time (P < 0.001), and a wider range of occupational groups were represented between 2015 and 2019. Charismatic leadership was the most frequently selected (31.9%), and over time there was a statistically significant (P = 0.004) increase in the selection of transformational leadership. Students tended to choose individuals whose acts of leadership could be seen and applied. Medical leadership education should account for students’ changing perceptions and present a feasible leadership model, introducing specific examples to illustrate these leadership skills.

Contemporary medical environments are facing complex issues, such as rising costs of treatment and inadequate access to and inconsistent quality of health care⁴. To address the ever-perplexing issues in medicine, there is an increasing need for effective leadership in health care⁴,⁵. In the past, medical care was primarily conducted by an individual physician. In addition, medical education heavily focused on the diagnosis and treatment of illnesses rather than working as a team to provide solutions that ensure higher quality medical care and safety⁴. However, in modern health care environments, a doctor’s role as a leader has become much more significant not only in physician–patient relationships but also in coordinating team-based tasks in the hospital and managing medical organizations⁵. For instance, as the socioeconomic environment becomes an essential component of a community’s health, physicians are expected to exert leadership in organisations that address public health issues⁶. Accordingly, physicians must be prepared to serve as leaders in health care.

Following the increasing need for leadership in healthcare, leadership skills are being included in physician evaluation criteria. The Association of American Medical Colleges has included leadership as the core requirement for medical students entering residency⁷. The Royal College of Physicians and Surgeons in Canada also includes the role of a leader as one of the main capability frameworks and has reflected this in their medical education⁸. Medical schools in the United States are proceeding with various leadership programs and incorporating leadership curricula into their undergraduate medical education⁹. Further, research shows that medical students now recognize the need for leadership education following the changing environment; 85% of medical students agreed that they should be taught leadership communication skills and teamwork abilities during their medical school years¹⁰. Korean medical educators also attempt to incorporate medical leadership education into medical education curriculum¹¹. Yonsei University College of Medicine (YUCM) offers a leadership curriculum, Doctoring & Medical Humanities: Medical Leadership (DMH-ML), which is a core course covering 16 h (two hours per week for eight weeks) and offered to first-year medical students in the final quarter since 2014. The
first 3 weeks feature lectures on basic concepts of leadership. The next three weeks are divided into three elective
tracks, from which students choose lessons about leadership taken from: (1) the history of Severance Hospital in
South Korea; (2) medical missions and international public health development; (3) business aspects of medicine.
The final two weeks of the curriculum provide a summary of the topics covered. The written assignment of the
course is a leadership model critique whereby students select a leader of their choice, summarize the leader’s
accomplishments, and analyse the strengths and weaknesses found in that leadership. The course aims to facili-
tate medical students’ understanding of the nature of leadership from various leaders and help them recognize
that their role as a leader is one of the fundamental responsibilities as physicians. All students who participated
in the class submitted the written assignment, and the prompts for the written assignments were not changed
between 2015 and 2019.

As no profiles have been reported on the leader models selected by medical students to date, in this study, we
aimed to examine the medical students’ perceptions of leadership and provide directions for leadership education
by analysing the characteristics and types of leadership models presented in leadership model critique essays.

Results
We analysed a total of 585 essays submitted between 2015 and 2019. After excluding 35 essays that did not present
a model, and double-counting 13 essays that presented two individuals, a total of 563 essays were chosen for
this study (125 in 2015, 84 in 2016, 113 in 2017, 120 in 2018, and 121 in 2019). Of the 563 essays, 407 (72.3%) were
written by male students and 156 (27.7%) by female students. Regarding admission types, 381 students
(67.7%) were identified as undergraduate students, 153 students (27.1%) as graduate students, and 29 students
(5.2%) as military (Table 1). We analysed the demographic characteristics of the model leaders selected in the essays
(Table 2). A total of 563 individuals were selected as model leaders, 499 men (88.6%), 55 women (9.8%) and
9 other (1.6%), such as names of industries. The comparison of the gender ratio between the selected model
leaders and the students showed that male students tended to select male leaders while female students were
significantly more likely to select female leaders (P < 0.001) (Table 3). A total of 331 leaders (58.8%) belonged to

| Characteristic   | N (% of 563) |
|------------------|--------------|
| **Gender**       |              |
| Male             | 407 (72.3)   |
| Female           | 156 (27.7)   |
| **Type of admission** |          |
| Undergraduate students | 381 (67.7) |
| Graduate students | 153 (27.1)   |
| Military         | 29 (5.2)     |

Table 1. Demographic characteristics of medical students in the leadership curriculum course whose essays
were selected for this study.

| Characteristic   | N (% of 563) |
|------------------|--------------|
| **Gender**       |              |
| Male             | 499 (88.6)   |
| Female           | 55 (9.8)     |
| Other            | 9 (1.6)      |
| **Generation**   |              |
| Present          | 331 (58.8)   |
| Previous         | 232 (41.2)   |
| **Occupation**   |              |
| Politics         | 128 (22.7)   |
| Business         | 121 (21.5)   |
| Science          | 117 (20.8)   |
| Sports           | 45 (8.0)     |
| Social activism  | 34 (6.0)     |
| Arts             | 33 (5.9)     |
| Military         | 32 (5.7)     |
| Religion         | 18 (3.2)     |
| Education/law/exploration | 7 (1.2) |
| Other            | 28 (5.0)     |

Table 2. Demographic characteristics associated with the selected model leaders in the essays.
the present generation category, and 232 (41.2%) belonged to the previous generation category. The occupational groups of the model leaders were as follows: politics (n = 128, 22.7%), business (n = 121, 21.5%), science (n = 117, 20.8%), sports (n = 45, 8.0%), social activism (n = 34, 6.0%), arts (n = 33, 5.9%), military (n = 32, 5.7%), religion (n = 18, 3.2%), education/law/exploration (n = 7, 1.2%), and other (n = 28, 5.0%). The comparative analysis of the selected model leaders' occupational groups and the demographic characteristics of the students showed that a statistically significant proportion of female students (P = 0.0014) chose leaders in science, and a statistically significant proportion of male students chose leaders in sports (P = 0.003) (Table 4). Further, a statistically significant proportion of undergraduate students (P = 0.049) chose leaders in politics, transfer/graduate students (P = 0.005) chose leaders in science, and military students chose leaders in the military. When we analysed the changes in the occupational groups of the selected model leaders from 2015 to 2019, the decrease in the number of students who chose leaders in politics was statistically significant (P < 0.001), and the increase in the number of students who chose leaders in sports was statistically significant (P = 0.015) (Table 5).

### Table 3. Comparison of the gender ratio between the selected model leaders and the student who wrote the essays. Data are presented as number (%) unless otherwise indicated.

| Gender | Male leaders | Female leaders | P-value |
|--------|--------------|----------------|---------|
| Male students | 377 (75.6) | 22 (40.0) | <0.001 |
| Female students | 122 (24.4) | 33 (60.0) | |
| Total | 499 (100.0) | 55 (100.0) | |

### Table 4. Comparison of the selected model leaders' occupational group and the demographic characteristics of the students who wrote the essays.

| Gender | Type of admission | Male leaders | Female leaders | P-value |
|--------|-------------------|--------------|----------------|---------|
| Politics | Undergraduate | 96 (75.0) | 24 (18.8) | 8 (6.6) | 0.049 |
| Business | Graduate | 81 (66.9) | 36 (29.8) | 4 (3.3) | 0.495 |
| Science | Military | 69 (59.0) | 45 (38.5) | 3 (2.6) | 0.005 |
| Sports | | 36 (80.0) | 8 (17.8) | 1 (2.2) | 0.174 |
| Social activism | | 23 (67.6) | 10 (29.4) | 1 (2.9) | 0.815 |
| Arts | | 23 (67.6) | 9 (27.3) | - | 0.379 |
| Military | | 25 (71.4) | 2 (28.6) | - | 0.504 |
| Religion | | 13 (61.1) | 7 (38.9) | - | 0.504 |
| Education/law, exploration | | 5 (51.4) | 2 (28.6) | - | 0.062 |
| Other | | 22 (75.0) | 6 (21.4) | 1 (3.6) | 0.831 |

### Table 5. Changes in the occupational groups of the selected model leaders from 2015 to 2019.

| Gender | 2015 N (% of 125) | 2016 N (% of 84) | 2017 N (% of 113) | 2018 N (% of 120) | 2019 N (% of 121) | P-value |
|--------|------------------|------------------|------------------|------------------|------------------|---------|
| Politics | 42 (33.6) | 24 (28.6) | 23 (20.4) | 20 (16.7) | 19 (15.7) | <0.001 |
| Business | 25 (20.0) | 11 (13.1) | 31 (27.4) | 25 (20.8) | 29 (24.0) | 0.259 |
| Science | 19 (15.2) | 12 (14.3) | 34 (30.1) | 22 (18.3) | 30 (24.8) | 0.061 |
| Sports | 4 (3.2) | 6 (7.1) | 9 (8.0) | 13 (10.8) | 13 (10.7) | 0.015 |
| Social activism | 8 (6.4) | 11 (13.1) | 5 (4.4) | 4 (3.3) | 6 (5.0) | 0.122 |
| Arts | 10 (8.0) | 3 (2.4) | 1 (0.9) | 14 (11.7) | 6 (5.0) | 0.771 |
| Military | 9 (7.2) | 7 (8.3) | 4 (3.5) | 8 (6.7) | 4 (3.3) | 0.185 |
| Religion | 5 (4.0) | 8 (9.6) | 3 (2.7) | 5 (4.2) | 2 (1.7) | 0.461 |
| Education, law, exploration | = | 1 (1.2) | 2 (1.8) | 2 (1.7) | 1 (0.9) | 0.246 |
| Other | 3 (2.4) | 7 (8.3) | 1 (0.9) | 7 (5.8) | 10 (8.3) | 0.096 |

### Qualitative analysis

We analysed the leadership types of the selected models in 563 essays according to a qualitative framework developed from thematic and content analysis. Based on the analysis, a total of 605 essays were selected (seven essays with no specific category of leadership type were excluded, and 49 essays that presented two types of leadership were counted twice). Six types of leadership were identified in the following
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Although many medical models regardless of whether they are officially designated as leaders or whether they have an educational intention, individuals influencing other persons in informal ways should be acknowledged. Since individuals can be role models regardless of whether they are officially designated as leaders or whether they have an educational intention, medical educators need to understand the role of informal leadership training. Although there are individuals officially designated as leaders in healthcare settings, the presence of informal leadership such as students’ experiences in leading and organizational culture plays an important role in developing students’ leadership skills. Therefore, medical schools need to develop a faculty development program based on the importance of role modelling, recognizing the fact that role modelling can have both positive and negative effects on medical students. A training program to enhance the leadership abilities of the instructors for better transfer of knowledge to the new generation of students is necessary.

The occupations of leaders chosen by the students changed over the course of the 5 years analysed. At first, many students chose politicians as their model leaders, but the percentage of politicians selected decreased over time, and a wider variety of occupations were represented. This change implies that the students’ perceptions of leadership are shifting, and that leaders recognized by society are emerging in various occupational fields. Therefore, medical leadership education and research need to incorporate the interdisciplinary and transdisciplinary approaches to meet continuous social changes. Building a leadership curriculum based on a balanced interdisciplinary approach through the theoretical background in various fields, introducing specific examples

| Type                  | Keyword                                                                 | N (% of 605) |
|-----------------------|------------------------------------------------------------------------|--------------|
| Charismatic leadership| Authority, ability, drive, firmness, determination, strong execution    | 193 (31.9)   |
| Servant leadership    | Sacrifice, serving, devotion, empathy, listening, respect, embrace, humility, love | 150 (24.8)   |
| Collaborative leadership| Communication, team, cooperation, together, member, network, horizontal | 117 (19.3)   |
| Transformational leadership| Change, innovation, creativity, novelty, pioneering, boldness, challenge, creation | 109 (18.0)   |
| Self-leadership       | Achievement of one's goals, achievement of tasks                        | 23 (3.8)     |
| Super leadership      | Education, teaching, human resources, making good leaders              | 13 (2.1)     |

Table 6. Keywords and classification by types of model leadership.

| Type                  | Keyword                                                                 | N (% of 136) | 2015 N (% of 84) | 2016 N (% of 126) | 2017 N (% of 125) | 2018 N (% of 125) | 2019 N (% of 134) | P-value |
|-----------------------|------------------------------------------------------------------------|--------------|------------------|-------------------|-------------------|-------------------|-------------------|---------|
| Charismatic leadership| Authority, ability, drive, firmness, determination, strong execution    | 54 (39.7)    | 18 (21.4)        | 40 (31.7)         | 40 (32.0)         | 41 (30.6)         | 0.345             |
| Servant leadership    | Sacrifice, serving, devotion, empathy, listening, respect, embrace, humility, love | 40 (29.4)    | 21 (25.0)        | 32 (25.4)         | 28 (22.4)         | 29 (21.6)         | 0.119             |
| Collaborative leadership| Communication, team, cooperation, together, member, network, horizontal | 19 (14.0)    | 27 (32.1)        | 22 (17.5)         | 27 (21.6)         | 22 (16.4)         | 0.935             |
| Transformational leadership| Change, innovation, creativity, novelty, pioneering, boldness, challenge, creation | 17 (12.5)    | 9 (10.7)         | 21 (21.4)         | 23 (18.4)         | 33 (24.6)         | 0.004             |
| Self-leadership       | Achievement of one's goals, achievement of tasks                        | 4 (2.9)      | 8 (9.5)          | 4 (3.2)           | 3 (2.4)           | 4 (3.0)           | 0.351             |
| Super leadership      | Education, teaching, human resources, making good leaders              | 2 (1.5)      | 1 (1.2)          | 1 (0.8)           | 4 (3.2)           | 5 (3.7)           | 0.115             |

Table 7. Changes in the types of model leadership from 2015 to 2019.

Discussion

The role models as leaders selected by students differed on the basis of the students’ gender and admission type. Although male leaders were dominant, the proportion of female leaders selected by female students was higher than that selected by male students. The selection of the contemporary leaders of the present generation was more common than those leaders of the previous generation. A high proportion of the transfer/graduate students, many with bachelor’s degrees in the sciences, chose leaders who worked in science fields, and a high proportion of the military students chose leaders related to the military. These findings imply that students tend to admire models as leaders among the contemporary figures whose acts of leadership can be observed in real-time as well as models with whom they share more in common, such as gender, academic backgrounds, or occupations, likely because the actions and achievements of such leaders are more understandable and more applicable to their own lives. The educational implication of these findings is the importance of role modelling as well as the influence of the informal, hidden curriculum. Just as clinical knowledge and skills can be transmitted formally and informally in clinical situations, leadership in healthcare can also be transmitted through formal and informal means. Although there are individuals officially designated as leaders in healthcare settings, the presence of individuals influencing other persons in informal ways should be acknowledged. Since individuals can be role models regardless of whether they are officially designated as leaders or whether they have an educational intention, medical educators need to understand the role of informal leadership training.

Although many medical schools strive to implement leadership education using various methods, they overlook how informal leadership such as students’ experiences in leading and organizational culture play an important role in developing students’ leadership skills. Therefore, medical schools need to develop a faculty development program based on the importance of role modelling, recognizing the fact that role modelling can have both positive and negative effects on medical students. A training program to enhance the leadership abilities of the instructors for better transfer of knowledge to the new generation of students is necessary.

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of leadership in various areas, and having students reflect on case studies will help students develop various leadership-related competencies.

The types of leadership delineated by the qualitative analysis of the essays showed that the most common type of leadership among the six types was the charismatic type, which is the most traditional leadership type. The traditional figure of a physician with ability, a firm and determined mind, the power to execute, and authority remains the most prominent model as a leader for medical students. As the charismatic leadership type tends to parallel the traditional heroic medical practice led by one-person, medical educators need to emphasize the possible limitations of charismatic leadership in the current health care context, which requires a substantially more team-based approach. As the ratio of students choosing diversified leadership types has gradually increased, it can be considered that the students' primary concept of medical leadership is changing according to changes in medical society.

The second and third types of leadership stated by students were the servant and collaborative leadership types, which were increasingly recognized as essential in the healthcare field. Earlier, the servant leadership, with its image of dedication to treating patients and contributing to the community, was exemplified as the prominent model for healthcare. The function of collaborative leadership has been increasingly emphasized in the changing medical environment where facilitating successful collaboration within teams and flexibly adapting to changes is becoming more important. Moreover, effective team management and cooperation in health care are known to be closely related to improved outcomes in the treatment of patients. The prevalence of the selection of these types of leadership by the students may reflect their correct understanding of the modern health care approach.

The proportion of transformational leadership increased significantly over time. Transformational leadership is a more suitable leadership type for a constantly changing environment such as that of health care where quick adaptation and decision-making are required. The fourth industrial revolution is characterised by developments such as precision medicine, AI-based medical treatment, and telemedicine, and related discussions are underway in medical education. This increase in the proportion of transformational leadership indicates that students recognize the importance of leadership that is sensitive to change and can respond quickly and with sound judgment.

When we compared the selected leaders' occupations and leadership types, it was confirmed that the students presented various leadership types in the same occupational group (Supplementary Table S1). This finding implied that there is no stereotyped leadership for a specific occupation but that different types of leadership can be manifested depending on the situations and followers in regard to which the leadership is exercised. In other words, physicians as a leader needs to lead organizations, teams, or themselves using various leadership types rather than pursuing one fixed style. Moreover, mature leaders are more proficient in using different types of leadership, and different leadership levels require different skills. These findings suggest that leadership in health care can be learned through case studies of other occupational groups and the curriculum should include various leadership types rather than emphasizing one style.

**Limitations.** This study has the following limitations. First, the sample of this study is limited to the medical students in South Korea. Considering that effective leadership behaviors are being accepted to be culture-specific, it is difficult to generalize the qualitative analysis conducted on essays collected from a single medical school. Second, although the percentage of students in each admission type corresponds with the average percentages of undergraduate track (70%) and graduate track (30%) admissions in South Korea, the fact that students in the graduate track would have been in their first year of medical school at the time of essay submission is a limitation. Third, it is possible that the essays submitted by the students were influenced by the lectures held in class. In selecting a model leader, the student may have considered leaders, leadership theories, and types of leadership presented by the instructor. Nevertheless, this study is meaningful because it explores the experiences of the medical students over the past five years, analyses leadership recognized by the students, and examines the changes in their perceptions over time.

**Conclusions**

Whether leadership is innate or acquired remains a matter of debate, but many experts argue that education and experience can teach the skills and behaviours necessary for developing the ability to lead others. Therefore, a well-designed leadership curriculum that presents feasible leadership models is needed because students imitate familiar and applicable leaders. Further, in the rapidly changing medical environment, leadership roles are diversifying, and students’ perceptions of leadership are changing. Therefore, when medical schools encourage the various approaches to leadership required in modern society, students can foster broad skills in medical leadership.

**Methods**

We reviewed all essays submitted in the first-year core course, titled *Doctoring & Medical Humanities: Medical Leadership*, from 2015 to 2019, to investigate changes in the perceptions of leadership among medical students. The prompt of the essay required students enrolled in the DMH-ML course to select a model leader, summarize that leader’s achievements, and reflect on the strengths and weaknesses of leadership found. We collected a total of 585 essays and performed quantitative and qualitative analysis (Fig. 1).

**Student demographics and data collection.** To perform quantitative analysis, we classified the characteristics of the students as well as those of the leaders they selected. We collected demographic information such as gender and type of admission of the medical students at YUCM who submitted the essays and classified them
into three groups: (1) undergraduate track, (2) graduate track, and (3) military track. The undergraduate track is a conventional 6-year program in South Korea and is for students who have immediately graduated from high school. The first two years are equivalent to the pre-med years of an undergraduate degree, and the remaining 4 years are equivalent to the medical years (2 years for preclinical and 2 years for clerkship) of medical schools elsewhere. Thus, by the time of their essay submission, students in the undergraduate track would be in their third year having enrolled at medical school. The graduate track is a four-year program for those with an undergraduate degree. Thus, students transfer straight into the medical years, skipping the pre-med years of medical school. This track is typical of admission to medical school in the United States and Canada. In Australia, England, Ireland, Singapore and South Korea, the undergraduate track and the graduate track are mixed (Fig. 2). Finally, the military track is for the military students with an undergraduate degree commissioned by the army.

Quantitative analysis. We also classified the gender, generation, and occupational groups of the selected model leaders. We classified the selected leaders as (1) the previous generation if they had passed away before 2000 and (2) the present generation if they had passed away after 2000 or were still living at the time of the study. The occupational groups of the model leaders were classified as politics, business, science, sports, social activism, arts, military, religion, and education/law/exploration. In addition, when students selected an individual with
whom they had a personal relationship such as a parent or a character in a book or movie, we classified them as “other”.

After classifying the characteristics of students and leaders, we analysed the characteristics of selected leaders according to the characteristics of students and observed how the students’ perceptions of leadership changed over time from 2015 to 2019.

**Qualitative analysis.** We used a combination of thematic and contents analyses for our qualitative analysis. Two authors independently analysed each essay. We omitted essays that did not establish a model leader. For essays with two selected leaders, we analysed them as two separate model leaders. The strengths of each selected model leader portrayed by students were summarized. Disagreements were resolved through group discussion and consensus.

In the first step, we extracted the main contents that delineated the selected leaders’ performance, strengths, and weaknesses from the essays for thematic analysis. We then, classified these extracted contents by thematic keywords with similar meanings.

Second, we developed a framework for content analysis through a review of previously published literature. Finally, the result of the thematic analysis was combined with the result of the content analysis. The framework was formed based on six types of model leadership by matching the 10 leadership types (adaptive, authentic, charismatic, collaborative, servant, self, situational, super, transformational, and transactional) selected through the analysis of previous studies with the leadership types described by the students: charismatic, servant, collaborative, transformational, super-, and self-leadership.

The six leadership model types are defined as follows. Charismatic leadership centres on the leader’s strong charisma and resolute style that allows members to follow the decisions they make. Servant leadership is based on respect for humans, whereby the leader volunteers to serve each member to help develop their full potential. Collaborative leadership is exerted by leaders who establish a horizontal and trusting relationship with members that enables the group to complete the given tasks through cooperation. Transformational leadership recognises the need for a change within the organisation and opportunities for a leader to envision and enact change. Self-leadership is a force that drives leaders themselves to accomplish their goals, whereas super-leadership nurtures other individuals (followers) and empowers them to lead themselves.

**Statistical analysis.** We used descriptive statistics to analyse the characteristics of the study subjects. We indicated frequencies and percentages for categorical variables, and a chi-square test and linear-by-linear association were performed to analyse the correlation between two categorical variables. Fisher’s exact test was performed if the expected frequency was five or less in the chi-square test. All statistical analyses were performed using IBM SPSS ver. 25.0 (IBM Corp., Armonk, NY, USA), and the statistical significance level was set to p = 0.05.

**Ethical considerations.** The Yonsei University Health System Institutional Review Board (IRB No: Y-2020-0206) approved the study. We used anonymised materials collected in commonly accepted educational settings according to Article 2 of the Bioethics and Safety Act Enforcement Rule in South Korea. The informed consent requirement was exempt from institutional review board approval. All procedures were conducted in accordance with the relevant guidelines and regulations.

**Data availability**

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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**Author contributions**

S.A. and J.I.S. designed the study, I.R.L. and H.J. collected the data, and I.R.L., H.J., and S.A. conducted the analysis. I.R.L., H.J., Y.L., S.A. and J.I.S. wrote the first draft of the manuscript. All authors had full access to all of the study data. All authors reviewed, wrote, and approved the final version.

**Competing interests**

The authors declare no competing interests.

**Additional information**

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