

Undergraduate Student Interest in Healthcare Career in the Context of COVID-19 Pandemic

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Abstract

Objectives: The healthcare profession has been long considered an excellent career choice. Pre-medical experience is documented to be important in shaping future medical landscape. In the wake of the pandemic, there has been intense media spotlight on the healthcare profession and change in academic environment, necessitating analyses of student experience. This project aims to assess change in undergraduate student interest in healthcare career using cross-sectional survey study.

Methods: The project was approved by our Institutional Review Board. Voluntary survey collected data on demographics, socioeconomic, media exposure, academic environment, and change in interest in a healthcare profession. Survey was distributed through the university undergraduate pre-health listserv. Total of 297 responses were obtained. Descriptive statistics including Fisher's exact test were applied in the analysis.

Results: Majority of the respondents were Asians (54.9%), second generation immigrants (52.2%), and female (73.4%). Large proportion of the respondents were negatively affected by the pandemic, with losing a job or internship personally (42.1%) or a family member or a friend (62.6%). Students had mixed response to online learning environment, with 27.3% of students noting no change, 40.4% students noting increased difficulty, and 32.3% students noting decreased difficulty of classes. During the pandemic, 47.5% of students noted increased interest in pursuing healthcare career. The change in interest in healthcare career was not associated with demographics, economic hardship, or online learning environment.

Discussion: Despite the challenges of COVID-19 pandemic, students showed strong interest in pursuing healthcare careers.

Keywords: COVID-19 pandemic; SARS-CoV-2 virus; Health care; Undergraduate education

Introduction

The healthcare profession has long been considered an excellent career choice with fulfillment of desire to help others [1], possibility of high income [2] and job security [3]. However, surveys of the general public demonstrate that there is also a substantial level of mistrust in medical professionals [4]. Moreover, physician burnout is a crisis that is becoming increasingly recognized as more and more physicians are feeling overworked and undervalued [5]. During the already trying times, SARS-CoV-2 virus hit the world with global pandemic. Given the enormous effect the pandemic had on everyday lives, it is imperative we understand the influence of the decision to pursue a career in healthcare by students.

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Previous study shows that pre-medical experience in undergraduate years is important in attrition from premedical track and well-being of physicians [1]. Hence, with the extensive effect of COVID-19 pandemic strongly affecting the social interaction, economy, and learning environment, there is need for analysis of undergraduate students' experience. In particular, the majority of educational experience has shifted online, and there has been intense media spotlight on the healthcare profession. It is unknown how disruptions to academic environment and the broadcasting of dangers and stress of healthcare professional affect a student's choice to enter healthcare career. Although similar studies have been conducted with medical students [6], one has not been conducted with undergraduate students. This project surveyed demographic, socioeconomic, and academic factors that may affect an undergraduate student's interest in healthcare profession and aims to assess change in interest during the pandemic. This information will give insight into characteristics of future workforce in healthcare profession.

Methods

Study was approved by the institutional review board. After the approval, the survey was distributed through the pre-health listserv to the undergraduate students through self-administered electronic link. Students interested in nursing school or medical school can voluntarily sign up for subscription to the pre-health listserv. Cross-sectional online survey response was obtained from July 22, 2020 to November 17, 2020. The survey questions were designed by authors and consisted of demographic and socioeconomic information, interest in healthcare career, academic environment, and time spent watching, listening, or reading news (media exposure). Complete survey is attached as supplementary material. As incentive to take the survey, survey respondents had the option to leave personal email address for entry into a \$5 Amazon gift card raffle. Otherwise, survey participation was voluntary and no identifying information was obtained. Survey responses were collected through Google survey application.

The survey link email was opened by 648 recipients. Total of 297 responses were obtained with response rate of 45.8% (297/648). Two-sided Fisher's exact test used to compare proportions. P-values less than 0.05 were considered statistically significant. Data were analyzed utilizing R software version 3.6.

Results

Survey link was distributed to pre-health listserv at our institution. Pre-health listserv subscribers include students interested in pursuing medical school and nursing school and was considered appropriate survey group. Demographic results of survey respondents were as follows. Age of the respondents ranged from 17 to 31, with 95.3% (283/297)

of respondents between ages 18 and 23. 73.4% (218/297) identified as female. Students' hometowns were from all across the United States as defined by the U.S. Census Bureau [7]; majority 46.5% (138/297) were from the Northeast and 23.9% (71/297) were from the South. This information was obtained as different parts of the country were differentially affected early in the pandemic. According to the federal government racial and ethnic categories [8], majority 54.9% (163/297) were Asians and 26.9% (80/297) were White. Others were Hispanic or Latino, African Americans, or multiracial. This information was obtained as minority groups are disproportionately affected by the pandemic. Majority of the students 52.2% (155/297) were second generation immigrants (student naturally had United States citizenship from birth, but not so for parents). Next large group was those who had been in the United States for over three generations (21.5%, 64/297). 11.4% (34/297) were first generation immigrants (student did not have United States citizenship by birth but obtained one), and 6.4% (19/297) were third generation immigrant (student and at least one parent naturally had USA citizenship from birth, but not so for grandparents). Rest 2.7% were international students, adopted, don't know, or choose not to answer. 58.2% (173/297) student were fluent in language other than English that was used at home. These results show that the pre-health listserv included high proportion of women, minorities, and immigrant families.

Next, we evaluated the economic aspect of our students. 24.9% (74/297) students relied solely on parental support for undergraduate tuition payment. Others used combination of parental support, financial aid, work study, scholarship, and work outside of school to cover tuition. 73.4% (218/297) of students were dependent financially. 23.9% (71/297) of students supported themselves, and 1.3% (4/297) of students supported other family members. Pandemic had strong negative economic impact on the student community, with 42.1% (125/297) of students reporting losing a job or an internship position due to the pandemic personally. Larger proportion (62.6%, 186/297) of students had a family member or a friend lose a job or an internship position due to the pandemic. This information was obtained as economic hardship may impact a student's interest in pursuing additional schooling.

We then evaluated the academic environment of the students. Survey respondents were distributed throughout the undergraduate years; 27.3 % (81/297) students were first year in college, 27.3% (81/297) students were second year in college, 16.2% (48/297) students were third year in college, 17.8% (53/297) students were fourth year in college. This question was asked as students further along the undergraduate studies may be more fixed in career path. With the onset of pandemic and state-wide lockdown in spring of 2020, our institution switched to online learning. Majority (76.1%,

Table 1: Summary of survey responses

Gender Identity	
Female	73.4% (218/297)
Male	25.9% (77/297)
Other	0.7% (2/297)
Race/ Ethnicity	
Asian	54.9% (163/297)
White	26.9% (80/297)
Hispanic or Latino	6.4% (19/297)
Black	5.7% (17/297)
Multi-racial	5.4% (16/297)
Other	0.7% (2/297)
Hometown	
Northeast	46.5% (138/297)
South	23.9% (71/297)
Midwest	10.4% (31/297)
West	10.1% (30/297)
International	8.7% (26/297)
Other	0.3% (1/297)
Immigration status	
First generation immigrants (student did not have United States citizenship by birth but obtained one)	11.4% (34/297)
Second generation immigrants (student naturally had United States citizenship from birth, but not so for parents)	
Third generation immigrant (student and at least one parent naturally had USA citizenship from birth, but not so for grandparents)	52.2% (155/297)
3+ generation in the United States	
Other (international, adopted, don't know)	6.4% (19/297)
	21.5% (64/297)
	7.1% (21/297)
Financial independence status	
Dependent	74.7% (222/297)
Self-supported	23.9% (71/297)
Supporting others	1.3% (4/297)
Economic hardship	
Lost job or internship position – self	42.1% (125/297)
Lost job or internship position – family or friend	62.6% (186/297)
Academic environment	
Classes became easier due to online format	32.3% (96/297)
No change in difficulty	27.3% (81/297)
Classes became harder due to online format	40.4% (120/297)

Media exposure	
Little to none	6.7% (20/297)
Up to 1 hour	42.1% (125/297)
1-2 hours	35.4% (105/297)
2-4 hours	11.1% (33/297)
4+ hours	4.0% (12/297)
Interest in healthcare career	
Increased	47.5% (141/297)
Unchanged	32.3% (96/297)
Decreased	2.7% (8/297)

226/297) of students had combination of live lecture session and recorded lecture session. This was accompanied by additional help through emails and/or live office hours. 27.3% (81/297) of students thought the difficulty of classes did not change with the socially distance classroom. 32.3% (96/297) of students thought the classes easier and 40.4% (120/297) of students thought the classes were harder. The perceived class difficulty may change pursuit of professional school, with those feeling the classes got easier may be encouraged and those feeling the classes got harder discouraged.

There has been frequent coverage of coronavirus pandemic in the media. High exposure to the pandemic news may affect a student's decision to pursue healthcare career. Time spent watching, reading, or listening to news (media exposure) per day and source of these news were surveyed. 42.1% (125/297) students had up to 1 hour of media exposure, and 6.7% (20/297) students had little to no exposure to media. 35.4% (105/297) had 1-2 hours of media exposure, 11.1% (33/297) students had 2-4 hours of media exposure, and 4.0% (12/297) students had more than 4 hours of media exposure per day. 9.1% (27/297) relied on family, friends, and word of mouth for news, 11.8% (35/297) relied on federal, state, and local government websites, and majority relied on national news outlet (e.g., CNN, NBC) 52.2% (155/297). 24.9% (74/297) relied on social media for news. Others noted mixture of news source. Survey responses are summarized in Table 1.

We next evaluated if there was change in students' interest in pursuing healthcare career. 47.5% (141/297) of students noted increase in interest in healthcare career, and 32.3% (96/297) of students noted no change in interest in healthcare career during the pandemic. Only 2.7% (8/297) of students noted decrease in interest in healthcare career. This result shows that pandemic situation heightened students' interest in entering healthcare career. We also analyzed if the increased

Table 2: Fisher’s exact test of association with interest in healthcare career

Geographic location and interest in healthcare post COVID (p = 0.087)		
	Unchanged/ decreased	Increased
Midwest	17	11
Northeast	70	68
Outside US	11	16
South	36	38
West	22	8
Race/ethnicity and interest in healthcare post COVID (p = 0.2368)		
	Unchanged/ decreased	Increased
Asian	85	78
Black/African American	6	11
White	49	31
Hispanic or Latino	9	10
Multiracial or multiethnic, other	7	11
Immigration status and interest in healthcare post COVID (p = 0.769)		
	Unchanged/ decreased	Increased
First generation	16	20
Second generation immigrants	83	72
Third generation immigrants	10	9
USA 3+ generation	37	27
International, other	8	11
Personal economic hardship and interest in healthcare post COVID (p = 0.725)		
	Unchanged/ decreased	Increased
No	88	83
Yes	67	58
Family/ friend economic hardship and interest in healthcare post COVID (p = 0.4702)		
	Unchanged/ decreased	Increased
No	61	49
Yes	94	92
Class year and interest in healthcare post COVID (p = 0.853)		
	Unchanged/ decreased	Increased
Freshmen	44	37
Sophomore	45	36
Junior	22	26
Senior	27	24
Other	18	18
Perceived difficulty of classes and interest in healthcare post COVID (p = 0.103)		

	Unchanged/ decreased	Increased
Unchanged	43	38
Easier	58	38
Harder	55	65
Media exposure and interest in healthcare post COVID (p = 0.181)		
	Unchanged/ decreased	Increased
Little to none	12	10
< 1 hr	75	50
01-Feb	49	56
02-Apr	16	17
4+ hours	4	8

interested was associated with other survey responses utilizing two-sided Fisher’s exact test. Surprisingly, the interest in pursuing healthcare career was not affected by geographic location, race/ ethnicity, immigration status, economic hardship, media exposure, or increased or decreased difficulty of classes. Results are summarized in Table 2.

Discussion

While initially affecting limited geographical regions during spring of 2020, our survey responses were obtained when the entire United States and the world became affected by the SARS-Cov-2 virus. This cross-sectional study aimed to evaluate the undergraduate students’ experience during the pandemic and its potential effect on the decision to enter healthcare career. Overall, the interest in pursuing healthcare career has increased or remained unchanged. The factors we examined that may influence career decision, including demographics, economic hardship, media exposure, and online learning environment, did not change students’ interest in healthcare career. This may in part due to the characteristics of survey respondents, who were subscribed to pre-health listserv and already interested in medical or nursing career. It is reassuring that pandemic promoted interest in healthcare career, rather than dissuading students from entering the field.

While we did not find a factor that was associated with change in healthcare career interest, a few interesting observations on future healthcare workforce have emerged from this study. First, there were high proportions of Asians (54.9%) and second-generation immigrants (52.2%) in the pre-health listserv. There was also high proportion of students who were fluent in non-English language used at home (58.2%). These findings point to the increasing diversity in the healthcare workforce. In fact, according to an article from 2016, foreign born doctors made up 25% of all physicians and Asian American medical school graduates made up approximately 20% of the class [9]. It is unclear why there is high number of Asians and second-generation immigrants interested in healthcare career. There may be strong cultural

preference in the Asian community in pursuing career in healthcare. Also, healthcare is consistently the top ten highest professions to receive visa approval [10], which may facilitate settling in the United States and thus have positive reputation in immigrant communities. It will be interesting to assess pre-health listserv demographics in other institutions to see if the trend is similar. Additionally, it is still imperative that we continue to find ways to encourage students who are traditionally underrepresented in medicine to consider the profession and find ways to support them in their pursuits.

Second, large majority (73.4%) of the respondents were females. There has been increasing female matriculants in medical school. In fact, in 2019, women comprised slight majority 50.5% of all medical school students (11). Large proportion of female respondents in our survey reflects the trend of women workforce in healthcare. With this trend of increasing women and minority as healthcare professionals, there is greater mandate to support our workforce. Multiple studies have shown that there is patient bias against women and minority healthcare workers (12-14), and these biased encounters have negative effects on professional and personal identity. In order to best serve patients and protect the workforce, healthcare as a field must set firm boundaries against bias and aim for embracing diverse and inclusive work environment.

Main limitations of our study are that it is restricted to a single institution, and the racial/ ethnic distribution and immigration status were heavily skewed and not reflective of the general population. Further studies including additional institutions will be helpful to better gauge the demographics of undergraduate students pursuing healthcare careers. Another limitation is that the email link was sent to pre-health listserv, which is a biased student cohort with already high interest in healthcare career. Those who were not interested in healthcare career previously and now plan to pursue healthcare will not be captured by the survey. Also, among the students that opened the email with the survey link, approximately half did not respond. While it is limitation of all survey-based study, the students who were willing to participate in the survey may be different from those who did not respond. On the other hand, among those who were already interested, there was persistent interest despite the pandemic.

There has been large increase in application to medical school in 2020, which has been compared to “time after 9/11, when we saw an increase in those motivated to serve this country militarily”. [15] It is great to see the desire to serve the community by our students, and this corresponds to our finding of increased interest in healthcare career. The media spotlight of the pandemic may emphasize the value of the healthcare professional and may spark a trend of increased interest in the field. Multi-year study will be necessary to assess the long-term effects of pandemic on the healthcare profession. As we welcome new members into

this profession, we must continue our efforts at supporting and meeting the need of increasingly diverse workforce.

Declaration of interest

Authors have nothing to disclose.

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Supplementary Material

Healthcare Career in COVID-19 Pandemic Survey

<https://docs.google.com/forms/d/e/1FAIpQLSd0bcb2SZ9rAz-9xtSgkXGN1SLgRVPr2281IQsJcUw3wvdqgA/viewform>

Page 1

Your participation is completely voluntary, and you can withdraw at any time.

To take this survey, you must be:

- At least 18 years old
- Be an undergraduate student, post-baccalaureate student, currently considering or at one time

considered becoming a healthcare professional

All data will remain anonymous. If you choose to provide your email to be entered into the

drawing for one of several \$5 amazon gift cards, your email will not be used in conjunction with

the answers you provided.

A detailed consent form and study information can be found here:

https://drive.google.com/file/d/1O9DtBbLgQTZHhySXi2H0DqXg_QPdGZ8Q/view?usp=sharing

If you meet these criteria and would like to take the survey, indicate below and continue to start

Page 2

By selecting 'Yes' you are indicating you have read the informed consent and agree to

participate in the research study *

Survey

What is your age? *

What is your gender? *

- Female
- Male
- Non Binary
- Other:

What is your race or ethnicity? *

- Native American or Alaska Native
- Caucasian
- Multiracial or Multiethnic
- Asian

- Native Hawaiian or other Pacific Islander
- Black or African American
- Hispanic or Latino
- Middle Eastern or North African
- Other:

What is your hometown (State, Country) *

What is your hometown city? *

What is your Immigration status? *

- First generation immigrants (yourself do not have USA citizenship or initially did not have
- USA citizenship but obtained one)
- Second generation immigrants (yourself naturally had USA citizenship from birth, but not
- so for parents)
- Third generation immigrants (yourself and at least one parent naturally had USA
- citizenship from birth, but not so for grandparents)
- In USA 3+ generation
- International
- I choose not to answer or don't know
- Other:

Fluent language(s) other than English used at home

What College or University do you currently attend? *

- How is your tuition paid? *
- Loan (need to be repaid)
- Parental support
- Financial Aid
- Scholarship (does not need to be repaid)
- Work during school (excluding work study)
- Work study related to financial aid
- Other:

Are you taking out an educational loan? (Please specify amount that needs to be paid back)

- none
- < \$10,000
- \$10,000 - \$25,000
- \$25,000 - \$50,000
- \$50,000 - \$100,000
- \$100,000 - \$150,000

- \$150,000 - \$300,000
- +\$300,000

Are you supporting anyone financially? *

- None
- Self
- Child / Children
- Parents / Extended family
- Spouse / Partner
- Other:

Year in college for Fall 2020 *

- Undergraduate year 1
- Undergraduate year 2
- Undergraduate year 3
- Undergraduate year 4
- Undergraduate year 4+
- Taking semester / year off of school
- Post-Bac year
- Other:

What is/was your major / minor in college? *Select all that apply

- Undecided
- Arts and Humanities
- Business
- Pre-Med
- Multi-/Interdisciplinary Studies
- Public and Social Services
- Science, Math, and Technology
- Social Sciences
- Trades and Personal Services
- Other:

What career field are you planning to pursue after college? *

- Undecided
- Education
- Finance/ Business
- Law
- Administration
- IT/Tech/Engineering

- Physician/Medicine
- Other Healthcare Professional (e.g. nursing, physician assistant, pharmacist, dentist, etc)
- Other:

What kind of healthcare professional are you working towards becoming? *

- Nurse/ Nurse Practitioner/ Nurse Anesthetist
- Physical/ occupational/ Speech Therapist
- Pharmacist
- Medical technician/ Dental hygienist
- Physician Assistant
- Dentist
- Emergency Medical Services
- Undecided
- Other:

What field do you want to go into? *

- General Internal medicine and hospitalist
- Internal medicine subspecialty (e.g. cardiology, nephrology, oncology)
- Pediatrics/ Pediatric subspecialty
- Ob/Gyn
- Family medicine
- Psychiatry
- Neurology
- Anesthesiology
- General surgery
- Surgical subspecialty (e.g. orthopedics, ENT, neurosurgery)
- Radiology/ Pathology
- Emergency medicine
- Undecided/I don't know yet
- Other:

What do you want to focus on? *

- Clinical / Direct patient care
- Healthcare administration
- Research, including academic & government hospitals/ research institutions
- Health-related insurance company
- Healthcare / Biotech Finance

- Healthcare industry/startup, including pharmaceuticals, medical devices / software
- Public policy
- Undecided
- Other:

Did your interest in the medicine/ healthcare profession change due to COVID-19 pandemic? *

- Increased
- Decreased
- Unchanged

Any consideration of change in career choice due to COVID-19 pandemic? *

- Yes
- No

Survey Part 5

What was your prior chosen field? *

- Undecided
- Non-Health Care Field
- Education
- Finance/ Business
- Law
- Administration
- IT/Tech/Engineering
- Physician/Medicine
- Other Healthcare Professional (e.g. nursing, physician assistant, pharmacist, dentist, etc)
- Other:

What was your reasoning for the change? *

- Personal health/ family health
- Work-life balance
- Income security
- Change of interest
- Other:

What was your previous experience with healthcare before COVID-19 pandemic? *

- Household member in medicine/ healthcare profession (people you live with e.g. parents or siblings)
- Relative/ friend in medicine/ healthcare profession (people not living with you e.g.

- grandparents, uncles/aunts, cousins, close family friend)
- Primary recipient of severe and/or ongoing chronic medical condition care (e.g. childhood cancer, asthma, seizure disorder)
- Household member with severe and/or ongoing medical condition care
- None of the above
- Other:

How do you consider your interaction with the American healthcare system before COVID-19

pandemic? *

- Extremely Negative 1 2 3 4 5 6 7 8 9 10 Extremely Positive
- On average, how much COVID-specific media exposure have you had lately? (including, news, social media, online, etc) *
- Little to none
- Up to 1 hour/ day
- 1-2 hours/day
- 2-4 hours/day
- +4 hours/day

What is your main source of COVID-specific media/news? *

- Family/ friends/ word of mouth
- Official news outlets e.g CNN, ABC, NBC etc
- Social media
- Federal, state, and local government website (e.g. CDC, FDA, local health department)
- Other websites
- Other:

How do you feel the media coverage on the American healthcare field has been in light of

COVID-19 *

(e.g. as it pertains to judging/praising healthcare professionals for their actions, judging/praising

safety conditions in clinics, judging/praising quality of care, etc?)

- Extremely Negative 1 2 3 4 5 6 7 8 9 10 Extremely Positive

What are your sentiments on the future practice of medicine and hospital/clinic recovery after the pandemic? *

Financial recovery, operational recovery (e.g. enough PPE, infection control), level of government regulation/ administrative burden.

- Extremely Negative 1 2 3 4 5 6 7 8 9 10 Extremely Positive

What are your sentiments on economic and social recovery from the pandemic? *

(e.g. on unemployment returning to pre-pandemic levels, COVID-19 impacting fewer individuals

health, social activities returning to normal)

- Extremely Negative 1 2 3 4 5 6 7 8 9 10 Extremely Positive

How has COVID-19 affected you personally emotionally, mentally, and/or physically on a personal level? *

- No effect 1 2 3 4 5 6 7 8 9 10 Significant effect

On average, how has COVID-19 affected your family and/or close friends on an emotional,

mental, and/or physical level? *

- No effect Negative 1 2 3 4 5 6 7 8 9 10 Significant effect

Have you lost a job, grad school position, or internship as a result of COVID-19? *

- Yes

- No

Has any of your family or friends lost a job, grad school position or internship? *

- Yes

- No

How has COVID-19 impacted the format of your education (check all that apply) *

- Recorded lectures/ “asynchronous lectures”
- Synchronous lectures/ “live session” only
- Online office hours (live sessions)
- Additional help through email
- No office hours/ additional help
- Other:

Within your knowledge, do you think there is increased academic dishonesty during this semester?

As a reminder, all responses are anonymous *

- 0% of class cheating 1 2 3 4 5 6 7 8 9 10 100% of class cheating

How have these changes impacted the difficulty of your courses? *

- Made classes easier
- Made classes harder
- Difficulty of classes unchanged

What contributed to less challenging courses? check all that apply *

- Open book exams
- increased time to complete exam
- Group projects in lieu of exams
- Professors more sympathetic
- No attendance/participation grades
- More generous curve
- More flexible learning environment e.g. can take breaks, re-watch lecture videos
- Other:

What contributed to more challenging courses? Check all that apply *

- Live session lectures/ office hours on inconvenient time zone
- Difficulty collaborating with group members on projects
- Disruptive/ distracting learning environment/ no dedicated study space
- Lack of technology/good internet connection
- Difficulty focusing due stress
- Additional responsibilities/ less time to study
- Other:

Has the change in academic instruction due to COVID-19 influenced your interest in medicine? *

- Increased interest
- Decreased interest
- Did not change interest