ORIGINAL INVESTIGATION

The Future of the White Coat: Do Future United States Physicians Prefer to Wear a White Coat?

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ABSTRACT

Background Physician appearance can play a role in his/her perceived competence by patients. The white coat has long been regarded as the standard uniform for physicians. However, little is understood in regard to the preference and intent to wear white coats in the future generation of physicians.

Objective To determine if medical students intend to wear a white coat in their future practice

Design 1,056 medical students at 30 randomly selected United States medical schools were asked to complete a brief questionnaire assessing their preference regarding future plans for wearing a white coat as an attending physician. For all survey respondent data, respective frequencies of categorical variables for patient cohorts were compared with Fisher exact test including 2 groups or chi-square test for patient cohorts including more than 2 groups

Results Among all respondents (n=1056), the majority of United States medical students do not plan to wear a white coat in future practice (n=641, 61%). Among stratified comparison sub-groups, there was only a significant difference between first-year and more senior medical students and those respondents from medical schools based in the Western United States. No statistically significant differences were found amongst other sub-group clothing preferences including student gender, age, or future specialty.

Conclusions Despite previous literature demonstrating a patient preference toward a provider who wears a white coat, future United States physicians do not intend to wear a white coat in their practice. First-year medical students and medical students training in the Western United States show a stronger preference for wearing a white coat, but there is no significant difference upon subgroup analysis based on student age, gender, or intended specialty. Though the findings of this study could represent a trend away from the traditional widespread donning of the white coat in future physicians, further research is needed to further understand the non-verbal, non-physical complexities of the doctor-patient relationship.

Level of Evidence: Economic/Decision Analysis IV.

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The authors claim no conflicts of interest or disclosures.

AMSRJ 2021; 7(1)

http://dx.doi.org/10.15422/amsrj.2020.08.006

INTRODUCTION

It is well documented that a physician's physical appearance may facilitate his/her perceived competence, [1,2] enhance the doctor-patient relationship, [2] and promote patient adherence to treatment recommendations. [2] The white coat

was selected by the Arnold P. Gold Foundation for physicians as a symbol of compassion and humility, and has traditionally been associated with the uniform of physicians. [3] To patients, the white coat is preferred due to ease of identification, [4,5] tradition, [4] apparent hygiene, [1,4,6] perceived competence, and seeming more knowledgeable [1,6–9] and professional in appearance. [4–6,8] This affinity for a physician who wears a white coat is even greater in those patients and doctors of advanced age. [4,10] However, the practicality, [4] comfort, [4] and even hygiene [4,11–15] of doing such has been called into question throughout recurrent study and paneling of physicians.

Much of the literature on the role of white coats in medicine has been targeted towards the patient's perspective, which has largely shown that patients do prefer their physicians to wear a white coat. [1,4,5,7–10,16–18] However, there is a paucity of literature on the topic from the perspective of the provider, and none from the perspective of our future providers—medical students. It is imperative that we gain perspective on the white coat and the anticipated role that it will play in the practice and dress of our future providers in order to more closely address and align the preferences of patient and provider. It is our hypothesis that current medical students do not intend to wear a white coat as future physicians, and it is the aim of this study to determine if medical students intend to wear a wear a white coat as part of their future practice.

MATERIALS AND METHODS

Study Respondent Selection As no patient information was sought for this voluntary, online questionnaire to medical students, Institutional Review Board exemption was granted for this study. Electronic consent was established upon engagement with the survey per study instructions. 1,056 medical students at 30 randomly selected United States (U.S.) medical schools were asked to complete a brief questionnaire including intentions to wear a white coat as a future physician. To select 30 random medical schools to query, a list of all accredited allopathic and osteopathic medical schools was first identified and indexed sequentially; a random number generator then was used to select 30 medical schools at random to survey. Survey respondents were asked by a neutral party to complete the questionnaire at their leisure either through group, student-body email or social media forum (eg, Facebook group pages) to ensure that no bias was introduced by the study procedures. Medical students (both allopathic and osteopathic) of all ranks were asked to participate. Medical students not at an Accreditation Council for Graduate Medical Education (ACGME) accredited medical school were excluded from the study.

Description of Questionnaire Subjects who had consented to participate in this study were asked to complete a brief questionnaire **(Figure 1)**. Respondents were prompted to provide a discussion of their viewpoint(s) selected if they desired. The following demographic information was collected for all respondents: current age, sex, environment of medical school (eg, urban, suburban, rural), clinical year of medical school (M1, M2, M3, M4), ethnicity, region of medical school (eg, Northeast, Midwest, South, West, Puerto Rico or other U.S. territories), education level, and whether participant has family members who are/were physicians, and their intended medical specialty for which they were most interested in applying for residency training (eg, psychiatry, family medicine, internal medicine, radiology, anesthesia, general surgery, ophthalmology, orthopaedic surgery, vascular surgery, urology, OB/GYN, pediatrics, neurology, emergency medicine, pathology, dermatology, plastic surgery, not listed/other/undecided).

Statistical Considerations For all survey respondent data, respective frequencies of

categorical variables for patient cohorts were compared with Fisher exact test including 2 groups or chi-square test for patient cohorts including more than 2 groups (version 8.00, GraphPad Prism for Mac, Graph Pad Software, La Jolla, CA). A p-value of less than 0.05 was considered statistically significant.

RESULTS

Patient demographics A total of 1,056 U.S. medical students were enrolled in our study. A breakdown of our study population can be found in **Table 1**. If a question was left blank, the remaining data was included in the study.

Analysis of Subject Responses Among all respondents, the majority of U.S. medical students do NOT plan to wear a white coat as a practicing physician (n=641, 61%; Table 1 and Figure 1). This trend persisted across respondents irrespective of area of post-graduate medical training interest and gender with the exception of first year medical students

Questionnaire Administered to Subjects

Circle the choice that best applies; or describe as appropriate

What year medical student are you:

M1 M2 M3 M4 Prefer not to Say

What is your age? ______

What is your gender?

Male Female Prefer not to Say Other: ______

Is English your first language?

Yes No Prefer not to say

Is anyone else in your family a physician (US or internationally)?

Yes No Prefer not to say

What is your intended specialty for which you plan to pursue residency training? (please select)

- psychiatry,
- family medicine,
- internal medicine,
- radiology,
- anesthesia,
- general surgery,
- ophthalmology,
- orthopaedic surgery,
- vascular surgery,
- urology,
- OB/GYN,
- pediatrics,
- neurology,
- emergency medicine,
- pathology,
- dermatology,
- plastic surgery,
- not listed/other/undecided

As a future physician, do you intend to wear a white coat?

a. Yes b. No

Figure 1: Questionnaire administered to study subjects

and those respondents from medical schools based in the Western United States (eg, Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming) (**Table 1, Figure 2**). Among stratified groups, as described in Table 1, there was only a significant difference in clothing preference between geographic region of medical school and year of medical school. No statistically significant differences were found amongst other sub-group clothing preferences.

DISCUSSION

The white coat has long been celebrated by the medical community as a symbol of status and the standard uniform for doctors. Though some institutions require a white coat to be worn by practitioners, there has been little study on the overall preference of physicians and future physicians, medical students, to continue this tradition in their future practice. To our knowledge, this is the first study reporting medical student preferences regarding their intent to wear white coats as future resident physicians. Consistent with our initial hypothesis, the majority of medical students do not intend to wear white coats in their future practice. Interestingly, there was an inverse relationship between seniority of medical student and his/her preference toward wearing a

Variable	Sample Size	Yes	No	P value
All respondents, % (n)	1056	39 (415)	61 (641)	–
Year of Training[a], % (n)				**P <0.0001**
MS1	144	58(83)	42 (61)	
MS2	149	48(72)	52 (77)	
MS3	221	34(71)	66 (140)	
MS4	552	34(189)	66 (363)	
Specialty Interest[§], % (n)				P = 0.245
Surgical	264	43(113)	57(151)	
Non-Surgical	645	34(217)	66(429)	
Geographic Region[a], % (n)				**P =0.005***
Northeast	402	43(173)	57 (230)	
South	377	34(146)	66(281)	
Midwest	55	33(18)	67(37)	
West	166	55(91)	45(75)	
Puerto Rico or Other[∞]	5	40(2)	60(3)	
Gender[§], % (n)				P = 0.469
Male	471	36(154)	64(275)	
Female	619	42(259)	58(361)	
Prefer not to say/Other[∞]	7	29 (2)	71 (5)	

Table 1. U.S. Medical Students' Intentions of Wearing a White Coat as a Practicing Physician
* Data are given as percentage (number) of each group unless otherwise indicated. Percentages may not total 100 due to rounding. Sample size totals may not equal 1056 due to participant refusal to provide response. Categorical variables were compared using Fischer's Exact Test[§] or Chi Square test[a]; p-values < 0.05 were considered significant (denoted by bold text). Sub-category cohort size of less than 1% of study population sample size ([∞]) were excluded from comparison of categorical variable as relative frequencies may be skewed by smaller sample size.

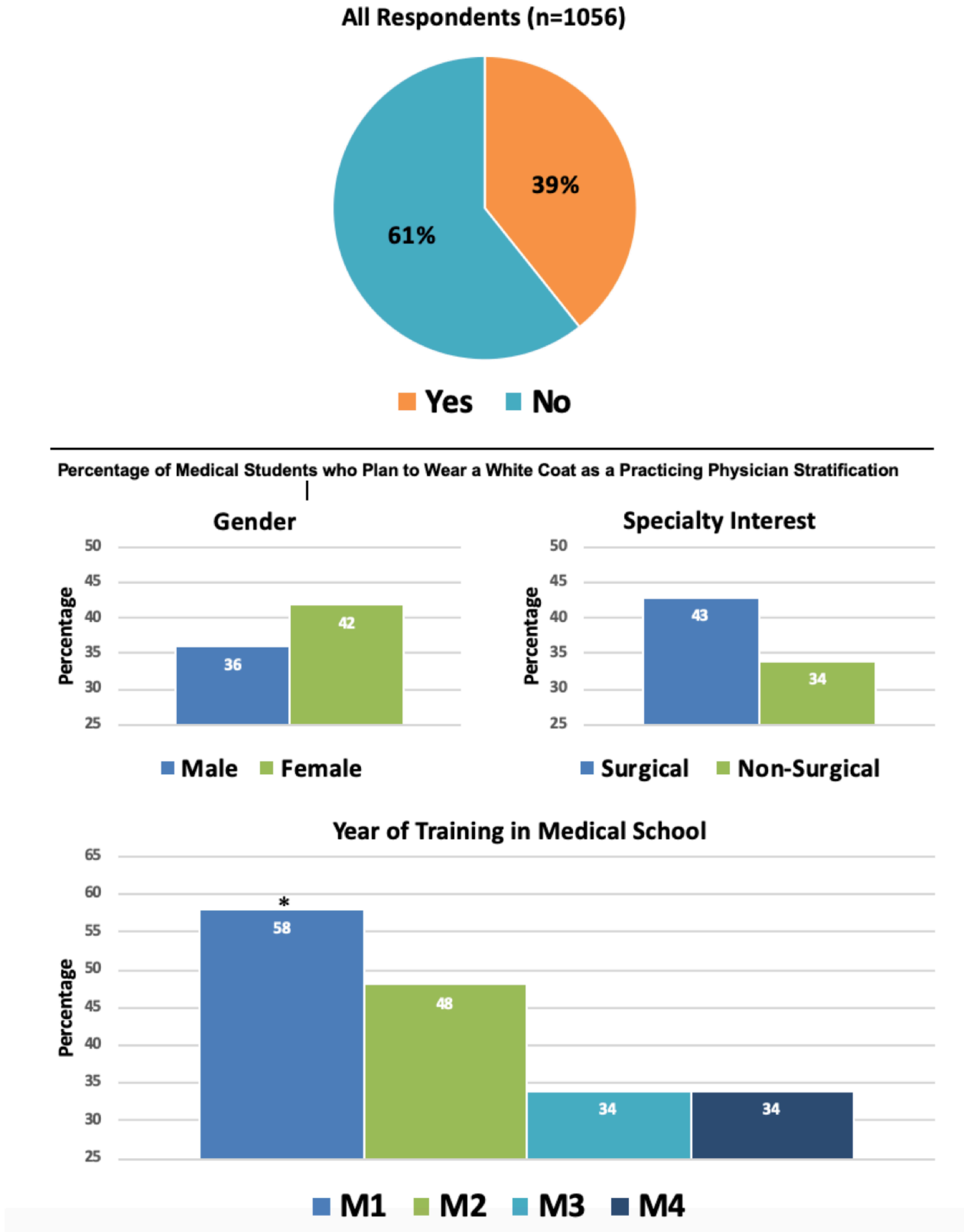

Figure 2: Intention of U.S. Medical Students to Wear White Coats, stratified by gender, specialty interest, and medical school class. Surgical Specialties: Dermatology, General Surgery, OB/GYN, Ophthalmology, Orthopaedic Surgery, Plastic Surgery, Urology, Vascular Surgery; Non-surgical Specialties: Anesthesia, Emergency Medicine, Family Medicine, Internal Medicine, Neurology, Pathology, Pediatrics, Psychiatry, Radiology.

white coat in future practice. While the cause of these findings is unclear, one may speculate that more senior students maintain less excitement or perceived importance in wearing a white coat as their clinical responsibilities in their respective hospital systems change. Medical students on the west coast indicated a greater preference towards wearing a white coat than any other demographic region. There were no significant differences in intentions to wear a white coat based on gender or future specialty preference.

The findings of the present study are in contrast to much of the existing literature regarding patient preference for a physician who wears a white coat. In a questionnaire-based study Petrilli et al., the most highly rated attire involved either formal attire or scrubs with a white coat for both male and female physicians, especially in the cohort of patients 65 years or older. [2] Specifically, physicians wearing a white coat were more highly regarded in domains including: knowledge, trustworthiness, compassion, and ability for the physician to comfort the patient. Respondents agreed that physician attire influences their overall satisfaction levels. [2] These findings possibly stem from both conscious and unconscious biases and preferences for specific physician attire across a variety of clinical settings. [6,8,26–30,9,19–25]

The preference of the majority of future U.S. physicians to not wear a white coat could have an effect on overall physician hygiene. A systematic review of 72 individual studies by Haun et al. demonstrated that white coats are susceptible to contamination with several infectious and antibiotic-resistant organisms including methicillin-resistant staphylococcus aureus (MRSA), enterococcus species, Clostridium difficile, and other gram-negative rods that are frequently implicated as cause for hospital-acquired infections. [31] Furthermore, a cross-sectional survey of white coats in a tertiary care hospital by Banu et al. revealed that despite the majority of physician white coats being washed within the past 2 weeks, frequent bacterial isolates included gram-positive cocci that were resistant to Penicillin, Erythromycin, and Clindamycin. [32] Goyal et al. also showed that providers launder their white coat far less frequently than scrubs or other clothing articles, [33] and further understanding provider clothing contamination has led some institutions to adhere to the "bare below the bow" movement. [34] While the white coat preference of the future generation of U.S. physicians goes against past traditions, it could play a substantial role in preventing the spread of harmful and drug-resistant pathogens in the hospital setting.

In the study by Petrilli et al., upon stratification of patient preference based on physician specialty, patients preferred their surgeon to not wear a white coat, but patients preferred all non-surgical specialists to wear a white coat. [2] In the present study, however, future surgeons indicated a greater preference towards wearing a white coat versus their non-surgical colleagues, though this difference did not reach significance.

Due to the nature of this study and distribution of survey materials, questionnaire bias is likely with only those who chose to participate are represented. While a cross-sectional design is optimal for this study question, it was not feasible to recruit subjects in a sequential manner. This study attempted to identify the physician's viewpoint on wearing white coats, but did not address that viewpoint of the patient. Additionally, our study queries medical students on their anticipated preference. While this survey cohort offers some benefit for educational training emphasis, it may also misrepresent the actions demonstrated by these students upon becoming a physician.

CONCLUSION

Much of the current literature on the role of white coats in medicine has been targeted towards the patient's perspective, which has largely shown that patients do prefer their physicians to wear a white coat. This is the first study reporting medical student preferences regarding their intent to wear white coats as future resident physicians. Contrary to what patients may prefer, the majority of medical students do not intend to wear white coats in their future practice. Further study is warranted that focuses on non-verbal modes of communication that comprise the doctor-patient relationship in order to optimize patient outcomes.

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