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This Medical Education theme issue introduces a new collaboration between the JAOA and the American Association of Colleges of Osteopathic Medicine (AACOM) to recruit, peer review, edit, and distribute articles through the JAOA on osteopathic medical education research and other scholarly issues related to medical education.

JAOA and AACOM

Perceptions of US and Australian Medical Students and Instructors About Clinical Professional Attire: LAPEL Study

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The authors made an oral presentation of this article at the Asian Medical Education Association Conference in Newcastle, New South Wales, Australia, on April 1, 2015.

The article was also presented in poster format at the Touro University California Research Day in Vallejo on April 29, 2015.

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Context: White coats have long been the professional uniform of physicians. However, when physicians opt to remove the white coat, their clothing underneath is brought to the forefront and can influence how they are perceived by their patients.

Objective: To explore the perceptions of medical students and their instructors about appropriate clinical professional attire.

Methods: An anonymous, voluntary 55-question survey was electronically distributed to medical students and their instructors at 2 US and 2 Australian medical schools. The survey incorporated 30 images of sample attire, 9 demographic questions, and 16 questions regarding culture and context of clothing and accessories.

Results: In total, 411 students and 73 instructors participated in this study. The data revealed that white coats and neckties are nearly absent in Australian clinical attire. Overall, students were significantly more supportive of full facial coverage due to religious or cultural values compared with instructors ($P<.001$), and US medical students were significantly more supportive than Australian students ($P<.001$). All cohorts preferred dress code policies that directed students to avoid but not prohibit the use of perfume or cologne. Nose rings were controversial with significantly more support for use from medical students than instructors (pooled cohorts, $P=.002$). Medical students in both the United States and Australia indicated that they were most influenced by observing the attire of physicians at work (155 [38%]), compared with courses in medical ethics (19 [5%]), school policy (16 [4%]), or hospital policy (9 [2%]).

Conclusion: Although regional dress code practices are different in the United States compared with Australia, medical students were overall most influenced by their instructors' attire in clinical settings.

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Dating back to 350 to 300 BC, the white coat has represented the uniform of physicians around the world.¹ Beginning in 2007, white coats largely fell out of favor because of concerns about transmission of infectious organisms.² In the clinical workplace (eg, hospital, outpatient clinics), we need to ask: What is acceptable or unacceptable professional attire and who decides? If the white coat that covers potentially unsuitable clothing is removed, the clothing underneath becomes the clinical uniform for social inspection.

Physicians' professional attire plays an important role in how they are perceived. White coats tend to garner trust and confidence from patients.³ In a survey of Canadian intensive care units,⁴ patients were presented photos of physicians and were asked which images best reflected attributes of a physician (eg, caring and compassionate, a team player, most capable of performing a life-saving procedure).⁴ Patients indicated that those in white coats were most knowledgeable and honest and most likely to provide the best overall care followed by those in scrubs, then suits, then casual attire, which received the lowest rating.⁴

Without the white coat, patients may have difficulty distinguishing physicians from medical students or other health care team members who wear similar attire (eg, surgical scrubs in the operating theater). In addition, name tags or identification badges are often not visible. Although some patients may prefer white coats,⁵⁻⁷ unsupported claims have been made that such coats can carry infectious organisms that may be detrimental in hospital wards and clinics.⁸⁻¹⁰ In the absence of the white coat, a physician's clothing must be assessed for appropriateness and professionalism. Our multi-institutional study explored the perceptions of medical students and their instructors about appropriate professional clinical attire. Aiming to understand what informs perceptions of appropriateness, the present study (or, the LAPEL study) recognizes the multicultural nature of student and instructor cohorts, as well as climate variations across continents.

Methods

This research was reviewed and approved by the Bond University Human Research Ethics Committee on behalf of Bond University and the University of Tasmania (#RO1785), the Touro University Institutional Review Board (#M-1913), and the Baylor College of Medicine Institutional Review Board (#H-34415).

We used a nonexperimental research design with osteopathic and allopathic medical student and instructor convenience samples at 2 medical schools in the United States and 2 in Australia. Sample size calculations determined that 327 student and 234 instructor participants were needed. An anonymous, voluntary questionnaire was distributed to 2198 osteopathic and allopathic medical students across all years and to 196 instructors using a SurveyMonkey survey. We did not reach the sample size calculation for instructors because the total number of instructors at all 4 schools was 196. From February 2014 to March 2014, the link was sent by means of e-mail (with 1 reminder 2 weeks later) to cohorts at 2 US universities (Touro University California, College of Osteopathic Medicine in Vallejo and Baylor College of Medicine in Houston, Texas) and 2 Australian universities (Bond University School of Medicine in Gold Coast, Queensland, and the University of Tasmania School of Medicine in Hobart).

The online questionnaire consisted of 55 questions that comprised 9 demographic questions, 16 questions regarding culture and context of clothing and accessories, and 30 questions seeking an opinion about the suitability of presented attire while working with real patients and standardized patients. These questions were based on those used in previous studies.^{3,11} Image distractions (eg, face, briefcase, mobile phone) in questions were obscured so as not to introduce bias.

Data were analyzed using 2-tailed χ^2 and Fisher exact tests ($df=1$) with QuickCals (GraphPad Software, Inc). Specifically, a χ^2 test was used whenever the cell size involved 5 or more observations, and the Fisher exact test was used with 4 or fewer observations. A P value less

Table 1.
Demographics of US and Australian Medical Students and Instructors
Surveyed About Professional Attire (N=484)

Characteristics ^a	Response Rate, No. (%)	
	Students (n=411)	Instructors (n=73)
Study Site		
Bond University School of Medicine	47 (13.6)	13 (18.3)
University of Tasmania School of Medicine	143 (24.9)	43 (71.7)
Touro University California, College of Osteopathic Medicine	123 (22.8)	16 (24.6)
Baylor College of Medicine	98 (13.3)	1 (0.3)
Overall	411 (18.7)	73 (36.7) ^b
Age, y		
20-30	344 (84)	...
51-60	...	30 (41)
Men	156 (38)	30 (42)
Highest-Earned Academic Degree		
None	160 (39) ^c	...
Bachelor's	195 (47)	...
MD/DO/MBBS	...	40 (55)
PhD	...	15 (21)
Experience,^d y		
1	84 (20)	...
2 ^e	100 (24)	...
3	79 (19)	...
4	105 (26)	...
5	42 (10)	...
6	1 (0.2)	...
0-5	...	15 (21)
6-10	...	22 (30)
11-15	...	11 (15)
16-20	...	9 (12)
>20	...	15 (21)

^a Not all participants answered all questions.

^b Overall response rate for instructors excludes Baylor College of Medicine because of their substantial lack of participation.

^c Bond University School of Medicine and the University of Tasmania School of Medicine have 5-year undergraduate programs. Students may enter the program after high school with no degree required.

^d Years in school for students; years in teaching for instructors.

^e First-year students at Bond University School of Medicine had progressed to year 2 status at the time the survey was administered.

than .05 was considered statistically significant. Sample size calculations were performed with a 95% confidence level. We did not receive delivery receipts and thus do not know how many e-mails were invalid.

Results

Of the 2198 students who were sent the survey, 411 completed it, accounting for an 18.7% response rate (Table 1). Of 196 instructors who were also sent the

Table 2.
A Comparison of US and Australian Medical Students' Practice of Wearing White Coats^a

Agreement Statement	US Students (n=224) ^b	AUST Students (n=189)	P Values ^c
I am required to wear a white coat per school policy.	187 (83)	2 (1)	<.001
I wear a white coat by personal choice.	28 (13)	1 (<1)	<.001
I do not wear a white coat—it is optional at my school.	8 (4)	11 (6)	.35
I do not wear a white coat—it is not part of my school dress code.	1 (<1)	175 (93)	<.001

^a Statements pertained to inpatient or outpatient settings, as well as educational sessions with standardized patients.

^b Three responses were duplicates, but they could not be removed because the data were anonymous.

^c A P value less than .05 was determined to be statistically significant using Fisher exact test.

Abbreviation: AUST, Australian.

survey, 73 completed it, accounting for a 36.7% response rate. Of 411 students, 258 (63%) were women, and 344 (84%) were aged 20 to 30 years. Student response was fairly equally balanced across years 1 through 4 of degree progression (20%, 24%, 19%, and 26%, respectively). Of the 73 instructors, 42 (58%) were women, 30 (41%) were aged 51 to 60 years, and 22 (30%) had 6 to 10 years of teaching experience. Most US and Australian instructors also worked in clinical practice (43 [77%] and 11 [65%], respectively). Notably, 1 US instructor and 2 Australian instructors wore white coats in their clinical practice.

We compared the practice of wearing white coats by medical students in the United States and Australia (Table 2). Both by school policy and by personal choice, white coats were predominantly worn by US medical student participants compared with Australian medical student participants.

Table 3 compares students and instructors in their opinions about dress code policies and various items of clinical attire, such as neckties, perfume or cologne, piercings, surgical scrubs, tattoos, and white coats. Our data confirm that a white coat and necktie for men is accepted in the United States even though 13 US instructors (81%) responded that it is permissible to have a different standard of dress for a medical student vs a practicing physician. In the United States, 14 instructors (88%) and 130 medical students (58%) responded that white coats should be routine attire in clinical practice,

whereas 24 Australian instructors (43%) and 111 medical students (59%) indicated that white coats should not be worn. Similarly, Australian medical students were significantly more prohibitive of neckties than US medical students (64 [34%] vs 26 [16%]; $P<.001$). Regarding full facial coverage due to religious or cultural values, medical students overall were significantly more supportive compared with instructors (236 [58%] vs 25 [34%]; $P<.001$), and US students were significantly more supportive than Australian medical students (145 [66%] vs 91 [48%]; $P<.001$).

Compared with their Australian peers, US students and instructors were significantly more supportive of dress code policies that prohibit the use of perfume or cologne by students in clinical settings (US instructors, 6 [35%] vs Australian instructors, 3 [5%]; $P=.004$; US students, 36 [16%] vs Australian students, 6 [3%]; $P<.001$) (Table 3). Nonetheless, all cohorts reported that they preferred dress code policies to direct students to avoid these products rather than to prohibit their use. Nose rings were controversial, with significantly more support for use indicated by students than by their instructors (pooled cohorts, 138 [34%] vs 10 [14%]; $P=.002$).

Table 4 compares students and instructors in their opinions about the suitability of various forms of footwear in clinical settings. Medical students in the United States are more accepting of casual footwear, such as

Table 3. US and Australian Medical Students' and Instructors' Perceptions About Professional Attire in Clinical Practice^a

Agreement Statement	Students (n=411)			Instructors (n=73)			Overall (Students and Instructors) (N=484)		
	US, No. (%)	AUST, No. (%)	P Value	US, No. (%)	AUST, No. (%)	P Value	US, No. (%)	AUST, No. (%)	P Value
Overall Perceptions									
Your concept of what is appropriate professional attire has changed over time.	105 (47)	97 (51)	.42	9 (56)	26 (46)	.68	35 (49)	202 (49)	.96
It is permissible to have a different standard of dress for a medical student and a practicing physician.	105 (47)	84 (44)	.69	13 (81)	19 (34)	<.001 ^b	32 (44)	189 (46)	.94
Professional Attire									
White coat should be routine attire.	130 (58)	24 (13)	<.001 ^b	14 (88)	20 (36)	<.001 ^b	34 (47)	154 (38)	.16
White coat should be optional.	78 (35)	52 (28)	.15	1 (6)	12 (21)	.27	13 (18)	130 (32)	.03 ^b
White coat should not be worn.	15 (7)	111 (59)	<.001 ^b	1 (6)	24 (43)	.007 ^c	25 (35)	126 (31)	.59
Surgical scrubs are suitable in lieu of other attire.	171 (77)	132 (70)	.15	9 (56)	39 (70)	.37	48 (67)	303 (74)	.27
Excluding the operating theater, it is appropriate for the clinical setting to affect the choice of professional attire.	209 (94)	165 (88)	.08	16 (94)	45 (80)	.33	61 (84)	374 (91)	.04 ^b
Neckties should be worn by all male medical students.	29 (13)	6 (3)	<.001 ^b	3 (18)	4 (7)	.34	7 (10)	35 (9)	.92
Neckties should be prohibited for medical students.	26 (16)	64 (34)	<.001 ^b	3 (18)	16 (29)	.53	19 (26)	100 (24)	.83
Dress code policies should permit full facial coverage due to religious or cultural beliefs or customs.	145 (66)	91 (48)	<.001 ^b	9 (53)	16 (29)	.08	25 (34)	236 (58)	<.001 ^b
Perfume or Cologne, Piercings, and Tattoos									
Dress code policies should prohibit perfume and cologne.	36 (16)	6 (3)	<.001 ^b	6 (35)	3 (5)	.004 ^c	9 (12)	40 (10)	.64
Dress code policies should indicate the avoidance of perfume and cologne.	133 (59)	65 (35)	<.001 ^b	9 (53)	27 (48)	.95	36 (49)	198 (48)	.94
Dress code policies should not address perfume and cologne.	55 (25)	117 (62)	<.001 ^b	2 (12)	26 (46)	.01 ^c	28 (38)	172 (42)	.003 ^b
Earrings should be allowed.	175 (80)	167 (88)	.03 ^b	12 (75)	43 (80)	.73	55 (79)	342 (83)	.41
Nose rings should be allowed.	75 (34)	63 (33)	.93	4 (25)	6 (11)	.22	10 (14)	138 (34)	.002 ^b
Facial piercings (eg, eyebrow) should be allowed.	28 (13)	28 (15)	.66	4 (25)	5 (9)	.19	9 (13)	56 (14)	.86
Lip piercings should be allowed.	23 (10)	21 (11)	.97	2 (13)	2 (4)	.22	4 (6)	44 (11)	.28
Tongue piercings should be allowed.	24 (11)	28 (15)	.31	2 (13)	2 (4)	.22	4 (6)	52 (13)	.11
Dress code policy should not address piercings.	55 (25)	32 (17)	.06	3 (19)	14 (26)	.74	17 (24)	87 (21)	.68
Visible tattoos must always be covered.	79 (35)	81 (43)	.15	5 (29)	25 (45)	.40	30 (41)	160 (39)	.79
Visible tattoos must be covered only if they depict violence, obscenity, or pornography.	122 (55)	96 (51)	.36	9 (53)	27 (48)	.95	36 (49)	218 (53)	.69
Visible tattoos do not require covering.	23 (10)	13 (7)	.003 ^b	3 (18)	4 (7)	.34	7 (10)	36 (9)	.68

^a Clinical practice refers to inpatient or outpatient settings, as well as educational sessions with standardized patients.

^b Statistically significant using 2-tailed χ^2 ($df=1$).

^c Statistically significant using Fisher exact test ($P<.05$).

^d Only eyes visible.

Abbreviation: AUST, Australian.

Table 4.
US and Australian Medical Students' and Instructors' Perceptions About Footwear Restrictions

Type of Footwear	Students (n=411)			Instructors (n=73)			Overall (Students and Instructors) (N=484)		
	US, No. (%)	AUST, No. (%)	P Value	US, No. (%)	AUST, No. (%)	P Value	US, No. (%)	AUST, No. (%)	P Value
Sneakers	51 (23)	85 (45)	<.001 ^b	5 (29)	26 (46)	.34	31 (43)	136 (33)	.16
Running shoes ^a	111 (50)	136 (73)	<.001 ^b	9 (60)	34 (61)	.96	43 (61)	247 (61)	.96
Stiletto	78 (35)	115 (61)	<.001 ^b	8 (47)	34 (61)	.47	42 (58)	193 (47)	.13
Stiletto ^a	127 (57)	156 (83)	<.001 ^b	12 (75)	48 (86)	.45	60 (83)	283 (69)	.02 ^b
Open-toed shoes	141 (64)	122 (64)	.93	12 (71)	29 (52)	.28	41 (56)	263 (64)	.24
Women's no heel, closed toe	59 (27)	59 (31)	.35	3 (19)	11 (20)	1.0	14 (20)	118 (29)	.15
Women's low heel, closed toe	13 (6)	13 (7)	.80	2 (13)	4 (7)	.61	6 (8)	26 (6)	.68
Women's mid heel, closed toe	15 (7)	54 (29)	<.001 ^b	1 (6)	12 (21)	.27	13 (18)	69 (17)	.92
Boots	18 (8)	23 (12)	.24	1 (6)	5 (9)	1.0	6 (8)	41 (19)	.80
Hiking boots ^a	104 (47)	102 (54)	.15	7 (44)	14 (25)	.25	21 (29)	206 (50)	.002 ^b
Ugg boots ^a	190 (85)	181 (96)	<.001 ^b	12 (75)	51 (91)	.10	63(88)	371 (90)	.70
Cowboy boots ^a	91 (41)	137 (73)	<.001 ^b	8 (50)	26 (46)	.80	34 (47)	228 (55)	.25
Sandals	153 (70)	130 (68)	.89	11 (65)	31 (55)	.69	42 (58)	283 (69)	.07
Sandals ^a	203 (91)	179 (95)	.17	15 (94)	49 (88)	.67	64 (89)	382 (92)	.42
Thong sandals	193 (88)	175 (92)	.20	14 (82)	51 (91)	.57	65 (89)	368 (90)	.85
Clogs ^a	67 (30)	137 (73)	<.001 ^b	4 (25)	28 (50)	.09	32 (44)	204 (50)	.51
Men's Oxford dress shoes ^a	4 (2)	7 (4)	.36	1 (6)	2 (4)	.54	3 (4)	11 (3)	.44
Men's boat shoes ^a	40 (18)	53 (28)	.02 ^b	3 (19)	9 (16)	.72	12 (17)	93 (23)	.34

^a Medical students and instructors were shown an image of this footwear.

^b Statistically significant using 2-tailed χ^2 ($df=1$).

Abbreviation: AUST, Australian.

tennis shoes, running shoes, and various boots (including hiking boots) in clinical settings, compared with Australian medical students. Stilettos were viewed as unacceptable clinical footwear by significantly more Australian medical students than US medical students (156 [83%] vs 127 [57%]; $P < .001$). Rubber clogs, commonly marketed to health care professionals, were viewed as inappropriate footwear by significantly more Australian medical students than their US peers (137 [73%] vs 67 [30%]; $P < .001$).

Students and instructors were asked to view a collection of 18 clothing ensemble images (9 men's and 9 women's) and indicate their appropriateness for the clinical setting (Table 5). Images of men not wearing a necktie were judged as suitable more often by Australian medical students and instructors than by their US counterparts. Conversely, when a necktie was present, US medical students and instructors found the images more suitable than their Australian counterparts. Jeans, untucked shirts, and T-shirts on men were generally viewed as unsuitable attire by all cohorts. Women's dresses with either low-cut necklines or short lengths were also generally viewed as unsuitable; however, men were more supportive than women. Cultural attire (eg, women's churidar kameez [Indian tight trousers with tunic] worn with thong sandals) was viewed as inappropriate clinical attire significantly more often by students than instructors (pooled cohorts, 297 [72%] vs 41 [57%]; $P = .02$).

When instructors were asked whether a physician's attire influenced patients' opinion of the physician's knowledge, experience, competency or skill, and professionalism, they ranked professionalism highest and knowledge lowest. Similarly, when instructors were asked whether a medical student's appearance influenced patients' opinions of their knowledge experience, competency or skill, and professionalism, they ranked professionalism highest and knowledge lowest. Medical students' answers reflected identical findings.

Students and instructors were presented with 9 variables: (1) coursework in medical ethics and professionalism, (2) having a parent who is a physician, (3) hospital policy, (4) observing the attire of physicians at work, (5) personal experience as a patient, (6) personal upbringing in general, (7) professional codes of conduct, (8) school policy, and (9) television and media exposure. The participants were asked to choose which variable most influenced their values about the concept of professional attire in clinical situations. Instructors in both the United States and Australia indicated they were most influenced by their upbringing (21 [29%]), whereas having a physician as a parent and television and media exposure were not influential. Hospital policy and coursework in medical ethics and professionalism were the primary influencers for 2 US instructors and 1 Australian instructor.

Students in both the United States and Australia indicated they were most influenced by observing the attire of physicians at work (155 [38%]). Upbringing was a major influencer for 110 students (27%), and courses in medical ethics (19 [5%]), school policy (16 [4%]), and hospital policy (9 [2%]) ranked low as being influential.

Because Touro University California, College of Osteopathic Medicine is an osteopathic medical school and Baylor College of Medicine, Bond University school of Medicine, and University of Tasmania School of Medicine are allopathic medical schools, we compared data between osteopathic and allopathic medical students. Accounting for the cultural differences of white coat and necktie preferences across the United States and Australia, these student groups were much the same. Of 288 allopathic medical students, 182 (63%) were women, and 76 of 123 osteopathic medical students (62%) were women. Also, 244 of 288 allopathic medical students (85%) and 100 of 123 osteopathic medical students (81%) were aged 20 to 30 years. Both groups indicated that the primary influence over

Table 5. US and Australian Medical Students' and Instructors' Perceptions About Inappropriate Professional Attire in Clinical Practice^a

Attire	Students (n=411)			Instructors (n=73)			Overall (Students and Instructors) (N=484)		
	US, No. (%)	AUST, No. (%)	P Value	US, No. (%)	AUST, No. (%)	P Value	US, No. (%)	AUST, No. (%)	P Value
Men's Attire									
Business suit with necktie	101 (46)	113 (60)	.01 ^c	8 (50)	30 (54)	.80	38 (53)	214 (53)	.98
Slacks and long-sleeve dress shirt, no necktie	31 (14)	5 (3)	<.001 ^c	4 (29)	2 (4)	.01 ^b	6 (9)	36 (9)	.96
Slacks and long-sleeve dress shirt, with necktie	9 (4)	39 (21)	<.001 ^c	2 (13)	12 (22)	.72	14 (20)	48 (12)	.08
Slacks and untucked dress shirt	193 (86)	167 (88)	.60	13 (87)	38 (68)	.20	51 (72)	360 (87)	.002 ^c
Jeans, blazer, dress shirt, no necktie	164 (73)	115 (61)	.01 ^c	14 (88)	30 (54)	.02 ^b	44 (61)	279 (67)	.36
Jeans, dress shirt, no necktie, no blazer	194 (87)	142 (76)	.003 ^c	15 (94)	39 (70)	.06	54 (75)	336 (82)	.22
Chino pants, polo shirt	98 (44)	125 (66)	<.001 ^c	7 (44)	14 (25)	.25	21 (29)	223 (54)	<.001 ^c
Casual pants, T-shirt	204 (92)	175 (94)	.64	15 (94)	48 (86)	.67	63 (88)	379 (93)	.21
Chino pants, denim shirt	116 (52)	88 (47)	.34	12 (75)	13 (23)	<.001 ^b	25 (35)	204 (50)	.03 ^c
Women's Attire									
Dress (low neckline)	200 (90)	178 (95)	.12	15 (94)	51 (91)	<.99	66 (92)	378 (92)	.88
Mindress	184 (83)	143 (76)	.09	13 (81)	42 (76)	<.99	55 (75)	327 (80)	.81
Business suit	30 (13)	28 (15)	.77	3 (19)	3 (5)	.12	6 (8)	58 (14)	.25
Jeans, blazer, casual top	157 (70)	105 (56)	.003 ^c	14 (93)	21 (38)	<.001 ^b	35 (49)	262 (64)	.03 ^c
Jeans, dress shirt	186 (83)	133 (71)	.38	14 (88)	32 (57)	.04 ^b	46 (64)	319 (77)	.02 ^c
Dress slacks, untucked blouse	59 (26)	60 (32)	.27	6 (38)	17 (30)	.81	23 (32)	119 (29)	.71
Casual pants, casual untucked shirt	63 (29)	51 (27)	.86	5 (31)	7 (13)	.17	12 (17)	114 (28)	.08
Skirt, tucked blouse	11 (5)	9 (5)	.94	2 (13)	2 (4)	.22	4 (6)	20 (5)	.77
Churidar kameez with flip flops sandals (Indian tight trousers with tunic)	163 (73)	134 (71)	.76	11 (69)	30 (54)	.43	41 (57)	297 (72)	.02 ^c

^a Clinical practice refers to inpatient or outpatient settings, as well as educational sessions with standardized patients.

^b Statistically significant using Fisher exact test ($P < .05$).

^c Statistically significant using 2-tailed χ^2 ($df=1$).

Abbreviation: AUST, Australian.

their values about professional attire was observing the attire of physicians at work. Significantly more osteopathic medical students indicated that dress code policies should prohibit perfume or cologne compared with allopathic medical students (29 [23.6%] vs 13 [4.6%]; $P < .001$).

Discussion

Professional attire, a subset of professionalism, encompasses clothing, footwear, jewelry, perfume or cologne, piercings, and tattoos. Most of the studies³⁻⁷ about professional attire published in the medical literature pertain to the perception of patients regarding the dress of their health care professionals. Although the white coat has served as a visible and trustworthy badge of the medical profession,¹² some physicians are opting to remove white coats from the dress code, as evidenced by the findings in the current study.

We speculate that the lack of white coats and neckties worn by Australian physicians was influenced by the decision of the United Kingdom's Department of Health to recommend to end the use of white coats owing to their potential to transmit infectious organisms.¹³ However, studies⁸⁻¹⁰ have concluded that the real issue is not the coat but rather the failure to wear clean coats. One reason that physicians continue to wear dirty coats is many hospitals no longer provide laundry services for their staff. Medical students may be unable to afford laundry and ironing services for multiple coats, and busy physicians may find little time for these tasks. On-site hospital laundry services that clean and deliver batches of coats to their staff each week is an extra service that is not standard.

In a small study,¹⁴ neckties were found to be relatively clean in hospitals. Specifically, bacteria cultured were present in "very small numbers" and required enrichment medium to produce large numbers. Additionally, the authors found less nonhemolytic *Bacillus* cultured from the study neckties than the control neck-

ties.¹⁴ Comfort and risk of physical harm (eg, strangulation) could be other reasons for omitting neckties from professional attire. Much policy attention has focused on neckties and white coats as harmful vectors, but little regard has been given to the stethoscopes dangling from physicians' necks.¹⁵ Because Australian physicians rarely wear white coats and neckties, the adorning stethoscope has become an accessory that identifies them as a physician. Unlike other wardrobe elements, stethoscopes can be easily cleaned between each patient use, but this often does not happen.¹⁶ This topic is an important part of hygiene education whether or not white coats are worn.

Additionally, compared with allopathic physicians, osteopathic physicians, who are trained to provide osteopathic manipulative treatment, may have closer physical contact with their patients. In the current study, notably more osteopathic medical students compared with their allopathic counterparts indicated that dress code policies should prohibit perfume or cologne. Because of the close contact osteopathic physicians have with their patients, an osteopathic physician's attire, including visible jewelry, perfume or cologne, and tattoos, could potentially adversely affect the patient-physician relationship more than that of allopathic physicians. Given that physician attire can affect the patient-physician relationship, attire must be chosen carefully.^{3,6}

The potential for tensions between a physician's rights of self-expression and the external environment (ie, hospital, medical school, patients, society) exist. Perfume or cologne can be physically harmful to patients,¹⁷ and piercings and tattoos can be perceived as being offensive.¹⁸ Medical students should ask themselves: Does my attire help or hinder the therapeutic relationship? Is my attire safe for the area I am working in (eg, stilettos in the emergency department)? Does my attire degrade or edify the profession?¹⁹ Reflective thinking can help medical students make better choices during their educational journey.²⁰ Moreover,

this type of thinking may be difficult for students without information to guide them regarding what colleagues and patients consider to be professional and unprofessional attire. The present study aims to help fill that data gap.

We did not find any correlation between climate and attire. The University of Tasmania School of Medicine and Touro University California, College of Osteopathic Medicine have similar climates (ie, cool, crisp winters, and mild summers). Bond University School of Medicine and Baylor College of Medicine have very hot, humid summers and mild winters. The hot Texas weather, however, did not deter students from wearing white coats as part of their professional attire. Similarly, the cool weather of Tasmania did not steer students toward including white coats in their professional attire. Furthermore, as shown by the present study, ethics courses, as well as school and hospital policies, have little effect on shaping a medical student's conception of professional clinical attire. Rather, students look to physicians in the inpatient and outpatient settings and model after what those individuals are wearing (ie, cultural practice). Therefore, physicians must also be reflective on their attire.

A few limitations in the present study exist. For studies involving e-mail surveys, 2 potential denominators for response rates must be considered: the number of intended recipients and the number of actual recipients. Students may block incoming messages when they are away from school or work, or they may auto-forward their work or school e-mail to other e-mail accounts, which can be blocked by spam filters. We did not test the susceptibility of the study announcement e-mail to be flagged by such filters.

Sample size calculations determined that 327 student and 234 instructor participants were needed. We easily reached our student target, attaining 411 responses; however, we missed our instructor target, attaining 73 responses. We speculate that some instructors may have

been busy with administrative, assessment, and teaching duties and viewed survey research as time consuming and burdensome. Also, instructors who are involved in academic duties that lack patient contact might view the survey topic as irrelevant to them or uninteresting. Failure to attain the sample size target in the instructor cohort means that results from that cohort should be interpreted with caution. Another potential explanation for the lack of response is overload and desensitization to survey solicitation if instructors are receiving surveys on a regular basis.

Additionally, the present study's findings do not allow us to make global generalizations about appropriate clinical attire. Specifically, in some countries and communities, unique cultural attire such as saris and thobes are considered professional attire for medical students and physicians.

Conclusion

The results of the present study provide evidence that ethics courses and dress code policies do little to shape a medical student's conception of professional clinical attire. Both allopathic and osteopathic medical students were most influenced by their instructor's attire, which distinguishes the present study from others in the literature. This finding points to valuable next steps, including disseminating the current research to residency and fellowship programs. Compared with allopathic medical students, osteopathic medical students are more cognizant of the need to protect patients from environmental allergens such as perfume or cologne. The present study clearly identifies regional dress code practices that are different in the United States compared with Australia. However, many opinions regarding specific dress practices expressed by students and instructors alike were similar. Because the response rate to our survey was variable, additional studies should be conducted for application of these results on a larger scale.

Author Contributions

All authors provided substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; Dr Bramstedt, Mr Colaco, and Dr Rehfield drafted the article or revised it critically for important intellectual content; all authors gave final approval of the version of the article to be published; and all authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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