

Opinion of medical professionals about 'Doctor's white coat'

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ABSTRACT

Usage pattern of apron has changed over time. A protective lab coat during experiments and dissection, evolved into symbol of medical profession. Aim was to study opinion of doctors regarding apron-usage, symbolic nature, professionalism. Cross-sectional online survey was conducted on medical professionals working in medical college in South-Indian city between July-October, 2020. After Ethics committee clearance, analytical study questionnaire link was generated and circulated. Form consisted fourteen questions, on five-point Likert-scale and two open-end questions concerning continuity in usage of apron. Data was statistically analysed. Total 212 respondents enrolled, males (122) and females (90), average age (32.2+11.6 years). Respondents felt white coat is symbol of professionalism (64.6%). Apron strengthens doctor-patient relationship and instil confidence (58.5%). White coat ceremony can reinforce respect towards apron.

Keywords

doctors, perception, professionalism, usage of apron, white coat

Introduction

What began as a protective lab coat during experiments and dissection, doctors white coat commonly known as apron gradually evolved into a symbol of medical profession often even being epitome of respect that it evoked among public. Somewhat at beginning of 20th century doctors began using white coat in northern hemisphere (1). In due course of time, usage of apron seems to be decreasing. Our study aims to analyse perspectives of medical professionals regarding apron and its usage. In a study, conducted in London, 424 doctors and 197 clinical students were interrogated through mail questionnaire regarding utility and significance of white-coat. Here, it was concluded that health professionals used white coat for easy recognition by colleagues and patients, to carry necessary items in pockets and to keep clothes clean. Some Specialities however preferred not wearing white coat, to create rapport and confidence in patients, for e.g. psychiatry and paediatrics (2, 3). Wide spectrum of studies has evaluated influence of appearance of doctors on a patient's perception and concluded that patients do care about their physician's appearance. General tendency of patients is to evaluate their doctors' proficiency and reliability through what their doctors wear as seen in a study of parents of children admitted to a paediatric ward (3, 4). When about 400 individuals were asked about role of doctor's attire in developing confidence over doctor, 76% said wearing white coat is better (5). There were also reports of guidelines urging doctors to not wear aprons at their workplace to avoid spread of diseases due to use of contaminated aprons. British Department of Health banned white coat from hospitals in England, changing dress code for doctors to "Non-coat bare below elbow policy (6). On other hand, "white coat "ceremony welcoming fresh graduates to medical school is still part of modern day medical ethos.

People of different age groups and from different geographical areas have differing opinions about their preferences for treating doctor wearing white coat (7). With evolution of time resulting in change in insights & priorities there is a need to re-look into these aspects from a medical professionals' perspective. Aim of our study is to study perception of medical professionals about doctor's white coat

in present times and to assess feasibility of framing guidelines about apron usage among medical professionals.

Materials and Methods:

After Institution's Ethics Committee clearance was obtained, this cross sectional study was conducted through online questionnaire forms (study setting), to be filled by study participants. This questionnaire was self-prepared with reference to review of articles pertaining to uses of apron. It was pre-validated and online form was encoded such that once link was generated and circulated, it could not be further edited by authors nor participants. This analytical study involved individuals associated with tertiary care hospital affiliated to medical college in South India. All medical professionals involved in patient care were included through self-reporting questionnaire, during a period of July 2020 to September 2020. Inclusion criteria was all those willing to participate. Exclusion Criteria was restricted to those not willing to participate. Since it was a time bound study based on online form link transfer we considered all entries who responded as a part of sample. Sample size was taken as time bound and continuous convenient sampling was considered. Online form was circulated through link and forwarded via group chat applications. A brief idea about study and purpose of study was given to participants in initial section of form, and those willing to participate could then continue to fill study form. After taking demographic details of subjects, some data with due concern to maintaining anonymity of participant was included, like total years of professional / medical educational life, total duration of wearing apron per week, total working hours every week, etc. This was followed by second section consisting of a questionnaire of sixteen questions, fourteen based on 5 – point Likert scale scoring while last two were open end questions. Fourteen Likert scale based questions were formulated on themes of professionalism, doctor – patient relationship, utility, and design of the apron. Participants were instructed to grade their perception regarding various aspects of apron from 1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree to 5 – strongly agree, wherein the participant had to choose ONLY one of five options, as their self - view-point. Final two questions were open –

end questions pertaining to personal view concerning to further recommendation of apron usage as, “I would *recommend using apron* by medical professionals because ...” and “I would *not recommend using apron* by medical professionals because ...”

Data collected were tabulated, summated and statistically analysed. All analyses were conducted using SPSS statistical software version 25. “p” value of < 0.05 was considered to be statistically significant. Normality test were used to check pattern of distribution and decide on use of non-parametric or parametric tests. Demographic characteristics of study population were described using mean and standard deviation. Since this study included answering to questions based on various features/ attributes on 5 point Likert Scale, we considered using ordinal scale as method of measurement for statistical analysis purpose. Median and interquartile range were considered for central tendency and as measure of dispersion for answers to these questions. Participants were grouped based on their ages, duration of wearing

apron per week and total duration of working hours per week for further inferential analysis. Answers to questions were considered as dependent variables and age of participants, duration of wearing apron, and duration of work as independent variables. Spearman 2-tail correlation was used to determine if there are statistically significant relations /differences between responses of two or more independent variables groups. We used non parametric Kruskal-Wallis H test for significance of association and to test for differences between inter - groups of independent variables with respect to fourteen questions. Kruskal-Wallis H Test was implemented to assess influence of independent variables on responses of participants for all fourteen questions. Answers to two open end questions were thematically tabulated.

Results

A total of 212 medical professionals participated in this online questionnaire study. Of these, 122(57.5%) were male while 90(42.5%) were females (Table 1)). Demographic details of study subjects have been presented in table 1.

Table 1: Demographic details of Study Participants

Variables/ characteristics	Sub- Groups	Frequency (n)	%
Gender	Males	122	57.5
	Females	90	42.5
Age in years	≤25	78	36.8
	26-35	62	29.2
	36-45	37	17.5
	>46-55	35	16.5
Time since entry into medical school (years)	1-10	120	56.6
	11-20	35	16.5
	21-30	35	16.5
	>31	22	10.4
Academic phase	Under Graduate	55	25.9
	Post Graduate	53	25
	Internee	10	4.7
	Completed Studies	94	44.3
Workplace	Medical College	88	41.9
	Corporate Hospital	4	2.3
	Private	8	3.7
	Medical College & Corporate Hospital	38	18.3
	Medical College & Private	34	15

	Private & Corporate Hospital	7	3.3
	Other	33	15.5
Average number of hours per week wearing apron	1-10	141	66.5
	11-20	17	8.0
	21-30	27	12.7
	31-40	12	5.8
	41-50	6	2.8
	>50	9	4.2
Average number of working hours per week:	1-20	36	17.0
	21- 40	36	17.0
	41 – 60	105	49.5
	61-80	23	10.9
	>81	12	5.7
	Total	212	100

Participants belonged to different age groups, minimum 18 years to maximum of 66 years. Mean age group of respondents was (32.2 ± 11.6 years) among them majority ($n=78$, 36.8%) of respondents were < 25 yrs. Most of participants ($n=120$, 56.6%) stated that they have been in medical field for around 10 years, (mean \pm SD = 13.6 ± 11.2), duration varied from 1 to 48 years (table 1). 42% participants reported of working in medical college and 18% stated of working in corporate hospital (table 1). 94 (44.9 %) participants reported of having completed studies. Workplace of study subjects was enquired, and majority mentioned of being affiliated to medical college ($n = 88$) apart from working in a private & / or corporate hospital. Majority participants ($n=141$, 66.5%) reported of wearing apron for <10 hours per week(hrs/wk.) on an average(mean \pm SD= 12.1 ± 18.3)

with minimum of 0 hours to maximum duration of apron being draped as mentioned was 94 hrs/wk. Respondents reported to be working for on an average (6 ± 25.9 hrs/week). Cumulative duration of working hours per week varied from <20 hours/week($n=36$) to >60 hrs/wk.($n=35$).

Age and duration of wearing apron showed negative correlation (Spearman's rho Correlation Coefficient = -0.365, $p < 0.001$, 2-tailed). Age on being correlated with total duration of working time showed positive correlation (Spearman rho=0.2, $p < 0.05$, 2-tailed). Duration of wearing apron in hours/week was correlated with total working hours/week, and we found it was negatively correlated (Spearman rho = -0.135, $p=0.05$). Figure 1, graphically represents cumulative responses of all participants regarding various attributes of apron for the 14 questions on 5 point Likert scale.

Figure 1: Perception of Participant Regarding various attributes of Apron

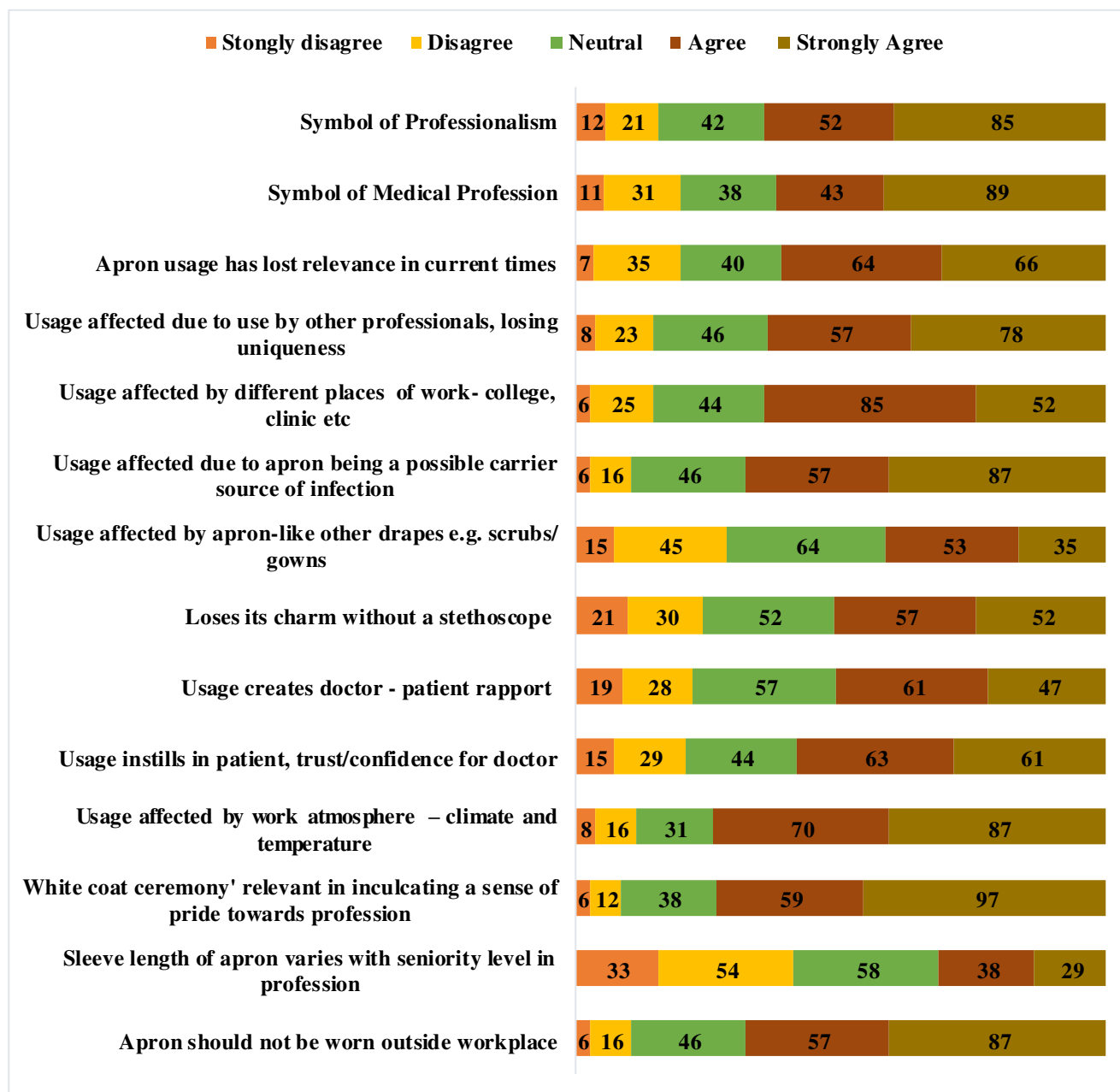


Table 2, depicts median and inter-quartile range and correlation values of all attributes with independent variables.

Table 2: Descriptive statistics of answers opted on 5-point Likert scale on a questionnaire regarding various attributes of Apron

Attributes	Median, IQR*	%n**	Age of participants Chi-Square,	Duration of wearing apron/week, (Chi-Square,	Duration of work/week, (Chi-Square, df*, 'p'
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			df*, 'p' value)	df*, 'p' value)	value)
Symbol of Professionalism	4,(3,5)	40	4.8, 0.3	32.5, 0.00	18.9, 0.001
Symbol of Medical Profession	4,(3,5)	41.9	13.8, 0.008	22.1, 0.00	15.1, 0.005
Apron usage has lost relevance in current times	4,(3,5)	31.1	4.9, 0.3	10.7, 0.03	8.1, 0.087
Usage affected due to use by other professionals, losing uniqueness	4,(3,5)	36.7	7.8, 0.11	15.5, 0.004	8.0, 0.09
Usage has been affected by different places of work – college, clinic, etc.	4,(3,4)	24.5	3.5, 0.5	3.9, 0.4	1.9, 0.76
Apron usage affected due to it being possible carrier source of infection	4,(3,5)	41	2.3, 0.7	20.2, 0.00	3.8, 0.44
Usage affected by apron-like other drapes e.g. scrubs/ gowns	3,(2,4)	16.5	6.3, 0.17	25.7, 0.00	7, 0.14
Apron loses its charm without a stethoscope	4,(3,4)	24.5	6.9, 0.14	1.7, 0.8	1.2, 0.88
Creates Doctor - patient rapport	4,(3,4)	22.1	4.3, 0.4	26, 0.00	2.8, 0.6
Instils in patient trust / confidence for Doctor	4,(3,5)	28.7	6.3, 0.18	4.8, 0.3	6.2, 0.2
Usage affected by work atmosphere – climate and temperature	4,(3,5)	41	6.3, 0.2	3.6, 0.5	4.1, 0.4
White coat ceremony relevant in inculcating a sense of pride towards profession	4,(3,5)	45.7	6.3, 0.2	12.8, 0.01	4.5, 0.34
Sleeve length variation resembles seniority	3,(2,4)	13.6	6.7, 0.15	0.5, 0.9	7.2, 0.13
Apron should not be worn outside workplace	4,(3,5)	41	13.1, 0.01	3.2, 0.52	1.7, 0.8

* - IQR - Inter Quartile Range

** - with 5 point in Likert Scale, strongly agree to asked attribute of apron

*df – degrees of freedom= 4

Majority (n=137, 65.2%) respondents felt that apron symbolizes professionalism and this opinion was statistically positively associated with age, duration of wearing apron (H=32.5, df= 4, p= <0.01 and duration of work hours (H=18.9, p=0.001). Similarly, 132(62.3%) were of opinion that apron symbolizes medical profession, responses showed statistically significant association with all 3 independent variables (H=13.8, p=0.008; H=22.1, p=0.00; H= 15.1, p=0.005). 135(63.7%) felt that apron has lost its uniqueness due to its use by other professionals, and this was statistically associated with duration of wearing apron (H=15.5, p =0.004) and working hours (H=8.0, p =0.09). Participants approved use of apron has lost relevance in recent time (n=130,61.3%), however, it had no statistically significant association with three independent variables. Place of work(n=137) can as well have an impact on frequency of usage of apron as felt by 64.6% respondents, though it did not show statistically significant association with three independent variables. Many respondents felt that beyond workplace (n=144,67.9%) there should be

restricted usage of apron and this opinion was statistically associated with age (H=13.1, p=0.01), but not significantly associated with duration of wearing apron (H=3.2, p=0.52) and work (H=1.7, p=0.8). Participants approved (n=109, 51.4%) that apron loses its charm if stethoscope is not used along with apron statistically associated with duration of wearing apron. Neither did many respondents felt that length of sleeve (n=67,31.6%) has a major role in depicting seniority level in medical profession, nor many were of opinion that use of scrubs and gowns has negatively impacted usage of apron (n=88, 41.9%) and it was significantly associated with duration of wearing apron (H=25.7, p=0.00). Many participants felt (67.9%) on Likert scale that usage of apron varies when it is considered as source of infection(n=144) and was statistically associated with duration of wearing apron (H=20.2, p=0.00). Usage of apron as felt upon by most (74.1%) study participants varies due to atmospheric condition like climate and temperature(n=157). Subjects (n=108,50.9%) felt on Likert scale for positive effect of apron on doctor-

patient relationship by creating doctor– patient rapport statistically significantly associated with duration of wearing apron ($H=26$, $p=0.00$), and presence of apron instils a sense of trust / confidence in patients ($n=124$, 58.5%), however, it was not statistically significantly correlated with age, duration of wearing apron and working hours. Lastly, many felt ($n=156$, 73.6%) “white-coat ceremony” is relevant in inculcating a sense of pride towards profession and was statistically significantly associated with duration of wearing apron ($H=12.8$, $p=0.01$).

Responses to two open–end questions were collected and based on basic theme of responses they have been tabulated Table 3a, 3b.

Table 3a: Reasons stated to recommend use of apron, (n=212)

Nos.	Themes	N	%
1.	Compassion, strengthens doctor-patient relation	76	35.8
2.	Professionalism	72	34.0
3.	Confidence & trust, respect	32	15.1
4.	Uniformity, purity	25	11.8
5.	Dignity, honor, pride	23	10.8
6.	Not recommend	21	9.9
7.	Recognition / identification as doctor	20	9.4
8.	Protects from infection	13	6.1
9.	Responsibility/ duty (towards society)	11	5.2
10.	Others*	8	3.8
	Total	301	100

* - helps to carry stethoscope, unique like lawyers’ coat, gives serious look, convenient, reflects sanctity of the profession

Table 3b: Reasons stated to not to recommend use of apron, (n=212)

Nos.	Themes	N	%
1.	Source of infection	130	61.3
2.	Not relevant now	60	28.3
3.	Used by other professionals	45	21.2
4.	Not suitable/ comfortable	25	11.8
5.	Will recommend	17	8.0
6.	No more symbolises profession	15	7.1
7.	Improper usage at wrong	9	4.2

	places		
8.	No reason	4	1.9
9.	Others *	5	2.4
	Total	310	100

* - Freedom of choice, profession has lost public respect, when they are off duty, stethoscope is enough, patient anxiety

Majority participants stated that apron symbolizes professionalism. They quoted apron denotes various virtues that can strengthen doctor- patient relation and enhance rapport. Most participants on asking their opinion regarding not recommending further use of apron mentioned apron as being possible source of infection. Many respondents cited more than one reason for recommending continuity or non- continuity in usage of apron.

Discussion:

Participants felt that use of apron by people of other professions (64.2%) has depleted its usage in recent time (61.3%). Idea of wearing apron by doctor has been strongly advocated through media, television advertisements, movies, newspaper ads, hoardings etc. Majority people irrespective of working as a medical professional regard white coat as symbol of professionalism and medical profession. Study of 86 non–surgical physicians about their perception regarding white coat found similar result ⁽⁸⁾. In recent times, people of other profession are using apron. This can change outlook towards apron. Another comparative study of physicians concluded similarly wherein doctors ascertained wearing apron symbolizes medical profession and professionalism ⁽⁹⁾. Our study subjects opted on Likert scale for positive effect of apron on doctor–patient relationship (51%), presence of which instils a sense of trust/confidence in patients (58.5%). Our findings are in line with another study of South Carolina where respondent in a written questionnaire admitted they favored white coat over surgical scrubs, business dress and casual dress. Study subjects said their trust and confidence was significantly associated with dressing pattern of their doctor and were more comfortable to share their problems when doctors were in formal dress or wear apron ⁽⁵⁾. Wearing casuals restricted patients in trusting efficiency and professional attitude of doctor. Patient and family members felt doctors wearing casual clothing impedes patient confidence and prevents from revealing proper history

especially in pediatric, psychiatric and sexual problems.

With change of area and climate temperatures, wearing 2 or more clothing can be difficult, especially in hot and humid region of South Indian city, this tropical atmospheric effect can alter usage of apron as felt by our respondents (74.1%). Hot climate makes wearing several garments at a time intolerable, thus affecting white coat usage. Not many studies have explored this fact that has been noted by us in our study, wherein usage of apron varies due to atmospheric condition.

Our study reports (68%) that utility of apron varies when it is considered as a source of infection. Similar results have been noted in many other studies^(10, 11, 12,13, 14, 15). Microbiological analysis of swabs in Nigerian study of doctors' apron concluded 91.3% had bacterial contamination and was directly proportional to extent of health care interaction of doctor. Microbiological study was done in tertiary care hospital associated nursing staff in Nepal⁽¹²⁾. Worn coats were collected at end of working session and analyzed to find 50% carried pathogenic bacteria. Authors of nursing staff study stated significance of maintenance of white coats to reduce bacterial contamination load and prevent cross-contamination. In another study in United Kingdom and Scotland degree of bacterial contamination of physicians' white coat after an 8-hour workday was assessed through a prospective, randomized controlled trial⁽¹⁴⁾. It was concluded that bacterial contamination occurs irrespective of duration of work hours, wearing of new apron and or donning of existing white coat. In another study, authors successfully inoculated bacteria from doctors' white coat to pig skin and proved apron are a source of infection⁽¹⁵⁾. Even in our study many participants believed apron is considered a source of infection.

Place of work as felt by respondents (64.6%) can have an impact on frequency of usage of apron. Many respondents felt there should be restricted usage of apron beyond workplace (68%). If people of other profession wear apron, general attitude of public towards those wearing white coat may change. Wearing apron beyond workplace further enhances chances of bearing more infections. Hence, our participants' response that apron should not be worn beyond workplace is justified. Doctors may not be restricted to one workplace. In a country

like India, senior clinicians have to switch in between two or more places to treat their patients, and carrying apron can be both infection spreading and cumbersome. Thus, restricted use of apron with due respect to workplace is reasonable.

Participants felt (51.4%) that apron loses its charm if stethoscope is not used along with apron. Also, neither did many respondents feel that length of sleeve (31.6%) has major role in depicting seniority level in medical profession, nor many were of opinion that use of scrubs and gowns has negatively impacted usage of apron (41.9%). Presence of stethoscope fortifies the feeling of being doctor, our responsibility; at the same time patients can differentiate between doctors and other health care workers wearing apron. In a study of 496 patients from Knoxville, Tennessee; patients preferred conservative look of their doctors wearing apron and stethoscope⁽¹⁶⁾. Wearing stethoscope intensifies doctor patient confidence. In a study at Philadelphia hospital, medical professionals were asked to empty their pockets and stethoscope was most common items 97% present⁽¹⁷⁾.

"White coat ceremony" started in medical schools all over world, has been helping in training values and discipline associated with usage of white coat in undergraduate curriculum, and as majority of our participants felt; this will inculcate a sense of pride and honor within ourselves. This can further restrict misuse of the noble white coat and help in reinforcing of apron's virtues. Conducted for every incoming student, this activity will help tie morals expressed in oath taken to ethics and professionalism potentially impacting on future behavior. In a study in California university, medical students were assessed for their reply towards professionalism and ethics after white coat ceremony and authors noted, students had better insight towards their responsibility for their profession⁽¹⁸⁾.

In a cross sectional survey, at an urban general hospital of East Birmingham authors found bacterial contamination of 100 doctors of different grades and specialties with cuffs and pockets being highly contaminated and severity increased with degree of usage by individual doctor. Thus in corroboration with our study perception of apron being source of infection can affect its utility⁽¹⁾.

Multiple studies have concluded that patients usually tend to trust physicians who wear formals

(shirt and tie) compared to casual attire (t-shirts and jeans). White coat not only helps in instilling trust and confidence in patient but also helps in creating good understanding/ rapport between doctor and patient. In a comparable study, patient's perception regarding their doctors value was estimated. Here, grading of clinical qualities of orthopedic hand-surgeons' was done on Likert scale. Study concluded that doctor wearing a white coat effectually enhances patient satisfaction to generate trust and respect needed to properly care for patients (19).

In a systematic review of articles through MEDLINE, Embase, Biosis Previews and Conference Papers Index, it was found that out of 30, 21 studies revealed the positive effect of doctors' outfit on patient's perception towards physician, with preference for Formal attire and white coats more so in older age group (4). A Brazilian study involving doctors, students and patients, reported formal white coat by a doctor was effective to develop a better initial impression and was associated with profession and looked more conventional (1).

In a survey of 86 non – clinical physicians in New York, US, regarding doctor's attire through a two-part questionnaire it was concluded that formal attire was preferred and white coat revealed honesty, confidence, and professionalism (8). Patients' preference regarding doctors' attire was assessed in a doctor – patient relation study in various clinical specialties. Of 2,272 outpatients enrolled, 62.7% stated hygiene as an important factor and inspiring confidence by 59.3% as an influential element. In this Japanese study, authors concluded patients preferred white coat to be draped by their doctor and that it favored patients' confidence over their physician in all types of practice (20). These findings are parallel to findings of many other studies conducted in different countries over different sub groups of populations.

In our study, majority cited infection as reason for not recommending further use of apron. Another reason cited was loss in relevance with respect to time and place. Apron was considered uncomfortable with regards to atmospheric conditions. Participants recommended continued usage of white coat as it distinguishes doctors from other people. Apron has been regarded as symbol of medical profession by most doctors in our study.

Conclusion:

This study showed medical professionals seem to look towards the apron as a symbol of professionalism and feel it is effective in enhancing doctor-patient relationship. They seem to disagree with usage of white coat outside workplace. Study also highlights there is little effect of type and pattern of apron in determining seniority level among medical professionals, thereby refuting a common belief that type of apron worn might indicate seniority. The climatic temperatures and other hospital dress codes seem to have an impact on usage of apron at workplace. Apron being a possible source of infection was being perceived as a major issue in undermining usage patterns of the apron. Authors would like to recommend that wearing of apron should be regulated by region specific norms possibly including color coding, to distinguish medical professionals and professionals from other fields. The 'Apron' will not lose its charm, and the wearers should appreciate the same.

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