**Title:** Perceptions regarding wearing of White coat amongst doctors from a public sector hospital of Delhi, India.

**Abstract:**

**Introduction:** The white coat has served as the pre-eminent symbol of physicians for over 100 years. But the image of this has changed over the years and now there are discussions about banning its use by the doctors. **Material and methods:** the sample size was calculated with p to be 50% so as to get the maximum sample size. Allowable error was fixed at 5%.Calculated sample size was 400.Study subjects were junior residents from a public sector hospital of Delhi, who had completed one year of compulsory internship . Junior residents were contacted in the month of December 2018 and January 2019 so as to include residents from two batches as each batch gets residency for 6 months. A self-administered questionnaire in English. Effort was made to collect the data from junior residents posted in all the departments of the hospital. Analysis was done using SPSS licensed version 21.0

**Result:** The present study included the information collected from a total of 408 junior residents. 268(65.68%) of the participants were males. 124(30.39%) had graduated from abroad. Half 211(51.71%) of them had the knowledge that it protects them from getting infection. There was a statistically significant association between correct response to significance of length of the white coat, significance of “White coat ceremony” and graduation from abroad p<0.05.Whereas attitude of the junior residents towards white coat is concerned approximately half, 210(51.47%) preferred to wear a white coat and others198 (48.52%) do not like to wear one. High number of 390(95.58%) participants expressed that a few modifications to the white coat may increase its wearbilty. Out of a total of 345 participant who actually wore white coat to work mentioned the main reason to be to look professional (290, 84.05%). **Conclusion:** White coat has for long been a tradition and a sign of purity which has commanded a lot of respect from the patients. If the doctors take it upon themselves to wear it responsibly there is no need to do away with the symbol of this noble profession.

**Introduction:**

The white coat has served as the pre-eminent symbol of physicians for over 100 years. The word *candor* is derived from the Latin *candidus* which means white. In fact, the foundation of all professional societies is candor or truth. Physicians dressed themselves in black and were painted in black garb until the late 19th century. Black attire was, and is, considered formal (e.g., today's tuxedo). Consequently until about 1900, physicians wore black for their patient interactions since medical encounters were thought of as serious and formal matters. Until the last third of the 1800s, an encounter with a physician rarely benefited the patient. In fact, up to that point, virtually all of "medicine" entailed many worthless cures and much quackery. [1] At the end of the 19th and the beginning of the 20th centuries, when medicine became the truly scientific enterprise we now know, the "whiteness" or "pureness" of medicine became reflected in the garb of physicians. In the 20th century, the white coat continued as the symbol of medical authority and respect as advance upon advance firmly established the patient-doctor relationship as a beneficial encounter. A depiction of a physician in a white coat is indeed the symbol of medicine, eclipsing the black bag or the stethoscope. [2] But the image of the white coat has also become so intimidating that pediatricians and psychiatrists generally choose not to wear it in order to reduce anxiety on the part of their patients. The term "white coat syndrome" is used to describe unrepresentative high blood pressure recordings due to a patient's anxiety upon seeing a doctor in a white coat.

White coat ceremonies are held in medical schools abroad to give students the scientific and clinical tools to become doctors.[3] Today we know that white coats harbour potential contaminants and contribute considerably to the burden of disease acquired in hospital by spreading infection.[4,5,6,7,8]

There have been reports stating that doctors in India should be banned from wearing it. [9] This study was planned against this background to get an insight into perceptions of doctors regarding the white coat.

**Material and Methods:** The present study was conducted in New Delhi, capital of India. Since there is paucity of literature on this topic in India the sample size was calculated with p to be 50% so as to get the maximum sample size. Allowable error was fixed at 5%. Calculated sample size was 400.Study subjects were junior residents from a public sector hospital of Delhi, who had completed one year of compulsory internship. Junior residents were contacted in the month of December 2018 and January 2019 so as to include residents from two batches as each batch gets residency for 6 months. This was done to ensure that the desired sample size could be achieved as it is not easy to get information from residents who are working in various departments in different shifts. A self-administered questionnaire was prepared in English. Effort was made to collect the data from junior residents posted in all the departments of the hospital. A prior approval was taken from the administration for carrying out this research. Data was entered in Excel sheet. Analysis was done using SPSS licensed version 21.0. Simple and cross tables were made. Also, appropriate tests of significance were applied. P value of <0.05 was taken to be significant.

**Results:**

The present study included the information collected from a total of 408 junior residents. 268(65.68%) of the participants were males. 124(30.39%) had graduated from abroad. (Table1).Half 211(51.71%) of them had the knowledge that it protects them from getting infection. All the participants correctly knew that white coat is contaminated by microorganisms in the hospital. 391(95.83%) correctly responded to the question regarding significance of colour white of the coat. 62(15.19%) knew the significance of the length of the white coat. 168(48.17%) knew correctly what a “White coat ceremony” was. There was a statistically significant association between correct response to significance of length of the white coat, significance of “White coat ceremony” and graduation from abroad p<0.05.Only 96(23.52%) correctly knew that half sleeve white coats decrease the chances of transmission of infection (Table2) .Whereas attitude of the junior residents towards white coat is concerned approximately half, 210(51.47%) preferred to wear a white coat and others198 (48.52%) do not like to wear one. In spite of this, 383(93.87%) were of the opinion that practice of wearing a white coat by doctors should not be banned in India. A very high number of 390(95.58%) participants expressed that a few modifications to the white coat may increase its wearbilty by the doctors. Out of the multiple responses given by the participants most frequent (245, 62.82%) was provision of washing facility of the white coat in the hospital itself followed by a better design of the white coat (88, 22.56%). Some participants, 62(15.89%) even expressed the desire for change in color of the historical white coat (Table3).

As per figure 1 main reason cited for not preferring to wear a white coat was difficult to maintain it which was quoted by 96(48.48%), followed by the weather being too hot (81, 40.90%).

As far practices of the junior residents regarding white coat are concerned majority (345, 84.55%) actually wore a white coat to work. About half of them (176, 51.01%) washed it once a week. At least two white coats were owned by 247(71.59%) of the participants. On being inquired how they carried the white coat most frequent response given was that they wore it (124, 35.94%).At times, residents wore the white coat even when it was stained, crushed or torn(74,21.44%).Practice of exchanging and sharing of white coat was very common, it was prevalent in 304(88.11%) of the participants. It was a common practice to wear the white coat to canteen and mess and eat with the coat on (318, 92.17%).At times the participants also wore it to public places (77, 31.42%).Table4 Out of a total of 345 participant who actually wore white coat to work mentioned the main reason to be to look professional (290, 84.05%). Some of them 57(16.52%) even mentioned that they wore the white coat to cover whatever they wore inside. (Figure2)

**Discussion:**

In our study all the participants correctly knew that white coat was contaminated by microorganisms. In another study done amongst medical students by Muhadi et al overall, 48.9% of students thought that white coats was always contaminated while 41.9% considered it completely clean if there was no stain on it and the remaining 9.2% considered it clean if the collar and pockets were clean.[5] In another study conducted in Telengana,82% of the participants believed that white coat could play a role in transmission of infections while 18% did not. [10]

In our study only 23.52% knew the significance of length of the sleeves correctly. Although we have not done isolation of microorganism from white coat in our study but Vargese et al found that bacteria were most likely to be isolated from the pockets and sleeves of white coats since these were the sites of frequent contact. [6] Seventy percent of the doctors sampled said they thought white coats transmit hospital acquired infections. In contrast less than 1% of patients expressed the view that white coats could be a health hazard, while 6.5% said they help prevent infections. [13] Douse .In another study by Muhadi *et al* it was found that the incidence of *Staphylococcus aureus*, was 32% on short sleeved and 54% on long-sleeved white coats. [5] Hence long sleeve white coats were considered to harbour more organisms as compared to short sleeves coats. Less than half of our participants knew what a white coat ceremony was those who had heard about it were more likely to have graduated from abroad(p<0.05).The reason for this may be the fact that such a ceremony is not held in medical colleges in India .Also the significance of length of a white coat was poorly known to our participants as compared to those who had graduated from abroad(p<0.05) again because in India no strict guideline is being followed regarding the specifications of a white coat and hence residents did not know that length had to do with seniority of a doctor.

In our study 84.55% actually wore the white coat to work. Reasons were either to look professional or to protect themselves or to carry stuff in the pocket or even to hide/cover what they were wearing inside which is similar to responses from other studies. In a study by Farraj 42% of doctors and medical students wore white coats >75% of their time in hospital. Reason for wearing a white coat was easy recognition by colleagues patients due to continuity of dress, carrying items in its pockets, keeping clothes clean, emphasizing doctor status, 'I have to'/'it is expected’ preventing own contamination, a symbol of cleanliness, preventing patient contamination and to keep warm .[11]In another study by Meti in et al among medical students 72.8% of the participants practiced wearing an apron to protect themselves while handling blood and tissue. [12]

In our study 48.52% would not have preferred to wear a white coat because of various reasons cited like difficult to maintain it, weather too hot, doesn’t look good and cumbersome to wear on top of other clothes. But it was only15.44% who actually did not wear a white coat. In the study conducted by Farraj only 29% of doctors and medical students did not wear white coats at all. Most of these (82%) were working in psychiatry or pediatrics and were trying to avoid the negative effect white coats were said to have on rapport with patients in these specialties .[11]

In a study conducted in Telengana, 20.7% wore a white coat during patient interactions, 44.4%in hospital only, 19.3% always and 9.6% while meeting the superiors. Common reasons for wearing being Dress code of hospital (28.7%) and to appear professional (25.4%). [10]

In a study undertaken at the Royal Free Hampstead NHS Trust older doctors were more likely to think that doctors should wear white coats (x2 test, p=0.006 under or over 30.)There were no significant differences between specialty groups . Twelve of the 52 from the medical specialties thought doctors should wear white coats. Psychiatrists (0/5) and pediatricians (1/8) were least likely to wear white coats. Surgeons (5/16) and Gynecologists (1/2) were most likely to wear white coats. Reasons for wearing a white coat were to protect clothes, to prevent infection, to look professional, as a mark of identification, to hold books and as a tradition. The reasons cited for not wearing a white coat not were infection risk, hot, interferes in doctor patient relationship, difficult to obtain and peer pressure . [13] In our study age wise comparison could not be done as the participants were all junior residents. Similar reasons for wearing a white coat have been observed by others also. [14], [15]

In our study too hot was a response given by participants for not preferring to wear a white coat and also the fact that it is cumbersome to wear it on top of routine clothes. India being a tropical country with hot, semi arid/arid climate, temperature here often reaches to 40-45 C especially in summer and hot and humid in rainy seasons particularly in coastal areas [16], hence not only, environment itself becomes uncomfortable to bear with, on top of that, wearing of apron leads to a three layer clothing for an individual making it further uncomfortable to work with, chances of increasing quantity of organisms on apron. [17]

In our study 71.59% owned at least two white coats. As per study done by Noor et al there is no association seen between number of white coats possessed and contamination with owning more than three coats being equally contaminated to owning just one coat in doctors. [10] Although as per SHEA recommendations health care providers engaged in direct patient care (including house staff and students) should possess two or more white coats and have access to a convenient and economical means to launder white coats.[18]

About half of our participants’ washed the coat once in a week. 35% once in 3-5 days. 8% even once in ten days and 5% once in two days. None of the participants washed it every day. In another study conducted in a rural dental care center at Manipal ,Karnataka by Priya et al also most (60.8%)of the participants washed the white coat once in a week frequency of washing white coat everyday was 7.8%, twice a week 25.5%,once a week (60.8%),once in a fortnight 3.9% and once a month 2%. [19] In another study majority of the graduate students (73.7%) and faculty members (83.3%) practiced weekly washing regime for their white coats. These authors have found no biological reason for changing white coats more than once a week, or for excluding white coats from clinical areas. [20]As per Society for Health care Epidemiology of America (SHEA )2014any apparel worn at the bedside that comes in contact with the patient or patient environment should be laundered after daily use. Also for home laundering a hot water wash cycle (ideally with bleach) followed by a cycle in the dryer is recommended. [18]

In a study conducted by Muhadi et al, majority of the graduate students (73.7%) and the faculty (83.3%) washed their white coats once a week. However, 35% interns reported of washing their white coats weekly and 50% washed twice a week. [5] Loh et al in their research observed 34.4% of students washed their coats once a month; 15.6% once a week and 9.4% twice a month. Remaining 40.6% would wash their coats every two months or even longer. [21] In another study conducted by Miller medical school ,Miami among health care providers , overall, white coats were washed every 12.4 \_ 1.1 days and four people referred washing their white coats every 90 or more days (up to 12months); however, 90% of the respondents laundered their white coats at least once a month. Water temperature used by health care providers to wash their garments included cold (11%), warm (21%), and hot (52%); 11% did not know the temperature they used, and 6% dry-cleaned their white coats.

[14] Noor et al reported that in washing agents the contamination was less when disinfectants were used however, this was not statistically significant (p>0.05) also frequency of wash was associated with a decreased contamination however this too was not statistically significant (p>0.05). [10]

In our study 71.59% of the participants had at least two white coats and as per recommendations by Society for Healthcare Epidemiology of America (SHEA) 2014 ,health care professionals engaged in direct patient care (including house staff and students) should possess two or more white coats and have access to a convenient and economical means to launder white coats (institution-provided on-site laundering at no cost or low cost). [18]

In our study 88.11% either shared or exchanged their white coats with others

The habit of exchanging white coats was seen among interns only in another study [19] and exchange of white coats was quoted at 5.9% by Acharya et in another research , which is very low as compared to our study. [22] The reason for high exchange rate in our study could be that the participants were junior residents only and no seniors were included.

In our study 92.17% mentioned that they wore white coat to mess or canteen and 31.42% answered that they at times also wore it to public places.

In a study conducted among dental graduate and postgraduate in Devanagre city, India majority of the study subjects (93.3%) have noticed health care professionals wearing white coats and roaming in public places and half of the respondents have frequently observed this practise among the doctors .The places where often doctors were spotted wearing white coats apart from the workplace included bus stand/ railway stations(4.2%), streets (6.0%), automobiles (6.5%),temples (1.4%), market places (3.1%), parks (5.8%), and eating joints (12.2%). It was interesting to know that 60.1% or the respondents had seen doctors in professional attires at all of these places 49.9% of the respondents have frequently spotted females wearing white coats outside the hospital premises and 38.9% have observed this practice more prevalent in males while 11.11%have seen this practice common in both the genders. [23] As per Fernandes In many cities in India some junior doctors are now seen wearing white coats in shopping malls and cinemas too, and then they enter sterile zones in the hospital in the same attire. [9]

In India changing areas in hospitals are rare because of space constraints, so white coats are commonly worn by students coming from college and outside the hospital. They are also often left on chairs, tables, and in corridors. Doctors and medical students tend to wear their white coats to the library, the cafeteria, the toilet, and so on.[9] Although there is no law against wearing a white coat to public places but since it is a source of infection it should not be worn to places where people eat or elsewhere out of the hospital**.**

Majority of our participants **(**93.87%) in our study did not want the white coat to be banned from India. The United Kingdom took the landmark decision to ban long sleeved white coats in 2007 [9] At the time the UK had some of the highest rates of meticillin resistant *S aureus*, the “superbug” resistant to nearly every antibiotic in use, in Europe. But according to some it must have demeaned the profession already. [24]

**Conclusion:** White coat has for long been a tradition and a sign of purity which has commanded a lot of respect from the patients. If the doctors take it upon themselves to wear it responsibly there is no need to do away with the symbol of this noble profession.

**Recommendations:** Based on our results doctors need to be educated about

1. standard procedure for cleaning and disinfecting the coats
2. Wearing Short sleeves and not wearing it to public places.
3. Laundry service for their white coats in the hospital itself.
4. The fabric and design of the coat should be more appealing and low in maintenance.

**Conflict of interest:** none

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