

# Study regarding conceptualisation of dermatology operation theatre based on perception of the five human senses

## Abstract

**Background** In general a pleasant environment has a positive effect on the occupant's feeling of well-being and this can affect patient recovery and staff performance. Therefore lighting, colour design, aroma and good behaviour of doctors are very essential. Based on these ideas we conducted a study in our hospital premises as to how our five senses can help to conceptualise a dermatology operation theatre.

**Method:** The study was carried out in the Department of Dermatology, Employees State Insurance – Post Graduate Institute of Medical Sciences & Research (ESI-PGIMS), Basaidarapur, New Delhi. It was a cross sectional study. 120 was the sample size which was divided in to 3 groups of doctors, nurses and patients of 40 each. All cases were evaluated using case record proforma comprising of their demographic profile and 21 questions which was prevalidated. These questions were based on five senses of human body (sight, sound, smell, taste, touch).

**Results:** In choosing colour of wall paint, 60% doctors opted white and 32.5% yellow. 53.3% selected white in total followed by yellow (21.7%) followed by blue (15.8%) and vibrant colour (9.2%). While choosing colour of linen (bed sheets) most doctors chose green colour (55%). All (100%) preferred provision of windows/ ventilator in OT for natural light. Hearing calming words by doctors before surgery was appreciated by all nurses and patients (100%).

**Conclusion:** Five senses of human body play an important role while conceptualising the operation theatre.

**Keywords:** five senses, colour psychology, dermatology operation theatre, doctor's behaviour

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## Introduction

The quality of the visual environment has a positive effect on the occupant's feeling of well-being and in the case of hospitals and healthcare buildings this can affect patient recovery and staff performance. For these reasons, it is essential to consider lighting and colour design at the early stages of specifying and designing a building. The colour and materials of window treatments such as blinds, curtains or upholstery needs to be chosen with care so as to enhance the interiors or control glare. Hence, a properly designed visually soothing environment, with the appropriate use of colour and lighting, will give necessary benefits to patients.<sup>1</sup> Similarly, behaviour of doctors towards their patients is also very important and is at par with their clinical skills. His/her good and polite behaviour is an important component of quality health care. It helps in allaying nervousness and anxiety of the patient.<sup>2</sup> Aromas have different effects on everyone. Smell can affect both our short and long term moods. Creating an environment with pleasant smells evokes positive, calm and good emotions.<sup>3</sup> An emotional response of the secretion of immune-boosting hormones is induced by certain music.<sup>4</sup> Based on these ideas we conducted a study in our hospital premises as to how our five senses (sight, sound, smell, taste, touch) can help to conceptualise a dermatology operation theatre. Hence a questionnaire was prepared covering different variables like colour of wall, drapes, curtain, provision of windows or ventilator, smell in OT room, behavior of doctors and staff, background music, etc.

## Aim of the study

The aim of the study was to conceptualise dermatology operation theatre based on perception of the five human senses using set of questionnaire.

## Method and material

The study was carried out in the Department of Dermatology, Employees State Insurance – Post Graduate Institute of Medical Sciences & Research (ESI-PGIMS), Basaidarapur, New Delhi after the ethical clearance from the institutional ethics committee. It was a cross sectional study. Sample size was randomly decided to be 120 as no similar study was done in past globally. Sample size of 120 was divided in to 3 groups of doctors, nurses and patients of 40 each. Doctors/nurses/patients who had exposure to operation theatre were included in the study. Others were excluded from the study. All cases were evaluated using case record proforma (Table 1) comprising of their demographic profile and 21 questions in the questionnaire which was prevalidated. These questions were based on five senses of human body (sight, sound, smell, taste, touch). The different variables that was covered were colour of wall, drapes, curtain, linen, furniture, provision of windows or ventilator, smell in OT room, behavior of doctors and staff, background music, refreshment pre or post procedure, preference of position during any procedure. The questionnaire was answered comprehensively.

**Table 1** Questionnaire for the study

<b>Age:</b>
<b>Sex: M /F</b>
<b>Patients/Nurse/doctor</b>
1. Which colour of wall paint would you prefer to be used in dermatology OT? White/ blue/ green/ black/ vibrant colour.
2. Which colour of drapes would you prefer to be used in dermatology OT? White/ blue/ green/ black/ vibrant colour.
3. Which colour of curtain would you prefer to visualise in surrounding in dermatology OT? White/ blue/ green/ black/ vibrant colour.
4. Which colour of linen (bed sheets) would you prefer on the operating table in dermatology OT? White/ blue/ green/ black/ vibrant colour.
5. Which colour of furniture including cabinets / laminates would you prefer to be used in dermatology OT? White/blue/green/black/vibrant colour.
6. Would you prefer to have provision of windows or ventilator in dermatology OT for natural light? Yes/No
7. Does display of instruments in transparent cupboard shelves or kept openly on slabs /shelves in dermatology OT generate apprehension on visualising the same? Yes/No
8. Is your nervousness and anxiety allayed on visualising a greeting smile on the face of treating dermatologist? Yes / No
9. Which fragrance / room freshener is preferred by you to be used in the OT room? Floral / Cologne / Fruity / Any Other
10. Do you prefer to avoid the characteristic hospital smell/smell of latex glove/smell of antiseptics and medications, if given a choice? Yes / No
11. Would you like to hear soothing, pleasantries; calming words prior to procedure by doctor/ supporting OT staff? Yes/No
12. Which type / nature of background music will impart a soothing effect on your mind prior and during the operative procedure? Silence/classical/soft/ instrumental/soft vocal/jazz beats/any specific music.
13. Does behaviour, general non-specific mutual discussion, unnecessary casual comments, lack of apparent concern or negative work attitude of supporting staff cause apprehension in your mind during the procedure? Yes/No
14. Before entering the OT which light refreshment(s) would you prefer prior to procedure? Water/tea/ coffee/juice/soft drink/any other
15. Do you prefer to eat any refreshment or snack in post-operative period – Yes / No

Table Continued

<b>Age:</b>
<b>Sex: M /F</b>
<b>Patients/Nurse/doctor</b>
16. Do you prefer a dehumidified, cool and pleasant environment rather than hot and humid environment, which is usually found in tropical country like India? Yes/No
17. Do you prefer additional presence of fan in air conditioned room for fresh blow of air to avoid feeling of suffocation? Yes/No
18. Do you prefer to avoid excessive use of topical chemicals and medications during the procedure, apart from those absolutely necessary for the said procedure on your skin – Yes / No
19. Do you feel discomfort when instruments, surgical instruments are kept either on the abdomen or other body parts over the drapes during the surgical procedure – Yes / No
20. During procedure which position do you find more comfortable? Sitting on chair/ Lying on table
21. While undergoing procedure which position do you find more comfortable? Supine/prone/lateral

## Results

In choosing colour of wall paint in dermatology operation theatre, 7.5% doctors opted blue, 60% white and 32.5% opted for yellow. Among nurses 22.5% opted blue, white was chosen by 42.5% and yellow by 7.5%. Among patients 53.3% chose white followed by yellow 21.7% followed by blue 15.8% followed by vibrant colour that was pink 9.2%. Thus, 53.3% selected white in total followed by yellow 21.7% followed by blue 15.8% and vibrant colour 9.2%. Result was significant (.000) (Table 2).

For colour of drapes 22.5% doctors opted blue, 27.5% green. While most 50% opted for white. Among nurses 12.5% opted blue, green was chosen by 62.5% and white by 25%. In patients 25 % chose blue 45% green and 30% white. While choosing colour of drapes green was most common 45.0% followed by white 35% and blue 20%. Among all colours black and vibrant colour were not selected. Result was not significant.

While choosing colour of linen (bed sheets) most doctors chose green colour 55%. Blue and white shared equal percentage among doctors (22.5%). 62.5% nurses chose white (62.5%) as their most preferred colour followed by green (25%) and blue (12.5%). Patients preferred white (70%) as colour of the linen followed by green (17.5%) and blue (12.5%). White was most common colour (51.7%) followed by green (32.5%). White colour was mostly chosen by patients (70%). Result was significant (.000) (Table 3).

All (100%) doctors and nurses preferred brown colour for furniture. Blue by preferred by 5% patients only. In total brown selected the most making 98.3% followed by blue (1.7%). Result was not significant. Green, white, black or vibrant colour was chosen by none.

**Table 2** Colour of wall paint

		Type of observer			total
		1	2	3	
Blue	Count	3	9	7	19
	% within TYPE OF OBSERVER	7.50%	22.50%	17.50%	15.80%
Pink	Count	0	11	0	11
	% within TYPE OF OBSERVER	0.00%	27.50%	0.00%	9.20%
White	Count	24	17	23	64
	% within type of observer	60.00%	42.50%	57.50%	53.30%
Yellow	count	13	3	10	26
	% within type of observer	32.50%	7.50%	25.00%	21.70%
		40	40	40	120
		100.00%	100.00%	100.00%	100.00%

**Table 3** Colour of linen

		Type of observer			Total
		1	2	3	
Blue	count	9	5	5	19
	% within type of observer	22.50%	12.50%	12.50%	15.80%
Green	count	22	10	7	39
	% within type of observer	55.00%	25.00%	17.50%	32.50%
White	count	9	25	28	62
	% within type of observer	22.50%	62.50%	70.00%	51.70%
Total	count	40	40	40	120
	% within type of observer	100.00%	100.00%	100.00%	100.00%

All (100%) preferred provision of windows/ ventilator in OT for natural light. Result was significant.

On displaying of instruments in dermatology OT 87.5% patient generated apprehension among patients while 12.5% did not. 75% nurses felt apprehension while 25% did not. Among doctors 50% had apprehension while 50% did not. In total 70.8% had apprehension while 29.2% did not had apprehension on seeing the instruments. Result was significant (0.001).

On seeing greeting smile on treating dermatologist's face anxiety was allayed in all nurses (100%). Anxiety was allayed in 80% patients while 20% had no effect. Even for doctors it was important as 75% had their anxiety allayed while 25% doctors remained unaffected. In total 85.0% were relieved on seeing greeting smile on dermatologist's face. Result was significant (0.004).

Aroma in the OT is also important. Most doctors preferred a floral (75%) smell followed by fruity odour (22.5%) and other smell (2.5%). Among sisters all preferred fruity smell. 85.8% patients preferred floral smell followed by fruity smell (13.3%). In total 85.8% preferred floral smell followed by fruity smell (13.3%) and other smell (0.8%). Cologne was selected by none. Result was not significant.

Maximum doctors 62.5% were not affected by characteristic

hospital smell/smell of latex glove/smell of antiseptics and medications. However 95% nurses were affected followed by patients 60%. In total most (64.2%) of them had problem with characteristic hospital smell in OT. Result was significant (0.000).

Hearing calming words by doctors before surgery was appreciated by all nurses and patients (100%). Overall 83.3% wanted to hear soothing words. Result was significant (0.000).

When asked about background music 65% doctors wanted instrumental music followed by silence (25%) and classical (10%). Soft/ soft vocal / specific music was selected by none of the doctors. Most nurses preferred silence 62.5% followed by soft (27.5%) and specific music (10%). Most patients wanted to hear instrumental music followed by silence (10%) and soft vocal (12.5%). In total most of them wanted instrumental 39.2% followed by silence (37.5%) followed by soft (9.2%), classical (6.7%), soft vocal (4.2%) and specific music (3.3%). Result was significant (0.000). (Table 4)

Most of them were disturbed (90%) by behaviour, general non-specific mutual discussion, unnecessary casual comments, lack of apparent concern and negative work attitude of supporting staff in dermatology OT. In this all patients were affected (100%) while 95% nurses and 75% doctors were affected. Result was significant (0.000).

**Table 4** Type / nature of background music that will impart a soothing effect

		Type of observer			Total
		1	2	3	
Classical	count	4	0	4	8
	% within type of observer	10.00%	0.00%	10.00%	6.70%
Instrumental	count	26	0	21	47
	% within type of observer	65.00%	0.00%	52.50%	39.20%
Silence	count	10	25	10	45
	% within type of observer	25.00%	62.50%	25.00%	37.50%
Soft	count	0	11	0	11
	% within type of observer	0.00%	27.50%	0.00%	9.20%
Soft Vocal	count	0	0	5	5
	% within type of observer	0.00%	0.00%	12.50%	4.20%
Specific Music	count	0	4	0	4
	% within type of observer	0.00%	10.00%	0.00%	3.30%
	count	40	40	40	120
	% within type of observer	100.00%	100.00%	100.00%	100.00%

For light refreshment(s) prior to procedure most doctors preferred nothing 52.5% followed by tea (20%), water(15%) and coffee (12.5%). Nurses had equal choice for all refreshments (25%). Patients

mostly preferred water 35% followed by tea (30%) and coffee (25%). In total most of them preferred nothing followed by tea (25%) and water (25%). Result was significant (0.000) (Table 5).

**Table 5** Light refreshment(s) before entering the OT

		Type of observer			Total
		1	2	3	
Coffee	Count	5	10	10	25
	% within type of observer	12.50%	25.00%	25.00%	20.80%
Nothing	Count	21	10	4	35
	% within type of observer	52.50%	25.00%	10.00%	29.20%
Tea	Count	8	10	12	30
	% within type of observer	20.00%	25.00%	30.00%	25.00%
Water	Count	6	10	14	30
	% within type of observer	15.00%	25.00%	35.00%	25.00%
	Count	40	40	40	120
	% within type of observer	100.00%	100.00%	100.00%	100.00%

For eating refreshments or snack in post-operative period all nurses said yes (100%). 62.5% patients wanted refreshment. While among doctors the opinion was equally divided (50%). In total most of them wanted refreshments 70.8%. Result was significant (0.000).

Everyone (100%) preferred dehumidified, cool and pleasant environment rather than hot and humid environment in dermatology OT.

Most (82.5%) of them wanted additional presence of fan in air conditioned room for fresh blow of air to avoid feeling of suffocation in dermatology OT. In this all nurses (100%), 95% patients and 52.5% doctors preferred additional fan. Result was significant (0.000).

Most of them (87.5%) wanted to avoid excessive use of topical chemicals and medications during the procedure. In this all nurses (100%), 95% patients and 67.5% doctors wanted to avoid . Result was significant (0.000).

All nurses and patients (100%) felt uncomfortable when instruments, surgical instruments were kept on the abdomen or other body parts during the surgical procedure. While only 52.5% doctors felt discomfort for the same. In total 84.2% people were not comfortable. Result was significant (0.000). Patients have feeling of suffocation when surgical instruments are kept either on the abdomen or other body parts. They also have feeling of slipping instrument making them uncomfortable. Many times instruments fall down, instrument count is missed by sister and surgery is hampered.

Lying was found to be more comfortable during procedure by most 73.3%. In this 80% nurses, 72.5% doctors and 67.5% patients preferred lying. Result was not significant. All (100%) preferred supine position during procedure.

## Discussion

Colour is a powerful communication tool and can be used to signal action, influence mood, and even influence physiological reactions. Feelings about colour are often deeply personal and rooted in your own experience or culture. For example, while the colour white is used in many Western countries to represent purity and innocence, it is seen as a symbol of mourning in many Eastern countries. While perceptions of colour are somewhat subjective, there are some colour effects that have universal meaning. Colour psychology suggests that various shades can have a wide range of effects, from boosting our moods to causing anxiety (Table 6). For example the colour white can feel fresh and clean. The colour is often used to evoke a sense of youth and modernity. People often describe blue as the colour of stability and safety. Driving a blue car might indicate that you are dependable and trustworthy. A person might prefer brighter, more attention-getting colours when they are younger, but find themselves drawn to more traditional colours as they grow older. Room colours can also be used to evoke specific moods, such as painting a bedroom a soft green to create a peaceful mood.<sup>5</sup> Colour psychology is mainly distinguished by two categories of colours: warm and cool. Warmer colours stimulate feelings of anger, hostility as well as comfort and warmth. Cooler colours, on the other hand, help instil feelings of sadness but calmness as well. All cool colours like green and blue are easy on the eye muscles and hence facilitate their relaxation. Offices having warmer coloured hues such as browns and golds actually make people feel warmer while those with lighter colours like pale blue or white make people feel cooler. A scientific experiment helps demonstrate colour psychology better: Two study groups were each given sleeping pills. The only difference was that one group was given a “blue pill” while another was given a “pink pill”. 72% of those who took the blue pill reported feeling sleepy as compared to only 32% of those who took the pink one. This could be because of the fact that blue inspires calmness and serenity and is associated with water and peace.<sup>6</sup> Certain colours have even been associated with increased blood pressure, increased metabolism, and eyes train.<sup>5</sup>

A great deal of thought and consideration must be given to placement and usage of colour psychology in work and home environments as it directly impacts one’s physical and mental welfare.<sup>6</sup> Experts have found that while colour can have an influence on how we feel and act, these effects are subject to personal, cultural, and situational factors. More scientific research is needed to gain a better understanding of colour psychology.<sup>5</sup> Windows are of key importance; as well as natural light, they provide an outlook, contact with the outside and access to sunlight about which patients are extremely positive. Windows should

therefore be sized and positioned to provide a view out, regardless of location, as well as a reasonable average daylight factor. Lighting has a considerable effect on the appearance of a space.<sup>1</sup>

**Table 6** Colour psychology<sup>5</sup>

Colour	Colour Psychology
Black	Sophistication, power, mystery, formality, evil, death
Yellow	Joy, cheerfulness, energy, warmth. caution, cowardice
White	Freshness, hope, goodness, light, purity, cleanliness, simplicity, coolness
Blue	Peace, stability, calmness, confidence, sincerity, affection
Green	Life, growth, environment, healing, money, safety, relaxation, freshness
Pink	Romance, compassion, faithfulness, beauty, love friendship, sensitivity
Purple	Royalty, luxury, dignity, wisdom, spirituality, passion, vision, magic

Healthcare professionals’ empathic behaviour is an important component of quality health care. Patients’ reports suggest that empathy is often lacking. Specific factors that may facilitate or inhibit empathetic behaviour have not been extensively examined.<sup>2</sup> Patients indicate a need to be recognized and treated as individuals by hospital staff. They are concerned with their illnesses and conditions and want to be kept informed. An atmosphere respectful of the individual patient should be focused. Fear and anxiety associated with illness can be as debilitating as the physical effects. Proper coordination of care can ease those feelings. Modifying external behaviour and how doctor’s communicate is very important. More value should be placed on talking with patients. A doctor’s behaviour also serves as a model to the students, interns, and medical staff around him. The benefits of setting the behavioural tone cannot be underestimated.<sup>7</sup>

Our mental state is influenced and often dominated by olfactory experiences that guide our senses. Whether it is an apple that looks rotten or a rose that seems freshly watered, behind the scenes it’s our sense of smell that’s responsible for much of those sensations.<sup>8</sup>

An odour has no personal significance until it becomes connected to something that has meaning. The capacities for both smell and emotion are rooted in the same network of brain structures, the limbic system. The olfactory centre also interacts directly with the hippocampus, a brain area involved in the formation of new memories. Scents can have positive effects on mood, stress reduction, sleep enhancement, self-confidence, and physical and cognitive performance.

Aromas have different effects on everyone, but the natural fragrances are odours for the masses. Peppermint is generally invigorating. It increases activity in the brain area that wakes us up in the morning. Jasmine is a sleep aid. The scent increases the brain waves associated with deep sleep. Lavender is generally relaxing. Smells can affect both our short and long term moods. Creating an environment with pleasant smells which evoke positive, calm or otherwise good emotions is rather simple and can have a profound impact on our mood.<sup>8</sup>

Any patient going into surgery will naturally feel anxious. That’s why standard procedure is to give them a dose of anxiety medicine, typically hydroxyzine, which helps them relax before receiving anaesthesia.<sup>10</sup> However, “conversational hypnosis”, does a better job



than pills for relaxing patients, suggests research being presented at the ANESTHESIOLOGY™ 2015 annual meeting. According to Dr. Boselli, the study suggests that conversational hypnosis might increase patient self-reported comfort during regional anesthesia without medication, and that this effect might be objectively monitored using the ANI Analgesia/Nociception Index (ANI).<sup>11</sup>

Listening to music has been shown to improve memory functioning, increased rate of healing, improve your workouts and more. Just like listening to slow music to calm the body, music can also have a relaxing effect on the mind.<sup>12</sup> Fast, upbeat music provide a burst of energy while exercising, slower music has been shown to be more relaxing. Classical music, in particular, can help slow the pulse and heart rate, as well as decrease levels of stress hormones.<sup>13</sup> Fast music increases the cortisol levels, while the slow, quiet, calm and classical music does the opposite. The blood cortisol levels of those with imminent surgery get reduced by 50% with the calming music, jointly chosen by the patient and music therapist. An emotional response of the secretion of immune-boosting hormones is induced by certain music. Music decreases the stress-related hormone cortisol, the increased levels of which weaken the immune system. Hence the chances of illness get reduced.<sup>14</sup> A study suggests playing soothing music to patients before anaesthetising them for surgery could calm their nerves as much as conventional anxiety drugs but with fewer side effects.<sup>15</sup> Listening to meditative music as a non-invasive and cost-effective strategy can help maximize efforts to promote comfort and relaxation for patients awaiting stressful procedures. Meditative music can be effective in alleviating state anxiety of patients.<sup>16</sup>

Optimal positioning not only ensures the best possible access to the surgical site, but also prevents long-term consequences such as nerve damage or pressure ulcers. These secondary complications can delay rehabilitation and recovery. Patients have better outcomes when hospitals can avoid these secondary consequences. Surgical teams should always choose a position that maximizes surgical site access while minimizing the risk of complications. In prone positions obese patients feel suffocated. The respiratory distress compounds to surgical side effects.<sup>17</sup>

## Conclusion

Thus based on five senses of human body an operation theatre should be conceptualized and built. A good visual environment will have positive effect on the occupant's feeling. In case of hospitals and healthcare buildings this will have good affect in patient's recovery and staff performance.

## Limitation of the study

Sample size of the study was small and may be extended in subsequent researches.

## Conflict of interest

We declare no conflict of interest.

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