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Awareness and Perception about Homograft, Cadaveric Skin Donation and Skin Banks in General Population

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ABSTRACT

Skin is the largest organ of the human body and serves several essential function and also skin is a good indicator of our general health. Burns are important health issues that significantly affect a variety of population groups. Skin grafting is still regarded as the gold standard in surgical burn treatment. Skin banking is a process involving skin collection from eligible deceased donor which is then processed, preserved and distributed to needy one. Aim and Awareness and perception about, Homograft, Cadaveric Skin Donation and Skin Banks in General Population. This was a cross-sectional study be conducted on general population of Mumbai under the field area of Grant Medical College Mumbai, for the duration of six months, included 350 surveyed samples after following inclusion and exclusion criteria given bellow and after getting consent form the sampling unit and approved by institutional ethical committee of Grant Medical College Mumbai. In the study total 350 study participants were included, out of which, majority of the population was lying in the age group of 31-40 years of age, males were more as compared to females. Out of those who were aware about skin donation and skin grafting, 76% of the observation were getting information through social media. 44% of the population were aware about skin banks. 83% of the people were liking to promote skin donation to skin banks. Awareness about skin donation and skin bank was found less among general population. Social media was efficient mode of awareness. But maximum people found good attitude towards skin donations.

INTRODUCTION

Skin is the largest organ of the human body and serves several essential functions. It is a complex and dynamic structure that plays a crucial role in protecting the body from external threats, regulating temperature and facilitating sensory experiences. It is soft, to allow movement, but still tough enough to resist breaking and tearing. It varies in texture and thickness from one part of the body to the next. For instance, skin on our lips and eyelids is very thin and delicate, while skin on the soles of our feet is thicker and harder. Also skin is a good indicator of our general health. If someone is sick, it often shows in their skin.

The word skin originally only referred to dressed, though the skin is the body's largest and primary protective organ, covering its entire external surface and serving as a first-order physical barrier against the environment, but when damaged by thermal injury, it is unable to defend the body against exterior elements. In a burns patient, the earlier we get to cover the damaged/burnt areas, earlier stabilisation of the patient when compromised haemodynamically and by infections and thus facilitate an early recovery^[1]. Skin reinstates it every 28 days. Thirty thousand dead cells are shed each minute from our epidermis^[2]. The most common cause of skin damage is burns. When damaged due to burns the defence mechanism breaks down. If untreated, the victim eventually succumbs. The loss of 40 percent of skin is fatal in developing countries. Approximately 1 to 1.5 lakh people in India are either disabled or require multiple interventions and rehabilitation^[3]. Though alternative treatment strategies of skin repair have been developed internationally, the allograft skin grafting option awareness, or even its availability, are lacking in a developing country like India^[4].

The extensive burns are treated by skin allografts when donor areas are limited. Skin donation becomes relevant in this situation. This is a relatively new approach in our Indian society. While donation of eyes has become popular, the donation of skin which can be obtained from living, brain dead and deceased donors, is almost absent. A cadaveric skin graft is a good option^[5]. When epidermal tissue is harvested from cadavers, skin banking facilities are required for preservation and prospective use. Skin is harvested from donors within six hours after death, processed in glycerol and transferred to a skin bank. This skin, thus preserved in a tissue bank is viable for further use^[6]. The skin is obtained from living, brain dead or deceased donors. This stored skin is grafted onto a burns wound when enough skin is not available from the patient's donor options. Additionally, there is no tissue type matching required.

Skin banking is a process involving skin collection from eligible deceased donor which is then processed, preserved and distributed as international protocols. Collected and processed skin is stored in a skin bank at 4-8 °C for up to for years.

Mass disaster situations merit sufficient availability of skin in a tissue bank. It is a pre-requisite to have an extensive supply of skin available for burns patient. Skin banks coordinate all activities including procurement, data recording, processing, storage, distribution and import and export of tissues according to written operating procedures detailed in technical guidelines. Significant improvement in thermal injury mortality can be achieved if we have enough skin banks in our country. Health care professionals have a vital role of spreading of awareness related to skin donation and skin banking. A lack of awareness is a major obstacle for donor skin and shortage of donor skin in skin banking.

“When you donate eyes, you give sight, when you donate skin, you give life”

Thus considering all above condition in mind present study we have conducted about awareness and perception about, Homograft, Cadaveric Skin Donation and Skin Banks in General Population.

MATERIALS AND METHODS

This was a cross-sectional study conducted on the general population of Mumbai under the field area of Grant Medical College Mumbai, for the duration of six months, included 350 surveyed samples after following inclusion and exclusion criteria given below and after getting consent from the sampling unit and approved by institutional ethical committee of Grant Medical College Mumbai.

Inclusion criteria:

- Participants should be above the age of 20 years
- All must be willing to participate
- All must be literate enough to fill and understand the questionnaire form

Exclusion criteria:

- Those candidates who were absent on the day of visit for data collection were excluded from the study
- Age below 20 Years

Sample size and sampling technique: According to the study conducted by AlShammrie *et al.*^[7], 43.26%, reported an awareness of skin donation, considering this proportion our sample size was calculated 350 by using Cochran's formula:

$$n = \frac{Z^2 PQ}{ME}$$

For estimating the expected proportion with 5% absolute precision and 95% confidence. Simple random sampling was used to select sample from the population from the general population.

Method: A self-administered, structured questionnaire was used to collect data from respondents. As per list attached:

- **Section A:** Assessed demographics comprised age, gender, religion, the field of work, education, awareness, source of news about skin donation and vowed organ donation
- **Section B:** To explore the knowledge of the participant by survey questionnaire regarding Skin donation, homograft, cadaveric skin donation and closed-ended questions will be offered with options choose in every item.

Data collection and data analysis: The study participants were approached on their workplaces and the Google link was sent via Android devices Data will be collected by the researcher in the organization set up of Plastic Surgery Department of Grant Medical College Mumbai.

This will be accomplished via a Google form that will be retrieved, encoded in MS Office Excel 2016 and analysed using SPSS 25.0. The obtained data were analysed to use both descriptive and inferential tests. Categorical data were expressed in terms of frequency and proportion.

OBSERVATION AND RESULTS

In the study total 350 study participants were included, out of which, majority of the population was lying in the age group of 31-40 years of age followed by 21-30 years. In our study males were more as compared to females shown in Table 1.

Out of all we have observed that, 47.71% of the population were aware about skin grafting and also these people were aware about skin donation (Table 2).

Out of those who were aware about skin donation and skin grafting, 76% of the observation were getting information through social media followed by other sources and newspaper, TV and scholarly articles (Table 3).

It was observed that 44% of the population were aware about skin banks and only 12% of the peoples known deceased person who have donated skin to skin

Table 1: Distribution of demographic profile of study population

| Parameters | Frequency | Percentage |
|------------------------------|-----------|------------|
| Age (years) | | |
| 21-30 | 143 | 40.9 |
| 31-40 | 152 | 43.4 |
| 41-50 | 40 | 11.4 |
| 50-60 | 15 | 4.3 |
| Gender | | |
| Male | 242 | 69.1 |
| Female | 108 | 30.9 |
| Education | | |
| Illiterate | 6 | 1.7 |
| Intermediate | 3 | 0.9 |
| Graduate | 190 | 54.3 |
| Above graduation | 151 | 43.1 |
| Profession | | |
| Technical | 86 | 24.6 |
| Non-technical | 127 | 36.3 |
| Official | 137 | 39.1 |
| Religion | | |
| Hindu | 265 | 75.7 |
| Muslim | 48 | 13.7 |
| Sikh | 17 | 4.9 |
| Christian | 14 | 4.0 |
| Other | 6 | 1.7 |
| Locality | | |
| Urban | 264 | 75.4 |
| Semi-Urban | 64 | 18.3 |
| Rural | 22 | 6.3 |
| Source of information | | |
| TV | 8 | 4.8 |
| Social media | 127 | 76.0 |
| News paper | 14 | 8.4 |
| Scholarly article | 4 | 2.4 |
| Others | 14 | 8.4 |

Table 2: Distribution of demographic profile of study population

| Awareness AMD perception about | Yes | Percentage |
|--|-----|------------|
| Skin grafting | 167 | 47.71 |
| Do you know when skin grafting is required? | 76 | 45.50 |
| Were you aware about it before coming to the hospital? | 137 | 82.00 |
| Do you know the advantages of skin grafting? | 129 | 77.20 |
| Do you know what is "autograft"? | 94 | 56.30 |
| Do you Know What is "Homograft"? | 86 | 51.50 |
| Do you know what is "cadaver"? | 62 | 37.10 |
| Do you know "cadaveric skin Homograft"? | 46 | 27.50 |
| Is "Cadaveric skin homograft" acceptable to you? | 35 | 21.00 |
| Do you know that it is useful for quick and better healing of the wound? | 49 | 29.30 |
| Are you aware of that "Cadaveric Homograft" so applied will be rejected? | 31 | 18.60 |
| Are you aware of complications like febrile ,anorexia, irritability during rejection of Homograft? | 28 | 16.80 |

Table 3: Distribution of awareness about cadaveric skin donation of study population

| Cadaveric skin donation | Yes/True | No/False |
|---|-------------|--------------|
| Do you know that permission for skin donation from the survivors of the deceased individual is required, without which it will not be possible? | 79 (22.57%) | 271 (77.42%) |
| Do you know that no testing like blood grouping or tissue matching of recipient is required with donor ? | 47 (13.42%) | 303 (86.57%) |
| "Any person above the age of 16 years can be a skin donor after death if found negative for Hepatitis B, C, HIV, Transmissible diseases. Skin cancer, skin infections, damaged skin, Systemic sepsis" | 126 (36%) | 224 (64%) |
| Skin graft procurement should be done with shortest delay after death, though it can be procured upto 24 hours after death if the body is preserved in cold storage | 84 (24%) | 266 (76%) |

Table 4: Distribution of awareness about skin bank among study population

| Skin bank awareness | Frequency | Percentage |
|---|-----------|------------|
| Do you know about skin banks? | 154 | 44.0 |
| Does your any known deceased person ever donated skin to "skin banks" | 42 | 12.0 |
| "Thinking it to be a help for ailing humanity" would you like to promote individuals for skin donation of dead persons to "skin banks"? | 83 | 23.7 |
| Does your any known patient ever obtained skin graft from "skin banks" | 26 | 7.4 |
| Do you Know these "Skin Banks" are under strict Government control | 88 | 25.1 |

banks. 83% of the people were liking to promote skin donation to skin banks. 7.4% of the people observed that their known patients obtained skin graft from skin banks and also 25.1% of the people knows that skin banks are under strict government control (Table 4).

DISCUSSIONS

Skin acts as a shield to protect person from heat and cold, as well as environmental impacts such as chemical, the sun's UV-radiation and bacteria. But when the skin gets badly burned or damaged, its unable to repair itself without help. For patients with severe burn injuries, one way to promote healing is by covering the wound with allograft (Skin from an organ donor). Skin is needed to prevent infections, decrease pain and provide protection and help faster healing and save lives. If the burnt area is not immediately covered with some skin substitutes, then patients are prone to infection, fluid loss and ultimately death. In case of smaller percentage of burns, skin from unburnt area of the patients is taken out and put on the burn wound to cover it. But when burns percentage is more than 40-50%, then the patient's own skin is not available to cover the burn wound. Therefore the need for skin substitutes. In emergencies when skin is not available often relative of patients offer their own skin as live donor, or from cadaver skin called as allograft or homograft, which is human cadaver skin donated for medical use. Cadaver skin is use as a temporary covering for excised wound surfaces before a permanent covering can be used.

Skin is the best substitute for skin. Thus, skin donated after death is the best and cheapest substitute compared to artificial skin substitutes. Such skin is a temporary dressing but is vitally important as it helps in patients own skin to regenerate. 80% of the such patients can be saved if we have enough skin in skin banks. Donating skin after death, instead of burning or burring body would be great service to millions who are suffering. But we found that there is lack of awareness about skin donation among the general population, also there are very less studies found about awareness and perception about skin donation, homograft and skin banks among general population. We observed some studies about knowledge, awareness and perception of skin donation, skin banks and homograft among healthcare professional and medical students, but it is not there among general population. So in the present study we

tried to find out awareness and perception about skin donation, skin bank and homograft among general population.

In the present study there were 350 samples included after following inclusion and exclusion criteria of the study, out of which majority of the study population were male, more than 95% of the people were graduated and above graduate. By the religion Hindu dominance was observed followed by Muslims and other religion. And more than 90% of the population were from urban to semi-urban region. According to the study conducted by AlShammrie *et al.*^[7], observed male dominance in the study, also Hindu population were more followed by Christian and majority of study population were graduate. Another study conducted by Mehra *et al.*^[8] in Sudi Arabia, observed, predominance of female population compared to male population and more than 60% of the population were graduated and above. One more study conducted, Gore and De^[9] among the medical students from first year to third professional year, also found male dominance compared to female and maximum students were belonged to hindu religion followed by Muslim religion and others.

In the present study we have observed that, out of all 47.71% of the study population were aware about skin grafting and skin donation and out of this 45.5% of the population were aware about when it is required and 82% of the population knew this before coming to the hospital via social media which was highlighted by majority of surveyed people. Of the 167 people 77.5% of the people were aware about advantages of skin grafting. 56% of the people knew about autograft and 51% of the population were aware about homograft. But those who were aware about skin donation 21% of the people were accepted cadaveric skin grafting and others were rejected due to some other reasons like religious activities and some were not responded over. In our study only 44% of the study population were aware about skin banks. 12% of the study population known to deceased person ever donated skin to "skin banks". 23.7% of the people were promoting skin donation to the skin banks, because they think that, it to be a help for ailing humanity and also it is under strict control of government. In the study we have found that only 22.57% of the people were aware that permission for skin donation from the survivors of the deceased individual is required and 13.47% of the people were knew that testing of skin or cadaver is not

Table 5: Distribution of Skin Donation awareness among different studies

| Skin donation awareness | Year of study | Percentage |
|--|---------------|------------|
| Present study | 2023 | 47.71 |
| Arunachalam <i>et al.</i> ^[6] | 2021 | 51.60 |
| AlShammrie <i>et al.</i> ^[7] | 2022 | 34.20 |
| Alharbi <i>et al.</i> ^[15] | 2022 | 76.00 |

Table 6: Comparison of mode of awareness (social media) about skin donation with other studies

| Medium of awareness | Social media | News paper | Others |
|--|--------------|------------|--------|
| Arunachalam <i>et al.</i> ^[6] | 51.61 | 5.65 | 8.86 |
| Present study | 76.00 | 8.40 | 8.40 |

required like blood testing, blood grouping or tissue matching of recipient is required with donor. 36% of the population were agree with the statement that, "Any person above the age of 16 years can be a skin donor after death if found negative for Hepatitis B, C, HIV, Transmissible diseases. Skin cancer, skin infections, damaged skin, Systemic sepsis." And also 24% of the population were agree with Skin graft procurement should be done with shortest delay after death, though it can be procured upto 24 hrs after death if the body is preserved in cold storage.

According to the study by Arunachalam *et al.*^[6] done among health professionals, 51.6% and less than half (47.5%), had a somewhat better understanding of skin donation and skin banking, which is somewhat more than present study. In the same study Half of the 51.6% of healthcare providers were aware of skin donation from social networks, which coincides with our study. In India, the media is the key source of information exchange and influences people's perceptions^[10]. Only 16.13% consented to motivate and assist their family and the public on skin donation, in our study this proportion was somewhat more than this study. In the study by Oyo state, similar findings were inconsistent. Almost the majority of them seem to be happy to give their skin, with only a few claiming deformities as that the reason for the reluctance to tissue donation^[11]. According to the study conducted by Rasania *et al.*^[12] included 300 undergraduate students from their institute observed that 76% of the students were aware and had knowledge about skin donation (Table 5).

Religion is the most influential factor in skin and organ donation; it may advocate the public^[13]. As per the conclusions of the Serbian research, spiritual organisation' participation supported and encouraged organ donation. Study by Tokalak *et al.*^[14], a first large-scale study investigating the public perception and attitude regarding skin donation in Saudi Arabia, observed that, a large proportion of the participants, 5,604 (65.8%), were not aware of the skin graft preservation time frame. Only 694 (8.2%) participants knew that skin can be preserved for 7-8 days and it was found in the literature that the maximum preservation times indicated were 7-8 days. In the same study regarding the obstacles to skin donation in Saudi Arabia, the low number of available donors was

reported as a major barrier by 2,364 (27.8%) participants. This was consistent with the findings reported in a study carried out in Turkey which reported that the lack of donor organs is the main obstacle to transplantation^[3]. In contrast, a local study conducted in Riyadh reported that religion was the primary barrier to donation among the general public which was consistent with our study. In the same study 22% of the participants did not agree to donate their skin due to religious reasons, so this proportion was similar to the acceptance of skin donation in our study (Table 6)^[15].

The majority of the people in our study field area seem less informed about allograft skin donation. More studies should focus on the understanding and knowledge regarding allograft skin donation, skin banks and cadaveric skin donations among the general population and explore the causation behind the withholding of skin donation, so it would be possible to address and implement the right solutions and improve the awareness and perception of the public toward skin donation. Also, there is a need to have vigorous awareness on allograft skin donations and their importance through healthcare personnel using campaigns and direct education and through social media which should show a major impact on the younger populations, as the case of India where information exchange has been effective in influencing people's perceptions concerning the skin donations.

CONCLUSION

From the overall observation and after discussion with other studies we can conclude from the survey that, most of the participants were not aware about skin donation, skin grafts and skin banks. Those who were aware about it, religious beliefs are key determinants in influencing the perception and attitudes of respondents toward allograft skin donation. However, most respondents affirmed that their human nature was a key determinant in skin donation. Furthermore, there is a lack of knowledge of many aspects of skin donation and its role among participants. Also we can conclude that, through the social media, awareness about organ donation mainly skin donation can be increased.

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