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Use of medical textiles in hospitals of Kumaun region in India

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Abstract

Medical textile is one of the important sector and the growing segment of the textile industry which includes medical, hygiene and health care sector. Medical textile material are classified on the basis of applications into four categories namely implantable textiles, non-implantable textiles, extracorporeal and health care and hygienic textiles. Aim of the present study was to explore the medical textile used in the selected government, private and multispeciality hospitals in the Kumaun region. Sixty hospitals comprising of government, private and multispecialty were included in the study. Information regarding use of nonimplantable textiles, extracorporeal textiles and healthcare and hygiene textile was collected. Results of the study indicate that extracorporeal textiles were used as least compared to non-implantable textiles and health and hygiene textiles.

Keywords: Medical textiles, extracorporeal textiles, non-implantable textiles, health and hygiene textiles, hospitals

Introduction

Textile materials play an important role these days as they are utilized for different purposes in several sectors such as agriculture, medicine, home, automobile, industry, etc. Medical textile is one of the important sector and the growing segment of the textile industry which includes medical, hygiene and health care sector. Advances in medical sector have promoted the use of medical textiles in the hospitals, due to which a rapid increase in the demand of medical textiles has been noted. Advancement in medical sector has increased the life expectancy due to which age related diseases have increased which have led to increased use of medical textiles. Despite of this, many diseases are appearing from time to time. Advancement in medical field is also helpful to cure patient having accident or some medical ailments. Innovative textile products give quick and effective treatment as well as comfort to the patients which have led to growth of medical textiles compared to few decades back.

Textile Institute (UK, 2002) defines medical textiles as “a general term which describes a textile structure which has been designed and produced for use in any of a variety of medical applications, including implantable applications”(Denton, 2002)^[7].

Chakrobarty *et al.*, (2010)^[1] highlighted medical textile material and classified medical textiles these on the basis of applications into four categories namely implantable textiles, non-implantable textiles, extracorporeal and health care and hygienic textiles. Thus, the present study was planned to explore the medical textile used in the selected government, private and multispeciality hospitals in the Udham Singh Nagar and Nainital districts.

Materials and Methods

The study was conducted exclusively in hilly and plain areas of Uttarakhand. The locale included hospitals present in Nainital and Udham Singh Nagar districts. These two districts were selected as one of these districts (Udham Singh Nagar) is situated in plain area and has many hospitals compared to another area situated in hilly area of Kumaun region i.e. Nainital district. The stratified and random sampling technique was used for selection of hospitals. Fig 1 shows schematic representation of selection of locale and sample. Hospitals were categorized into three different types namely, government, private and multispeciality hospitals. Among 30 hospitals, 5 government, 20 private and 5 multispeciality hospitals were selected making total to 30 in each district thus total 60 hospitals were selected. The number of hospitals in each category was kept same in both the districts for comparison. All government hospitals were selected. Number of multispeciality hospitals were less compared to private hospitals so 5 multispeciality hospitals were selected and 20 private hospitals dealing with either maternity, orthopaedic, skin and cardiology treatment were selected in the category of private hospitals. The collection of data regarding the usage use of textile material in the selected hospital was limited for the year 2018- 2019.

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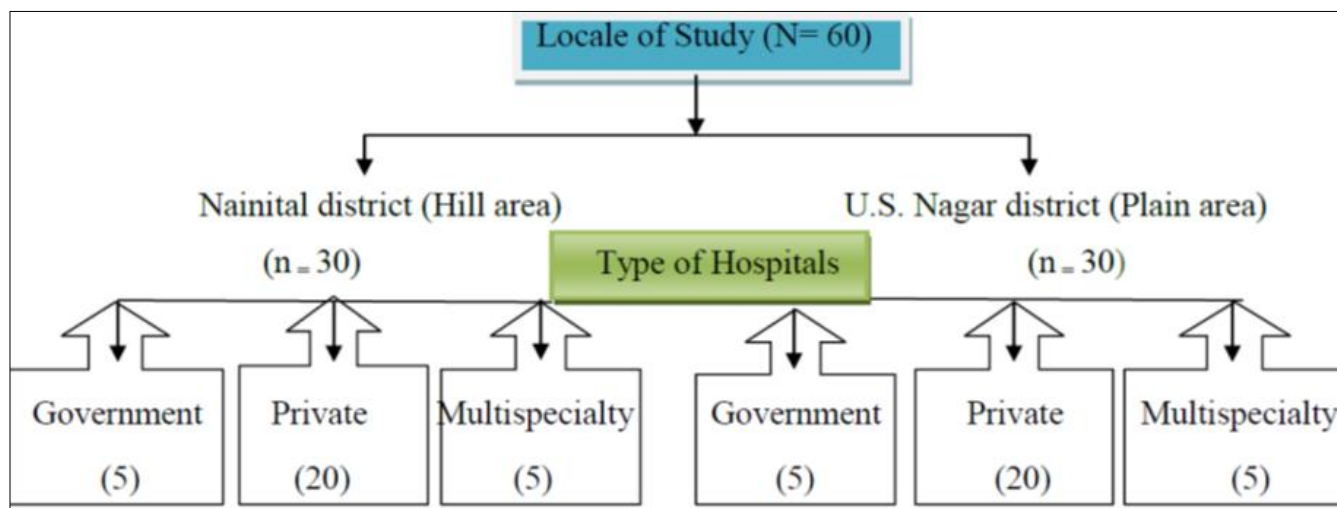


Fig 1: Diagram showing selection of locale

The research was explanatory in nature which included interaction of the researcher with the respondent for collecting necessary information via questionnaire cum interview schedule (Veliveli, 2014) [6]. The survey method was the most suitable method for researcher for collection of data. The study was conducted to collect the information as per the objectives of the study. The tool used for collection of data was questionnaire cum interview schedule. Interview schedule is a method which basically centers on the data collection. A questionnaire can be defined as a set of printed or written questions with the choices in the possible answers, used for the survey. Jackson (2011) [4] defined the data collection work as a tool used to collect the responses of the respondents on the selected subject and described the responses stated by them. Under the present study, information was collected by the researcher by face to face interview method. The interview schedule was formulated and used as instrument for collecting data about use of medical textiles in different types of hospitals of Udham Singh Nagar and Nainital district of Uttarakhand. Interview schedule consisted of questions which guided the researcher. Interview schedule was formulated by the researcher with the help of subject matter specialist and was assessed by teaching staff

Department of Clothing and Textiles, College of Home Science, G.B.P.U.A. & T., Pantnagar to check the clarity of the questions and corrections were made as per the suggestions. The questions comprised of two parts, i.e. general information and specific information. The survey method was used for data collection. Personal interview schedule was used as an instrument for collecting data from hospitals. Collected data analysis can be done through statistical tools. The information collected from each hospital was arranged and analyzed using appropriate statistical tests. Analysis was done using statistical measures like frequency, percentage, rank, mean and t-test.

Results and Discussion

Table 1 shows information regarding the uses of non-implantable medical textiles in the government, private and multispecialty hospitals of Udham Singh Nagar and Nainital districts. Non-implantable textiles included items such as cotton gauzes, absorbent pads, plasters, baby diapers, wound dressing and wadding. Rigby and Anand (2006) [5] stated that non-implantable materials are those which are used for external applications in the body and they may or may not come in contact with skin.

Table 1: Distribution of hospitals according to non-implantable textiles used (N=60)

S. No.	Non implantable textiles	Type of hospitals					
		Udham Singh Nagar (n = 30)			Nainital (n = 30)		
		Government (n= 5)	Private (n= 20)	Multispecialty (n= 5)	Government (n= 5)	Private (n= 20)	Multispecialty (n= 5)
		Frequency (percentage)					
1.	Cotton gauze	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)
2.	Absorbent pads	5 (100)	20 (100)	5 (100)	5 (100)	17 (85)	2 (40)
3.	Plasters	3 (60)	10 (50)	2 (40)	2 (40)	7 (35)	2 (40)
4.	Baby diapers	3 (60)	17 (85)	3 (60)	2 (40)	6 (30)	3 (60)
5.	Incontinence pads	1 (20)	12 (60)	4 (80)	2 (40)	13 (65)	2 (40)
6.	Wound dressing	5 (100)	18 (90)	5 (100)	4 (80)	20 (100)	5 (100)
7.	Wadding	1 (20)	12 (60)	3 (60)	2 (40)	14 (70)	2 (40)
		t_{cal}			-0.7 N.S.		
					-0.7N.S.		-0.8 N.S.

N.S. =Non-significant

It is clear from Table 1 that all hospitals used cotton gauze and absorbent pads irrespective of type of hospitals in both districts, except for 15 per cent of private hospital and 60 per cent multispecialty hospitals of Nainital district. The reason for no use of absorbent pads may be due to the type of treatment given in the hospitals might not require the use of absorbent pads.

Plasters were used in all the 60 per cent of government hospitals of Udham Singh Nagar district and 40 per cent of government hospitals of Nainital. Fifty per cent of private hospitals of Udham Singh Nagar and 35 per cent of Nainital district used plasters. As per patients requirement, forty per cent multispecialty hospitals of Udham Singh Nagar and Nainital district used plasters in their hospitals. This was the

department generally found in all the levels of hospitals for the treatment of fracture whereas few hospitals were treating with specialized orthopaedic treatment and were not doing plasters.

Data given in Table 1 also suggest that baby diapers were used in 60 per cent of government hospitals of Udham Singh Nagar whereas, 40 per cent of government hospitals of Nainital were using baby diapers. Apart from that, 85 per cent of private hospitals of Udham Singh Nagar and 30 per cent of private hospitals of Nainital were using baby diapers. Whereas, 60 per cent multispeciality hospitals of both the districts were using baby diapers. Mostly baby diapers were used in neonatal care units due to non existence of neonatal care units, baby diapers were not available in those hospitals. It was also found that in few hospitals, cotton gauze was used instead of diapers.

It is also clear from the results that in all the government and multispeciality hospitals of Udham Singh Nagar, wound dressing was done followed by 90 per cent of private

hospitals, reason behind this may be that some of the private hospitals are specialized with single treatment. All the private and multispeciality hospitals of Nainital district wound dressing was practiced (100%) followed by government hospitals (80%). It was found that maximum number of private and multispeciality hospitals (60 per cent) used wadding material in comparison to government hospital (20 per cent) of Udham Singh Nagar district. Forty per cent of government and multispeciality hospitals and private hospitals (70 per cent) of Nainital district used wadding during surgical treatment. Wadding material is the absorbent material used by maximum number of hospitals during surgery for dressing. No significant difference was found among government, private and multispeciality hospitals of Udham Singh Nagar and Nainital districts in relation to use of non-implantable textiles as observed by t-test. This means that more or less same type of trends was found with respect to use of non-implantable textiles.

Table 2: Distribution of hospitals based on use of extracorporeal textiles (N=60)

S. No.	Extracorporeal textiles	Type of hospitals					
		Udham Singh Nagar (n = 30)			Nainital (n = 30)		
		Govt. (n= 5)	Pvt. (n= 20)	Multi Sp. (n= 5)	Govt. (n= 5)	Pvt. (n= 20)	Multi Sp. (n= 5)
Frequency (percentage)							
1.	Artificial kidney	0	2 (10)	0	0	1 (5)	1 (20)
2.	Artificial lungs	0	0	0	0	0	0
3.	Artificial liver	0	0	0	0	0	0
4.	Skin	0	5 (25)	1 (20)	1 (20)	3 (15)	1 (20)
t_{cal}					-1.0 N.S.	-0.3 N.S.	-0.8 N.S.

Where Govt.= government Pvt.= private Multi Sp.= Multispecialty N.S = Non-significant

Table 2 furnishes data regarding the distribution of hospitals according to the extracorporeal textiles used. The extracorporeal textiles include artificial kidney, artificial lungs, artificial liver, skin, tendons and ligaments. Study conducted by Choudhary (2009) [3] stated that extracorporeal devices were the textile engineered mechanical organs used for purification of blood and include artificial kidney (dialysis). It was also stated that performance and functions of these devices were based on density of fiber which was used for removal of waste.

It was found that extracorporeal device like artificial kidney was not used in the government hospitals of both the districts and multispeciality hospitals of Udham Singh Nagar district. Whereas, 10 per cent private hospitals of Udham Singh Nagar district were practicing to provide artificial kidney. Five per cent of private hospitals and 20 per cent of multispeciality hospitals of Nainital district were dealing with artificial kidney. Artificial kidney (dialysis) is used to remove dirt from patients blood. As these are the highly specialized treatments and were not practiced in maximum number of hospitals due to the lack of specialized doctors in government and private hospitals.

Artificial lung and artificial liver are the extracorporeal textile materials which were not used by any hospitals of both the districts i.e. Udham Singh Nagar and Nainital districts. Artificial lung is used to supply fresh air and remove carbon dioxide whereas artificial liver is used to supply fresh plasma. It means that none of hospitals were doing replacement of lungs and liver. It may be due to non-availability of specialized doctors for these treatments.

Data in the Table 2 also depict the use of skin. It is clear from the Table that none of government hospitals of Udham Singh Nagar district, whereas 20 per cent of government hospitals of

Nainital district used skin for treatment because people from both the districts come to this hospital for treatment as this is the only government hospital which look up for skin related treatments. Artificial skin was used by the 25 per cent and 15 per cent of private hospitals of Udham Singh Nagar and Nainital districts respectively. Multispeciality hospitals (20 per cent) of both districts were dealing with skin grafting treatments as extracorporeal material. Skin was used in burnt as well as cosmetology department of the hospitals. As per the records, it was found that in Kumaon region has less number of patients who go for cosmetology which might be due to low level of awareness among the people regarding this department and another reason may be cost of treatment which is very high and is not affordable by middle and low income group people.

Government, private and multispeciality hospitals of Udham Singh Nagar and Nainital districts where in relation to use of extracorporeal textiles as observed by t-test. Which means that same trend was seen with respect to use of extracorporeal textiles.

It can be concluded that extracorporeal textiles were not popularly used in the selected hospitals. Total uses of extracorporeal textiles was maximum in the hospitals of Nainital district as compared to Udham Singh Nagar district. All the extracorporeal textiles were not used in government hospitals of both the district except skin treatment provided in government hospital of Nainital districts. Artificial kidney was managed in both the districts. Artificial lung and artificial liver were not used by any hospitals of both the districts. Skin treatment was done more in Nainital district as compared to Udham Singh Nagar district.

Table 3 gives information on the distribution of hospitals according to uses of health care and hygiene textiles,

considered as quite essential to protect from infection and in order to maintain hygiene practice.

It is indicated in the Table 3 that irrespective of type of hospitals; surgical gowns, caps, masks, curtains, bedsheets, blankets, pillow case, pillow mattress, gloves and surgical drapes were considered as the necessary textile items and therefore used by all the hospitals of both the districts. Surgical hosiery was used in all the hospitals of both districts except government hospitals of Udham Singh Nagar district. Surgical hosiery is used as compression stocking to provide

pressure in leg and maintain blood flow and to reduce discomfort and swelling. It is generally used during aching legs, swelling and deep vein thrombosis.

It was observed by the researcher that in all the hospitals quilts were used, Maximum number of quilts (80 Percent) were used in multispeciality hospital of both the districts, followed by government hospitals (40) and private hospitals (35 per cent) of Nainital district. Rest of the hospitals were using blankets instead of quilts.

Table 3: Distribution of hospitals according to the textiles used for healthcare and hygiene textiles

S. No.	Name of health care and hygiene textiles	Type of hospitals							
		Udham Singh Nagar (n = 30)			Nainital (n = 30)				
		Government	Private	Multispeciality	Government	Private	Multispeciality		
Frequency (percentage)									
1.	Surgical gowns	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)		
2.	Caps	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)		
3.	Masks	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)		
4.	Surgical hosiery	0	2 (10)	2 (40)	1 (20)	4 (20)	2 (40)		
5.	Curtains	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)		
6.	Bedsheets	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)		
7.	Blankets	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)		
8.	Quilts	1 (20)	5 (25)	4 (80)	2 (40)	7 (35)	4 (80)		
9.	Pillow case	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)		
10.	Pillow mattress	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)		
11.	Backsheet	1 (20)	14 (70)	2 (40)	1 (20)	6 (30)	3 (60)		
12.	Wipes	4 (80)	20 (100)	4 (80)	3 (60)	20 (100)	3 (60)		
13.	Knee caps	0	10 (50)	0	0	7 (35)	4 (80)		
14.	Mosquito nets	2 (40)	0	0	1 (20)	2 (10)	1 (20)		
15.	Gloves	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)		
16.	Surgical drapes	5 (100)	20 (100)	5 (100)	5 (100)	20 (100)	5 (100)		
$t_{cal} =$									
				0.0 N.S.		0.0 N.S.		0.3 N.S.	

N.S = Non-significant

Minimum number of government hospitals in both the districts were using backsheet (20 per cent). Maximum number of private hospitals (70 per cent) which were using backsheet in Udham Singh Nagar, followed by multispeciality hospital of Nainital district (60 per cent). Backsheet is disposed off after the use, so many hospitals do not provide it as they were not available in the hospitals due to lack of funds. Cent per cent of private hospitals of both the districts were using wipes followed by government and multispeciality hospitals of Udham Singh Nagar (80 per cent) and government and multispeciality hospitals of Nainital district (60 per cent), respectively. Wipes were used for cleaning of wounds and for hygienic purposes in hospitals. Few hospitals used medicated cotton instead of wipes.

Knee caps were not used in government hospitals of both districts and multispeciality hospitals of Udham Singh Nagar district. Knee caps were used by maximum number of multispeciality hospitals of Nainital district (80 per cent) followed by private hospitals of Udham Singh Nagar district and least by private hospitals of Nainital district.

Mosquito nets were used in government hospitals of Udham Singh Nagar district. None of the private and multispeciality hospitals of Udham Singh Nagar district were using mosquito nets. Twenty per cent of government and multispeciality hospitals in Nainital district were using mosquito nets as compared to 10 per cent of private hospitals of Nainital district. Maximum utilization of mosquito nets was found in Nainital district because the mosquitoes were found more here as compared to Udham Singh Nagar district.

Chinta and Veena (2013) [2] found that protection from infection in the hospitals is given by using medical textiles. It is also utilized to control bleeding due to accidents.

No significant difference was found between government, private and multispeciality hospitals of Udham Singh Nagar and Nainital districts in relation to use of health care and hygiene textiles as observed by t-test.

Conclusion

It can be concluded from the above study that among different classes of medical textiles non implantable textiles and health care and hygiene textiles were used by maximum by the hospital surveyed. Extra corporal textiles such as skin and artificial kidney were used as these hospitals were not having advanced facilities.

References

1. Chakraborty JN, Arjun D, Srinivasulu K. Application of textiles in medical, hygiene and health care. *Asian Textile Journal*. 2010; 19(12):43-57.
2. Chinta SK, Veena KV. Impact of textile on medical field. *Journal of Latest Trends in Engineering and Technology*. 2013; 3(2):142-147.
3. Choudhary SN. Advanced textile material in health care. *Asian Textile Journal*. 2009; 18(4):40-48.
4. Jackson SL. *Research Methods and Statistics: A Critical Approach*, 4th edition, Cengage Learning, 2011, 17.
5. Rigby AJ, Anand SC. *Handbook of Technical Textiles*. Cambridge: Woodhead Publishing Ltd and CRC Press LLC, 2006, 298-363.

6. Veliveli VL. Reference book in Home Science. 3rded. New Delhi, Kalyani Publishers, 2014, 272p.
7. Denton MJ. Textile Terms and Definitions, 11th ed. Manchester, UK: Textile Institute, 2002, 408p.