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Latesh

Assistant Professor, Department of Home Science, Govt. PG. College for Women, Kurukshetra University, Kurukshetra, Haryana, India

Nikita

M.Sc. (Human Development) Student, Department of Home Science, Govt. PG. College for Women, Kurukshetra University, Kurukshetra, Haryana, India

Assessment of knowledge about medical textile in healthcare product among young women

Latesh and Nikita

Abstract

Medical textile have been playing significant role in medicine for centuries. This sector of medical textile focuses on fibre based product used in healthcare applications like prevention, care and hygiene. During COVID-19 the rate of medical textile products such as face mask, medical gowns and PPE were surged gradually. In addition, the manufacture of medical textile is a growing sector due to new technology is used in medicine and textile; aging population, increasing population, lifestyle alteration and longer life expectancies. Despite of successive establishment of medical textile, there are number of entities have lack of knowledge about this sector. The research was conducted in government P.G. College for Women, Sector-14, Panchkula district of Haryana of India. The data were collected with sampling technique questionnaire cum interview method was used to conduct the present study. The main purpose of the research is to collect the data to find out that how many young women had knowledge about medical textile products used in Healthcare products and hygiene.

Keywords: Ageing population, healthcare product, hygiene, medical textile

Introduction

What is medical textile? Medical textile is one of the best innovative subjects of the Technical textile sector which is also known as biomedical textile. It is actually the mixture of textile technology and medical science. The importance of medical textile results in the progressive growth of this sector in the textile industry. The medical textile made up of high performance developed fibre which prevents hazardous bacteria to build up. It will also find application in the fields of personal hygiene. Based on the area of applications, the medical textile product can be woven, knitted and non-woven structure. Development in the field of textile, both natural and man-made textile focuses at how they enhance the comfort to the users. From the hygienic materials and hospital bed sheet, curtains to surgical mask, gowns etc. uses in operation theatre even surgical threats, bandages and artificial bones, ligaments and artificial kidneys, livers, there are touches of technological and smart textile everywhere.

Materials used in Medical textile

Fibres

Commodity Fibres

- Natural and Regenerated Fibres: Cotton, Silk, Wood Pulp, Viscose.
- Synthetic fibres: polyester polypropylene, polyethylene, polyamide, PTFA, carbon, glass, silica.

Specialty Fibres

Collagen, calcium alginate, chitin, chitosan

Fabrics

Different types of fabrics are used in the medical and healthcare sectors,

1. Woven fabric
2. Non-woven fabric
3. Knitted fabric
4. Braided

However, most medical textiles are made with woven and non-woven fabric.

Corresponding Author:

Latesh

Assistant Professor, Department of Home Science, Govt. PG. College for Women, Kurukshetra University, Kurukshetra, Haryana, India

Fibers Used in Different Purposes in Medical & Health Care

Fiber Types	Applications
Cotton	Surgical clothing gowns, Beddings, Sheets, Pillow cover, Uniforms, Surgical hosiery, Lint etc.
Viscose	Caps, Masks, Wipes, PPE, Plasters, Bandages, Wound care pad etc.
Hollow viscose	Artificial Kidney, Artificial Liver.
Polyester	Gowns, Surgical cover, drapes, Blankets, Cover stock, Surgical hosiery, Sutures, Artificial tendon etc.
Hollow polyester	Artificial Kidney.
Polyamide	Surgical hosiery, Bandages, Wound care pad etc.
Polypropylene (PP)	Protective Clothing, Sutures Plasters etc.
Polyethylene (PE)	Surgical Covers, Drapes, Artificial joints/bones etc.
Polytetrafluoroethylene (PTFE)	Heart valves, Vascular grafts, Bio-degradable Sutures etc.
Carbon	Artificial tendon, Artificial bones etc.
Glass	Caps, Masks, Plasters etc.
Collagen	Artificial skin, Ligament, Lumen, Sutures
Silicone	Artificial joints/bones, Artificial lumen, Artificial skin etc.
Hollow silicone	Artificial Lung
Elastomeric	Surgical hosiery, Gloves etc

Features of Medical textile

- Medical textile materials are non-toxic.
- Medical textiles are resistant to allergens and cancer.
- Medical textiles have the ability to disinfect without any structural or chemical changes.
- Medical textile materials are biologically compatible.
- It has complete good dimensional stability.
- It has air permeability and waterproofing properties.
- It is resistant to acid and alkali.
- It is capable of anti-microbial activity, i.e., It is resistant to microorganisms.
- The quality of the fabric is good.
- It is Re-washable and reusable.

Classification of Medical Textiles and its Applications:

1. Implantable Materials: There is a special type of textile structure that is used for various purposes inside the human body. The use of implantable material can be observed in closure or replacement surgery. For example: Sutures, Soft tissue implants, orthopedic implants, cardiovascular implants, etc. are used in textiles.

Product applications: Artificial Tendon, Artificial Ligament, Artificial Skin, Artificial Bone, Artificial Cornea, Vascular Grafts, Heart Valves etc.

2. Non-Implantable Materials: Non-implantable medical textiles are used for external application of the body i.e. it is used to help in the recovery of various wounds on the outer part of the body. These textile materials must be non-toxic and resistant to allergens and cancer-causing influencers.

Product Applications: Absorbent Pads, Wound Contact Layers, Bandages, Plasters, Gauze Pads, Lint, Wound Dressing etc.

3. Extra Corporal Devices: Such devices are widely used in modern medical science. This modern textile material is used to replace various organs inside the body of infected people. These devices must have non-toxic, non-carcinogenic, bio-compatibility properties.

Product Applications: Artificial Kidney, Artificial Lung, Artificial Liver etc.

4. Health Care & Hygienic Products: An important area of medical textile is healthcare and hygiene assurance. These textile materials are used to protect physicians and health

workers and to equip wards when treating patients in the hospital and will have non-toxic, non-carcinogenic etc. properties.

Product applications: Surgical masks, PPE, caps, gowns, bed sheets, curtains, protective clothing, baby diapers, sanitary napkins, etc.

Benefits of different type of Medical textile products:

- 1. Contact Lenses:** Contact lenses are one of the most widely used textile technologies in modern times. Like eyeglasses, contact lenses help to correct refractive errors and perform this function by adding or subtracting focusing power to the eye's cornea and lens. It is made of textile materials with water absorption capacity.
- 2. Artificial Cornea:** This technology is used to recover from blindness. The textile materials used in this case should be flexible and sufficient mechanical strength.
- 3. Artificial Kidney:** Artificial kidney is used to remove wastes like urea from the blood. Artificial Kidney is a device which artificially purifies the blood on the base of dialysis. Generally, hollow membrane fibres like hollow viscose, triacetate, polyvinyl alcohol, polyester fiber are used in this system.
- 4. Artificial Lungs:** Artificial lung removes carbon dioxide from the blood and helps in transporting clean oxygen. It is made using hollow fibers like hollow viscose whose pore size is less than one micro meter.
- 5. Artificial Ligaments:** It is used to join the two ends of the bone. Artificial ligaments can be made using man-made fiber like polyester and collagen.
- 6. Artificial Bones:** A group of scientists from Deakin University in Australia are claiming that artificial bones will be made from used Denim fabric which is used in human body. Denim is basically made from cotton and cotton (cellulose) is a versatile renewable material that can be used to regenerate aerogel by using various liquid solvents on used denim. Aerogel is low density advanced material, due to its low density, Aerogel is often referred to as solid sm
- 7. Artificial Liver:** Artificial livers are recently developed. All types of biochemical reactions occur in this liver. So, in particular, it is a complex device because the body's biological reactions take place here. This device is used to separate and dispose of patient's plasma and supply fresh plasma
- 8. Artificial Blood Vessel:** Medium and large diameter artificial blood vessels are made with PET fabric or

Polytetrafluoroethylene membrane. Biocompatible elastic polymers are used to prevent the blood leakage

9. **N95 Mask:** The Covid-19 issue has introduced us to a special type of mask called N95. It is a special type of respiratory protection product. N95 has its own unique meaning, 'N' stands for "Non-Oil" meaning that if no oil-based particle is present anyone can use this mask in that environment. And '95' means the mask has 95% efficiency. A drop of 3 microns or larger cannot penetrate the wall of the mask. This mask is made with multiple layers of non-woven fabric which is mostly made of polypropylene.
10. **Surgical Mask:** Surgical masks are made with non-woven fabric while maintaining filtration and air permeability properties. It is mostly made of polypropylene with a density of 20-25 GSM. Polystyrene, polycarbonate, polyester can also be used. It is made by combining multiple non-woven layers, which is effective in resisting bacteria/viruses above 1 micron.
11. **Surgical Gown:** The main raw materials for making surgical gown are non-woven fabric. The complete gown is made by combining three separate layers of non-woven fabric. The outer layer is a Polypropylene non-woven of 30 GSM. The middle layer is 15 GSM Polytetrafluoroethylene (PTFE) fabrics and the inner layer is about 25 GSM Polyester non-woven. Polypropylene has a moisture recovery capacity of 0% so; it is suitable for outer layer. On the other hand, polyester has a moisture recovery ability of 0.4%, so it is suitable for inner layer, helps to absorb sweat when the gown used for a long time.
12. **Sanitary Napkin:** Sanitary napkins are produced by using three layers of textile materials. The inner layer which contacts with human body is made of nonwoven. The inner layer should have some special characteristics like quick transfer of menstrual blood from inner layer to center layer, comfortable, softness feels pliability and sustainability against blood. The center layer of sanitary napkin composed of special polymer which has super absorbent properties. And the outer layer is composed of polyethylene.
13. **Diapers:** Diapers are generally of two types, 1) Pants type & 2) Pad type. Diapers are primarily designed for babies & adults. Diapers like sanitary napkins also have three layers. Nonwovens are used to make diapers
14. **Bandages:** Bandages are used to place the wound care layer in the correct position. Wound care prevents the body from becoming infected and absorbs blood from the wound site. Woven, non-woven and knitted fabrics are

used to make bandages.

15. **Human Textile:** If there is any wound in the human body, it can be treated with human textile. The wound part is filled up with artificial yarn and the fall merges with the body. In this case artificial yarn is made from human cells.

Objectives

1. To study the awareness of medical textile in Healthcare product and Hygiene among young women.
2. To evaluate the importance of medical textile product among young women.

Material and Methods

Locale of Research: This study was conducted in Government P.G. College for women, sector 14 panchkula district of Haryana of India.

Sampling tool: Questionnaire method cum interview method was used in this project work.

Sample size. The study was conducted on 60 young women in Government P.G. College for women, sector 14 Panchkula. The age range is divided into three: less than 18 years, 18-20 years and above 20 years. Questionnaire was developed and pretested. Interview cum questionnaire method was to collect data about the knowledge of medical textile products among young women using Google form.

Data collection: Data work collected by interview method and analysis done by percentile method in this research. In this survey question was prepared, based on medical textile products. In the Questionnaire, specific questions were asked to the young woman regarding medical textile products. The final data was collected according to their responses.

Statistical Analysis: In this statistical analysis of data, table and percentile method was used.

Table Method: The method contains three column in which first column represents option and second column represents frequency of response and the last column represents the percentage of the responses.

Percentile Method: Percentage = specific respondents no. / Total no. Of respondents $\times 100$

Results and Discussion

Table 1: Sociodemographic data of respondents

Group	Total no. of Respondents =60	Frequency	Percentage
Age	Less than 18 years	1	51.7
	18-20 years	20	46.7
	Above 20 years	31	1.6
Religion	Hindu	57	95
	Sikh	2	3.4
	Muslim	1	1.6
Residency	Urban	34	56.7
	Rural	26	43.3
Marital status	Married	2	3.3
	Unmarried	58	96.7
Occupation of father	Private service	11	18.3
	Business	9	15
	Government job	9	15
	Other	31	51.7

Occupation of Mother	Private services	4	6.7
	Business	4	6.7
	Government job	4	6.7
	Housewife	48	80
Family Income per month in Rupees	25000	16	26.7
	25000-50000	16	26.7
	Above 50000	28	46.7

According to the table data all the respondents were females in which 51.7% girls were below 18 years, 46.7% female were 18-20 years old and rest of the females were above 20 years old. In this survey, 95% respondents were belonging to Hindu religion and almost half population of the total respondents were from urban areas. It was also notified that only 2% respondents were married and the monthly family incomes of 46.7% respondents were above 50000 INR.

Table 2: Awareness about clothing material observe in hospitals

Sr. No.	Option	Frequency	Percentage
1.	Doctor's green dress	12	20
2.	Cotton clothing	13	21.7
3.	All of the above	31	51.7
4.	Don't know	4	6.6

It was observed from the survey that 20% of respondent were observed Doctors green dress in hospitals. About 21.7% respondents were aware of cotton clothing in hospitals and almost half of the respondents were observed both these products whereas 6.6% respondents didn't know about these products.

Table 3: Knowledge about characteristics of cotton used in medicine

Sr. No.	Option	Frequency	Percentage
1.	Greater absorption capacity	10	16.7
2.	Soft	9	15
3.	It is non-allergic	3	5
4.	All of the above	37	61.7
5.	Don't know	1	1.6

It was seen from the data of the above table 16.7% respondents admitted that cotton had greater absorption capacity and other 15% respondents were said that it is soft. Only 5% members of survey found cotton as non-allergic product. However 61.7% respondents were admit all these quality present in cotton, only 1 girl didn't know any of these quality of cotton.

Table 4: Knowledge about typical nature of medical textile

Sr.no.	Types	Frequency	Percentage
1.	Anti-microbial	11	18.4
2.	Non-Toxic	10	16.6
3.	Non-carcinogenic	2	3.4
4.	All of the above	35	58.3
5.	None of the above	2	3.3
	Total	60	100

It is quite ostensible from the above table that 81.4% respondents were admit that the anti – microbial nature of medical textile. Non-toxic and non- carcinogenic nature were admit by 61.6%and 3.4% respondents respectively. 61.3% young women aware about all the three typical nature of

medical textile whereas 3.3% didn't have knowledge about this.

Table 5: Knowledge about implantable medical textile products

Sr. No.	Option	Frequency	Percentage
1.	Sutures	7	11.7
2.	Artificial skin	4	6.6
3.	Eye contact lenses	2	3.3
4.	All of the above	27	45
5.	Don't know	20	33.4

It is observed from the above table 11.7% respondents found future as Implantable Medical textile products. However 6.6% respondents were recognized artificial skin as Implant able medical textile products, 3.3% respondents said that eye contact lenses were Implantable. Almost half of the respondents favoured these products as Implantable medical textile products and one third respondents didn't have knowledge about this.

Table 6: Knowledge about fabric material used in caps, mask and wipes

Sr. No.	Option	Frequency	Percentage
1.	Viscose	13	21.7
2.	Cotton	23	38.3
3.	Polyester	11	18.3
4.	Don't know	13	21.7

The above table represents that 21.7% respondent's said that viscose material used in caps, mask and wipes and identical masses of respondents didn't have knowledge about fabric material. 31.3% participants were suggested cotton material used in caps, mask and wipes however polyester were favoured by 81.3% respondents.

Table 7: Opinion about more comfortable nature of fabric Handiplast than plastic one

Sr. No.	Option	Frequency	Percentage
1.	Yes	54	90
2.	No	6	10
	Total	60	100

The above table represents that 90% of respondents were believed that fabric handiplast is more comfortable than plastic one whereas leftover denied this opinion.

Table 8: Knowledge about reasons behind use of light support bandage

Sr. No.	Option	Frequency	Percentage
1.	Sprain and Strain	22	36.7
2.	Exact compression	7	11.7
3.	Padding	7	11.7
4.	Don't know	24	40

It is observed from the table that 36.7% respondents were suggested that light support bandages help in relieving sprain and strain and similar amount i.e. 11.7% of respondents found exact compression and padding were the reason behind using light support bandages 40% of the respondents didn't know about the work of light support bandages.

Table 9: Knowledge about the use of Gauze bandages

Sr. No.	Option	Frequency	Percentage
1.	Wound dressing	46	76.6
2.	For scraps	5	8.4
3.	To cover injection	3	5
4.	For blisters	1	1.6
5.	Don't know	3	5
6.	None of the above	2	3.4

It is clear from the above table data that 76.6% respondents were said that Gauze used for wound dressing 8.4%, 5% and 1.6% respondents were said that Gauze are used for scrapes, to cover injection and for blisters respectively. However 5% respondents didn't have knowledge about this, only 3.4% respondents said none of these reasons behind using Gauze bandages.

Table 10: Awareness about beneficial applications of Medical textile

Sr. No.	Option	Frequency	Percentage
1.	Prevent infection	13	21.6
2.	Flexible and comfortable	5	8.3
3.	Disposable and reusable	2	3.4
4.	All of the above	40	66.7

It is observed from the above data 21.6% respondents suggested that medical textile products prevents infection 8.3% respondents said that medical textile are flexible and comfortable. Furthermore, 3.4% suggested that it is disposable and reusable correspondingly 66.7% respondents were favoured all of these beneficial applications of medical textile.

Table 11: Awareness about more comfortable nature of sanitary napkin than cotton cloth

Sr. No.	Option	Frequency	Percentage
1.	Yes	59	99
2.	No	1	1

The above table represents that 99% of respondents were believed that sanitary napkin are more comfortable than cotton cloth only 1% denied this.

Table 12: Knowledge about the reason behind choosing sanitary napkin instead of cotton clothes

Sr. No.	Option	Frequency	Percentage
1.	Greater absorption capacity	10	16.6
2.	Soft	2	3.4
3.	It is non-allergic	5	8.4
4.	All of the above	43	71.6

It is seen in the above table that 16.6% respondents were experienced that sanitary napkin had greater absorption capacity that cotton cloth and 3.4% respondents were admit that sanitary napkin is softer than cotton cloth whereas 8.4% respondents were believed that sanitary napkin is non – allergic 71.6% respondents favoured all the reasons behind using sanitary napkin instead of cotton cloth.

Table 13: Awareness about the preference of products used during menstruation cycle

Sr. No.	Option	Frequency	Percentage
1.	Cotton cloth	2	3.4
2.	Sanitary napkin	53	88.4
3.	Menstrual cup	4	6.6
4.	Tampons	1	1.6

It is observed that 3.4% young women were opined that they preferred cotton cloth during menstruation cycle however 88.4% use sanitary napkin. Moreover, 6.6% girls are using menstruation cup and 1.6% using Tampons during their menstruation cycle.

Table 14: Knowledge about reason behind using diapers for children

Sr. No.	Option	Frequency	Percentage
1.	Hygienic and clean	8	13.4
2.	Comfortable	7	11.6
3.	Non-allergic	3	5
4.	All of the above	42	70

It is observed that 13.4% respondents were aware that diapers are used for Hygiene and clean 11.6% girls said that diapers are comfortable for children. Whereas 5% respondents were said diapers were non -allergic, 70% respondents were said all of these reason using diapers for children.

Summary and Conclusion

It can be concluded from above study the value of medical textile for the modification of Healthcare world is great. The updated technique and modern medical textile products will help patients more effectively to overcome their previous pain and diseases.

- The significant finding observed from this study suggested that 51.7% young women were aware about the clothing material used in hospitals and 61.7% young women were knew about the characteristics of cotton use in medicine.
- Almost 58.3% respondents were aware that material textile are anti – microbial, non- toxic and non – carcinogenic. However 45% respondents had knowledge about the Implantable nature of medical textile, 33.4% were unaware about this. 38.3% young women had knowledge that cotton material is used in caps, mask and wipes. 90% respondents opined that fabric handiplast is more comfortable than plastic one.
- It was also noticeable that 40% respondents had no knowledge about the use of light support bandages whereas leftover suggested that light support bandages relieves sprain and strain, exact compression and Padding Furthermore, 76.6% respondents believe that Gauze bandages used for wound dressing.
- In addition, 66.7% respondents were aware about the beneficial applications of medical textile. In case of opinion regarding sanitary napkin and cotton clothes, 99% young women frequently said “yes” to favoured the sanitary napkin and 71.6% young girl were aware all the reason behind choosing sanitary napkin instead of cotton cloth. While questioning about the preference of products use during menstruation, 88.4% respondents were favoured in sanitary napkin whereas only 1.6% young women were using Tampons.
- Eventually, 70% respondents were aware about the reason behind using diapers for children which were that diapers are hygienic, comfortable and non- allergic.

Hence, it is concluded that more than 50% of the respondents were aware about Medical Textile products and 90% young girl were also had knowledge about the Importance of the Medical textile products (for ex-sanitary napkin during their menstrual cycle to keep them Hygienic and clean.

References

1. Dissanayake N, Sagara LP. Medical Textiles–A Review. *International Journal of Textile Science*. 2017;6(3):49-56. DOI: 10.5923/j.textile.20170603.01
2. <https://ejournal.org/index.php/esj/article/viewFile/3196/3023>
3. <https://ejournal.org/index.php/esj/article/viewFile/3196/3023>
4. <https://leartex.com/medical-textile>
5. <https://textilelearner.net/medical-textiles/>
6. <https://www.fibre2fashion.com/industry-article/1466/recent-developments-in-medical-textiles>
7. <https://www.technicaltextile.net/articles/medical-textiles-2587>
8. Jayaramudu J, Rajulu AV. (Eds.). *Medical textiles and biomaterials for healthcare applications*. Springer; c2019. DOI: 10.1007/978-981-13-0539-9
9. Karthikeyan M. Medical textiles and biomaterials in healthcare. In *Medical and Healthcare Textiles*. Woodhead Publishing; c2018. p. 49-78. DOI: 10.1016/B978-0-08-101272-2.00003-5
10. Ko FK. *Biomedical textiles for orthopaedic and surgical applications: Fundamentals, applications and tissue engineering*. Woodhead Publishing; c2006. DOI: 10.1533/9781845691119
11. Matthews S, Rajendran S. (Eds.). *Medical textiles and biomaterials for healthcare*. Woodhead Publishing; c2011. DOI: 10.1533/9780857092654
12. Rajendran S, Anand SC. *Medical Textiles and Biomaterials for Healthcare*. Woodhead Publishing; c2018. DOI: 10.1016/B978-0-08-101272-2.00001-1
13. Muthu S, Tam TWY, Wong JRS. (Eds.). *Medical and Healthcare Textiles*. Woodhead Publishing; c2018. DOI: 10.1016/B978-0-08-101272-2.00002-3
14. Tzou JC, Dai S. Smart textiles and wearable technology in engineering. *Smart Textiles and Their Applications*; c2017. p. 1-28. DOI: 10.1016/B978-0-08-100575-5.00001-1
15. Zhang M, Chen X, Zhang H, Du Y. A review of chemical treatments of polypropylene fibre and its applications in biomedicine. *Materials Science and Engineering: C*. 2019;100:333-346. DOI: 10.1016/j.msec.2019.02.080