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Exploring the potential of Chindi (textile waste) for producing quality products for women empowerment

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Abstract
The research is conducted in the slums of sector 25, Chandigarh, which is a part of larger research study- Chindi: An Art of Textile Waste Management. The study seeks development of tools for converting textiles waste from various sources into Chindi Product. Chindi is a term used to describe the textile waste, which has been cut in the strips, ranging from ½'' to 2 ½" width. Based on secondary data, techniques are identified and classified which can be employed in converting textile waste to useful products. In the present study, a group of 20 women was formed on the basis of their interest in learning new skill for increasing their earnings in near future. A pretest was administered to test their knowledge of using Chindi as raw material, understanding of quality and colour aesthetics. Tools were developed for the methods employed for the segregation of waste on the basis of colour and converting fabric scrape in pre-identified second stage raw material. The testing of second stage raw material for consistency in quality and colour aesthetic is limited to assessment of Chindi products developed by the researcher. The pre and post test were conducted that showed noticeable improvement in the skills of making Chindi twinning balls with further scope of improving the quality and colour understanding of the group and 80% satisfaction in the method adopted for instructions.

Keywords: Textiles waste, Chindi products, basic colour, women empowerment

1. Introduction
In India, textile and clothing is the second largest industry in generating employment after agriculture. It is also one of the largest industries that produce waste at each stage starting from fiber production to manufacturing of end products. Human desires for fashion and technological advancements have ignored this fact for centuries. Materialistic growth and joy of continuous change has gripped human fancy to such an extent that the rate of production is increasing at much higher pace than population growth. Basic need of clothing changed with changing roles of males and females in the society. Clothes are not merely looked upon as article of necessity but the medium to express individual personality. Production of clothes for different occasion, profession, recreational activity and religious ceremonies indirectly put pressure on people to buy clothes for all of events separately. In order to conform to social status or to express superiority, clothes have become an instrument. Individualistic styles and designs by renowned designer are preferred by elite and fashion leaders and knockoffs are mass produced. These desires have changed our society drastically in last two centuries. The result is overflowing closet with garments which are of good quality but not in use. We were so busy in materialistic growth, that side effects of the same have been overlooked. End of 20th century and beginning of 21st century has come with the realization of the harms we have been doing for future generations. The new terms like up cycling, remade, reclaimed, re-fashioned started surfacing to support growing trend of sustainability. High rate of production with chemical processes and finishings which were acceptable for satisfying egos and self centered happiness raised many questions related to carbon footprints. There are tons and tons of textile waste which either goes to incinerators or to landfills which is putting pressure on mother earth. Clothes when end up reaching landfills produce gases which are harmful for the environment. Developed countries have become aware of the environmental degradation caused by our careless consumerist approach.
The production of natural and synthetic textile materials use non- renewable energy resources. Throwing them away without proper utilization till the end of the life cycle is wastage of

natural resources. Developed economies are focusing on recycling technologies, products and application of recycled textiles. It is human responsibility to put the resource to use and keep them in product life cycle for extended period of time to avoid wastage.

Dumping of polymer as municipal solid waste in landfills is sheer depletion of natural resources. Fabric takes years to decompose and during the process it releases harmful gases and chemicals to pollute the earth and environment. There are many ways to recycle textile material which has 100% recyclable nature. They can be converted into reclaimed fibers and are further processed to recycled yarns and non-woven fabrics. Textile waste can also be used to insulate materials in agro textiles and geo textiles. These actions are not sufficient as there are tons of unused textiles and garments lying at individual, organizational and industrial level. Contributions from each level would be beneficial for reducing carbon footprint because of clothing and textiles.

Jain (1993) [6] studied Chindi durries in Fatehpur Sikri with the same size of 50 units. In the second stage of sampling she selected 100 weavers randomly. Her major finding showed that Chindi durrie industry started functioning in 1970's with the first unit in 1972. Early 80's did not show any positive growth by 1985-86 showed tremendous growth where maximum units were set up after 1986 due to increased demand in foreign countries and easy availability of labour and raw material.

In 1985, M/s Mahajan Overseas introduced Chindi Dhurries under the guidance of Mr D.C Bhatia, a master weaver in Panipat. Chindi weaving is an art of adding more value to recyclable material. MSME foundation (2004) [8].

Chindi weaving has emerged in Fatehpur Sikri, Agra almost 25 years ago. Durries were woven on horizontal device, placed on the floor. Durries of varying sizes were made by using cotton fabric strips for warp and unspun cotton for weft. Today this industry is a major revenue earning resource. History of Indian Craft (2005) [5].

In a study done by social psychologist Burn (2007) [3], it was found that personal contact with individuals within a neighborhood is the most effective way to increase recycling within the community.

One of the sustainable design principles as discussed by Roy (2011) [11], under subheading- designs for reuse and recycling was: Products, processes, and systems should be designed for performance in commercial afterlife. He suggested the availability of large number of project design guides for sustainable development and many are being developed by private organizations and individuals but these are not sufficient.

The scrap fabric is shredded in strips by hasia (an instrument with long and sharp metal teeth for tearing and cutting piles of clothes into strips). After shredding, strips of fabric are sorted into colour piles, which are used as weft in hand weaving process. Types of Textile Waste can be classified as under:

- Pre Consumer waste- inventory and surplus of the garment industry which are kept as a buffer to meet the quality standards of the buyer and to replace the defected pieces at the time of shipment.
- Waste from yarn and fabric manufacture, garment-making process and from retail industry are termed as Post- industrial waste. The fabrics are manufactured in standard width so lot of fabric get wasted in the process of pattern cutting.
- Post-consumer, originating from discarded garments, household items, vehicles, etc. These include second hand clothing be it cotton bed sheets, old T- shirts, synthetic Scarfs, old silk and synthetic sarees or any used clothing. Sikka (2013) [13].

There is vast potential of recovery and recycling of the waste. There are abundant materials and opportunities existing in recycling of textiles waste for new products, giving employment to skilled, unskilled and semiskilled workforce. Handique (2013) [14].

Ogtrop *et al* (2013) [10] on post-consumer textile material flows in Europe, concluded that 58.5% (1244.763 kt) is collected and 41.5% (88.304 kt) not collected which is used for incinerations and landfills in Europe. Out of collected post consumer textile material, 75% is reused and 25% is recycled. 16%is used for textile to textile recycling. 52% is down cycled (wipers, rags, shoddy) and 32% is incinerated or used for landfills. As textile waste is hazardous, citizen action groups in United States are not allowing the dumping sites near residential areas.

Recycling of clothes is an age old tradition in India and all over the world. Various states have traditional method of converting the waste into useful household products. In Rajasthan the old clothes or fabrics are patched and quilted to makes bedcovers, bags and other items. In Bengal two or three old sarees or dhotis are quilted by hand using even or uneven running stitch in various forms and motif inspired from day to day activities to make Kanthas. Chindi is a term used in Gujarat for traditional weaving with old clothes which are cut in one to two inches strips. These strips are assembled and stitched together with crotchet hook and thread. These are mats or floor coverings are known as Chakhlo or Chindi rugs. Centre of Excellence (2015) [7].

2. Objectives

- To promote public participation in Textile recycling
- To analysis the skilfulness of sample and their knowledge on textile waste.
- To test method of implementation for producing second stage raw material for Chindi products.

3. Limitations

- The development of products is based on only boutique waste.
- Group of 20 women is formed for testing.

4. Methodology

The study is both experimental and conceptual in nature as researcher has to be practitioner also for making the products. There is a little research done on Chindi products, its designs, motifs, colours and techniques. Secondary data was used to find out the procedure for starting product development with Chindi.

Public involvement in recycling process involves lots of persuasion and motivation. A module was developed for providing training to semiskilled or unskilled women in the field of textile waste management.

A large group of women in sector 25 slums of Chandigarh were persuaded to participate in the study. Out of those only 20 women came forward to participate in ten days module. They were interested in learning new skill for increasing their earnings in near future. Pretest for testing their knowledge on various handicrafts skill and on textile waste was given to them.

Textile waste from the boutiques in Chandigarh was collected.

The process of converting the waste into useful raw material was taught to the group by the researcher through the module. Ten session of two hours duration were conducted by the researcher with the group.

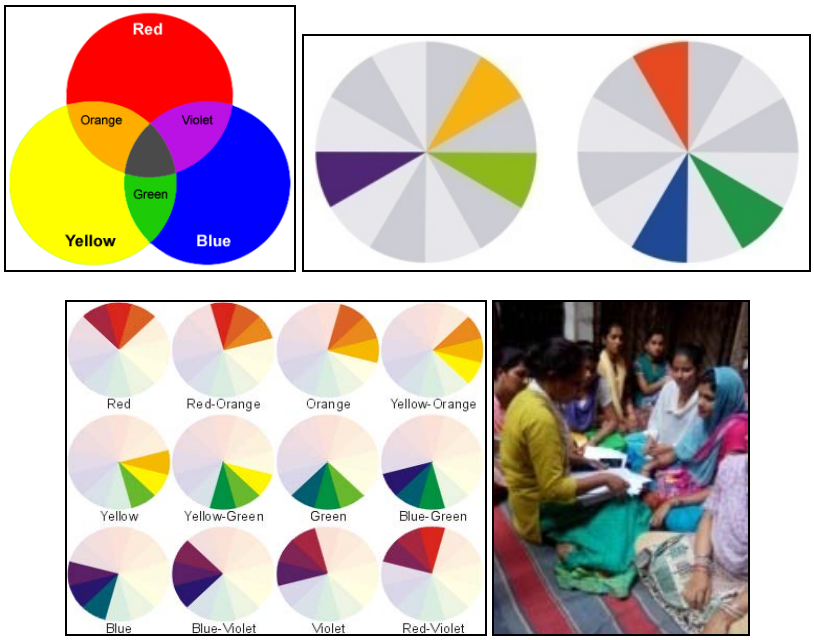
They were given input on segregating the waste as per colour schemes or colour combinations by the researcher as per module. Instructions on different methods of cutting the waste in 1" to 2 ½" width as per thickness of fabric were demonstrated by the researcher for making Chindi twinning balls.

Post test was given to them after development of second grade raw material and development of products by the researcher in their presence. Pre and post test analysis was done.

5. Method for developing second stage raw material for Chindi products

Step-1: Instruction as per colour module and

Instruction were given orally and by showing sheets made in the colour module to explain the colour (Fig. 1).



Colour module

Fig 1

Step II: Collection of fabric waste

Around 36 kgs of fabric waste from 3 boutiques, making womens' clothing was collected. The waste had fabric cutting of irregular size, shape and material. The boutiques owners confirm that it is of their no use and they throw it to garbage bin every weekend or after 10 days.

Step III: Segregation of waste

The bundle of waste was opened in the group. They were further paired and asked to collect one colour from the list of 11 basic colours as given by two American anthropologists Brent Berlin and Paul Kay. Varley (1980) [1]. The colours were Red, Orange, Yellow, Green, Blue, Violet, White, Black, Grey, Pink and Brown. They pulled and gathered fabric scrape of one specific colour. They were guided by the researcher to decide on the hue of the fabrics which were of varying saturation and value. While segregating waste as per colour it was realized that exteme White tints of Yellow, those named Cream or Pearl can be collected as separate pile. So the piles of fabrics were 12 in number finally with addition of Cream colour in the list of basic colours.

Fig 2: Segregation of waste

Step IV: Making second level raw material

Second stage raw material for Chindi product are i) Chindi twinning balls ii) Chindi braid balls iii)a continuous Chindi yarn balls iv) Chindi cut pieces of 1"to 2" width and 4" to 9" length.

Instruction were given orally as per module for Chindi twinning balls

They were taught the technique for converting the waste to second stage raw material by practical demonstration, however module was made by researcher for personal use. The technique of cutting the strips and joining it was demonstrated. The Short listed colour combination for Chindi

twinning balls were; Red and Green, Blue and Orange, Yellow and Purple, Black and Grey, Cream and Brown, White and Pink. The group was given fabric as per decided colours.

Fig 3: Making second level raw material

The second stage raw material was then weighed which come out to be 20 kgs. The leftover material was either heavy weight fabrics or fabrics with jacquard weave or soiled fabrics. Those fabrics were not suitable for making second stage raw material for Chindi products but could be used for other products.

Fig 4: Chindi twinnings and Chindi Braids

Step V: Making products for assessing the quality of second stage raw material made by group of women

The products were made by researcher to check the consistency of thickness, understanding of colour, amount of twist and braiding tension. The techniques used to make products were macramé knotting, pasting and zig zag sewing with pattern sewing machine. The products were of acceptable quality as per five fashion experts with further scope of improvement in use of colour while joining the pieces. The thickness of the stripes was also need to be controlled for better quality product.

Fig 5: Products with Chindi

6. Results and Discussions

62% of participants have family income between Rs 5,000-10,000 and 19% families earn less than Rs 5,000 per month (Fig.6). 69% participants are unmarried girls (Fig.7). 50% of sample is 10th pass and 44% is 10+2 qualified (Fig.8). 94% sample size lies in the age group of 15-24. The group has more number of students' i.e. 56% who want to supplement family income by getting involved in part time activity (Fig.9).

6.1 Graphical Representation of Demographic background

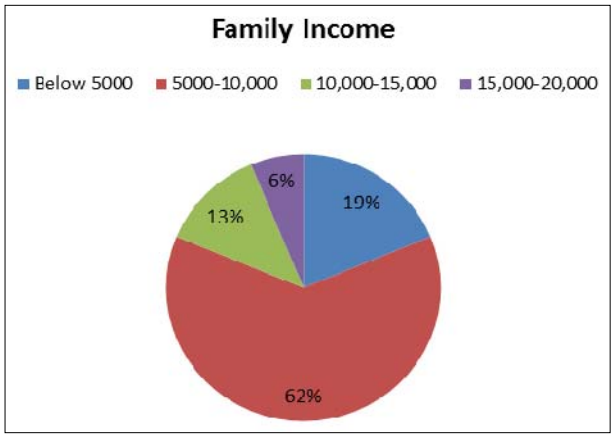


Fig 6

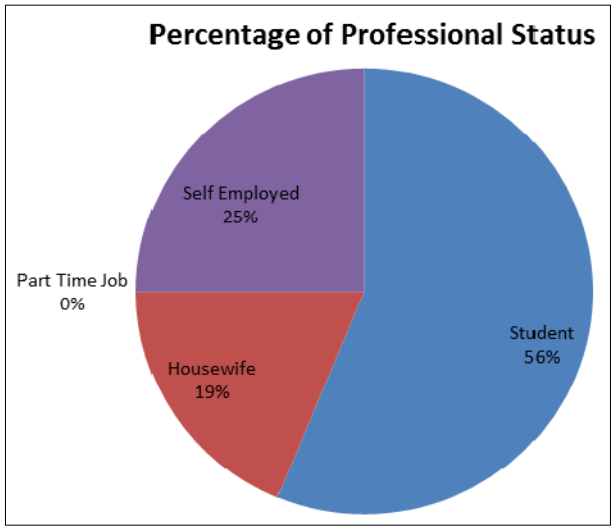


Fig 9

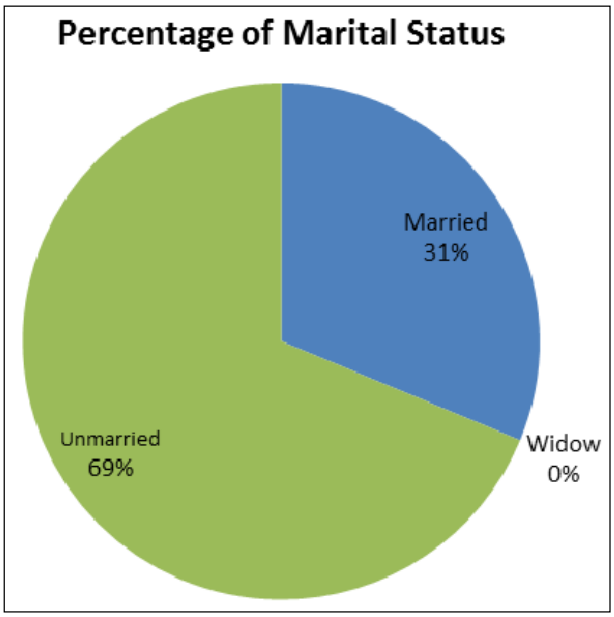


Fig 7

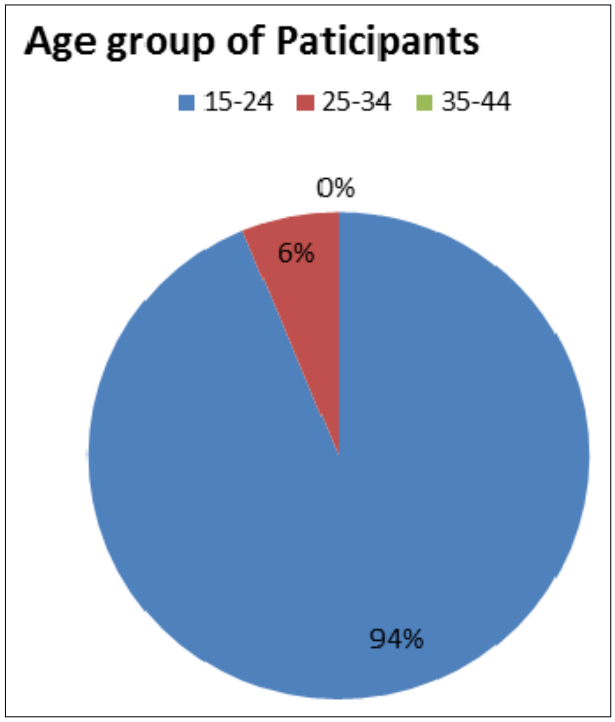


Fig 10

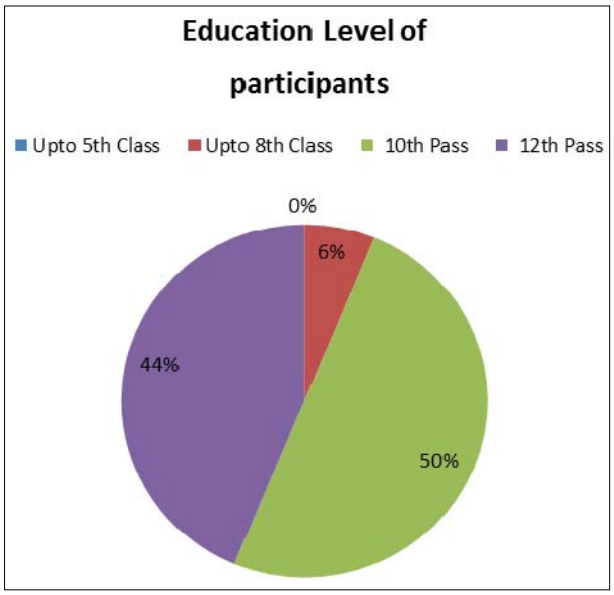


Fig 8

6.2 Pre test and post test analysis

- Only 15% of the sample has seen the products made with left out pieces of textiles. The items include cushion covers, durries, mats and kids garments (Fig 10). Post test increased the percentage to 100% as products made with second stage raw material were show to them before the test.
- 30% of the sample has made products like kid's garments or have helped their mother and grandmother in making durries with fabric strips (Fig 10).

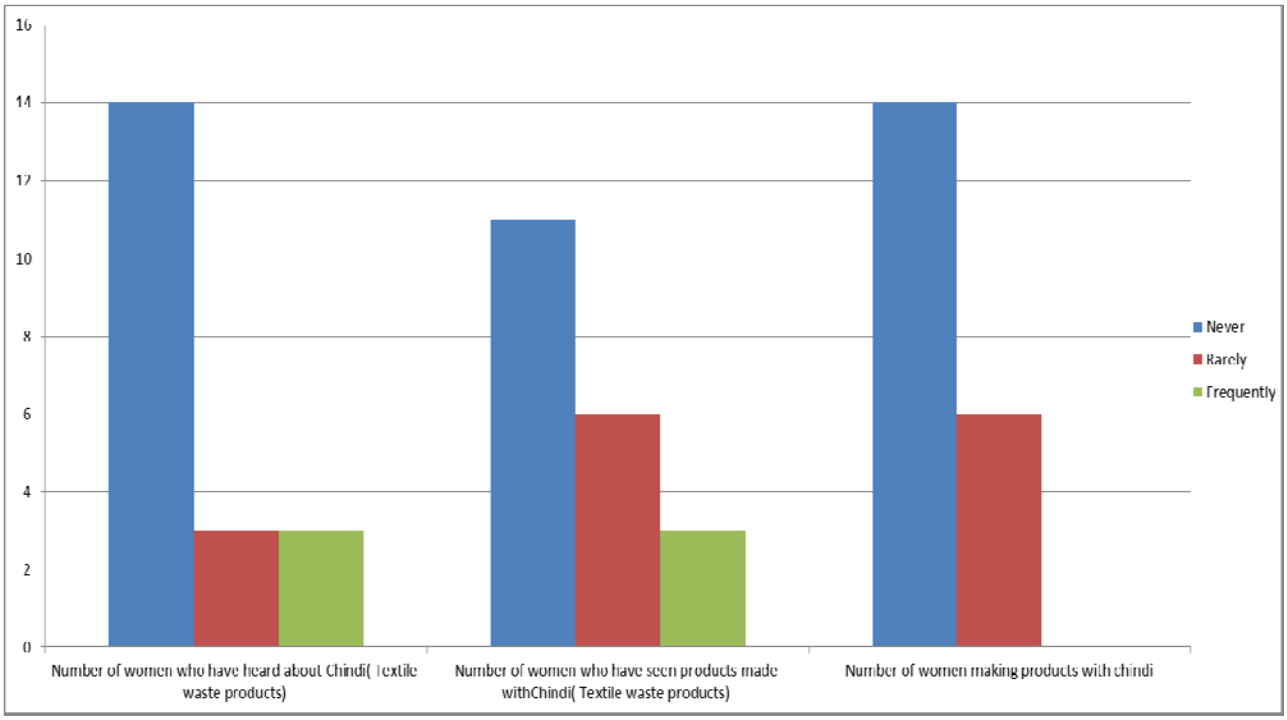


Fig 10

- For testing their knowledge on colour, they were asked about primary and secondary colours and if they have ever heard of any colour scheme.65% of women have never heard of colour schemes and 35% have rarely used monochromatic colour schemes. Understanding of colour also improved drastically. 50% of them said that they use colour knowledge given to them during module frequently, however 50% choose rarely as option as they are still not confident in remembering the colour schemes.
- The percentage on the agreement for devoting number of hours for craft activity increased from 10% to 40% for 03-04 hours per day and 35% to 60% for 2-3 hours per day. As they realize that they can perform these activities while watching television at home.
- The expectation in terms of money also changed after getting skilled. None of the participant is interested in earning below Rs 100. 30% of them expect to earn Rs 300-400. 40% find Rs 200-300 would be reasonable amount in exchange of their labour.
- The group was tested for their knowledge on handicrafts, handlooms and sewing machine handling. 58% of them know one or two handicraft techniques, 39% can handle sewing machine for simple stitching of household articles and few of that lot was skilled to make ladies suits and kids' panty and frock.
- 7% agreed for knowing Chindi twinning and 43% said that they know Chindi braiding. The percentage of women knowing handicrafts especially, Chindi braiding and Chindi twinning increased to 100% after module.
- The complete group find the method of developing second stage raw material for Chindi products satisfactory.

7. Conclusion

While segregating textile waste it was realized that cream colour is added in the list of eleven basic colours for segregation. Large amount of waste has underlying yellow colours in very low percentage in white which was not considered appropriate for yellow so seperated pile was made for it because of amount of content in the waste.The group was enthusiastic to learn the skill of converting waste into braids and twinning balls as 100% sample wanted to involve in similar project for income generation though expectations in terms of money varied. The success of method adopted could be assessed by the agreement of the group for converting second lot of boutique waste to Chindi braid balls without any supervision. However they were asked to follow monochromatic colour scheme for making Chindi braid balls. They all find it very interesting activity as they can do it while watching television and during free time. The assessment of quality of the Chindi twinning balls was done after product formation. The length of material was almost homogeneous in thickness as similar thickness of fabric was cut with same width by all as instructed. The amount of money expected is only possible with the involvement of any government support to take the production and next level and by providing the support for marketing of products. The opportunities for forming new product range are abundant.

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