



A STUDY ON USER PREFERENCES AND CHALLENGES IN BLENDER USAGE

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Abstract: This research aims to investigate user preferences, challenges, and requirements concerning blender usage in Indian households. The study gathered data from 31 respondents, about their general information, brand preferences, frequency of use and desired design features. The research also highlights the problems faced by respondents during the use of blender. The findings provide valuable insights into user expectations and will guide the development of improved blender design guidelines for enhanced user comfort and efficiency. The main limitation of the study is that the sample size is relatively small. This means that the results of the study may not be generalizable to the population of blender users.

Index Terms - Blender; Brand and design preferences; Features; Challenges; Design guidelines.

I. INTRODUCTION

A blender is an essential and versatile electric mixing machine used in food preparation for a wide range of tasks such as liquidizing, chopping, and pureeing ingredients. Its ability to blend a variety of items makes it an incredible tool for numerous kitchen applications. Some of the common uses of a blender include whipping cream or eggs, blending cake batter and cookie dough and creating items like icing and salad dressings. However, one of its most popular uses is whipping boiled potatoes to make mashed potatoes and whipping butter milk as it provides the easiest and quickest way to achieve a smooth and creamy texture.

Blenders are not just limited to hand mixers; there are various types of blenders available, including countertop blenders and immersion blenders, each with its unique features and capabilities. Countertop blenders are designed for handling larger quantities and can perform tasks like crushing ice and blending smoothies. Immersion blenders, on the other hand, are handheld devices that can be directly immersed into the ingredients, making them ideal for pureeing soups and sauces.

Blenders significantly reduce the time and effort required for various food preparation tasks, cooking and baking more efficient and enjoyable. Blender is a versatile tool that adds convenience and precision to the kitchen workflow apart from whipping up creams, churning butter milk, creating sauces, making smoothies, or pureeing soups.

Features of a blender:

Size Variation: Blenders come in different sizes, ranging from 3 to 14 cups. The choice of size should depend on individual needs and storage space availability. Smaller, compact blenders are suitable for limited spaces or for those who only require single-serve portions. On the other hand, larger blenders are more appropriate for users who frequently prepare meals or beverages for groups.

Speed and Power: When selecting a blender, it is important to consider the speed settings and power. Blenders with 3 to 10 speed settings offer enough control for various tasks. Fewer than three settings may limit the blender's versatility, while more than ten settings might not be necessary for most users. Additionally, having a pulse button is crucial for precise blending control. For typical blending tasks like making smoothies or milkshakes, a blender with around 500 watts of power is sufficient.

Special Attachments: Some blenders come with additional attachments that increase their versatility. Personal cups allow users to blend individual-sized drinks while reducing the need for extra cups. Chopping and mixing bowls equipped with sharp blades enable the blender to double as a food processor, streamlining kitchen appliance needs.

Price Considerations: Budget is a significant factor in the blender purchasing decision. There is a wide range of blender options available, catering to different price points. Quality and durable blenders can be found at affordable prices, suitable for everyday use. At the same time, professional-grade blenders with advanced features may come with higher price tags, catering to more specialized needs.

Choosing the right blender involves considering the appropriate size, speed, power, attachments and budget to meet individual preferences and requirements. Whether for simple tasks like making smoothies or more complex tasks like crushing ice or grinding meat, there are blenders available to suit various needs and kitchen spaces.

1.1 Blender Brands available in India

S. No	Name of the Brand	Capacity	Power	Special attachments	Cost	Picture
1	Inalsa Hand Blender Robot INOX 1000	1.5 L	750 W	Whisk attachment, chopper attachment	Rs.2,271/-	
2	Philips Daily Collection Hand Blender HR1387/10	1.25 L	650 W	Whisk attachment, chopper attachment, emulsioner, mini chopper	Rs.1,899/-	
3	Panasonic Hand Blender MX-GX1071	1.25 L	650 W	Whisk attachment, chopper attachment	Rs.3,141/-	

4	Morphy Richards Hand Blender 524010	1 L	600 W	Whisk attachment, chopper attachment	Rs.1,975/-	
5	Preethi Blue Diamond 2 Speed Blender	1.5 L	750 W	2 speed settings, pulse function with 2 attachments	Rs.3,199/-	
6	Havells Premio 750 W Blender	1.5 L	750 W	3 speed settings, pulse function with 3 attachments	Rs.1,799/-	
7	Bajaj HB Blender	1.5 L	750 W	3 speed settings, pulse function with 2 attachments	Rs.2,049/-	
8	Kenstar Nutri Pro 750 W Blender	1.5 L	750 W	3 speed settings, pulse function with 2 attachments	Rs.4,688/-	
9	Prestige PHB 12.0	750 ml	300 W	Whisk, chopper, emulsifier, mini chopper, beaker	Rs.1,825/-	

10	Butterfly Magnum 1.2 HP	750 ml	750 W	4 jars (2 x 0.4 L, 1 x 0.75 L, 1 x 1 L), chutney maker, and chopper	Rs.4,749/-	
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On the whole, table top models have one to 1.5 Litres capacity while hand held blenders have 750 ml to 1.25 Litres capacity. Power consumptions ranged from 300 to 750 Watts. The cost varied from Rs.1,799/- to Rs.4,749/-. Whisking and chopping are the major activities carried out in all the blenders.

II . RESEARCH METHODOLOGY

The sample for the study comprised of 31 respondents who use blenders. The sample was selected using a random sampling method. The data for the study was collected using a structured questionnaire to collect information from the respondents about their experiences with blenders, including the types of blenders they use, how often they use them, how satisfied they are with them and the problems they experience with them. The data collected from the questionnaire will be analyzed using frequencies, percentages, mean and standard deviations.

The methodology section outline the plan and method that how the study is conducted. This includes Universe of the study, sample of the study, Data and Sources of Data, study's variables and analytical framework. The details are as follows;

III. RESULTS AND DISCUSSION

3.1 Occupation

Table 1: Occupation of the study participants

Occupation	Frequency	Percentage
Employee	18	58.10
Homemaker	13	41.90

The data indicates that 58.1 % of the participants were engaged in employment, while 41.9% were identified as homemakers. These figures highlight a predominant presence of employed individuals within the sample, accompanied by a noteworthy representation of home makers.

3.2 Number of blenders being used

Table 2: Number of blenders being used by the sample

Number of blenders used	Frequency	Percentage
1	26	84.0
2	5	16.0
Mean: 1.8 Standard deviation: 0.78		

The utilization pattern of blenders revealed that 84% of the respondents exclusively use a single type of blender, while 16% of the respondents reported using two distinct types of blenders. The outcomes of the survey strongly denote a prevailing inclination towards single-blender usage among the surveyed sample.

This trend could potentially be attributed to the fact that a single type blender adequately fulfills fundamental culinary requirements. The dual-blender utilization observed among certain individuals might

be attributed to specific culinary demands, such as the preparation of smoothies or the grinding of coffee beans, etc.

3.3 Brand preference for the blender

The percentage of respondents who prefer Butterfly brand blender is significantly higher (39%) than the other brands. In comparison, 26% indicated a preference for Preethi brand blenders, 20% for Prestige brand, 10% for Philips brand and 6% for alternative brands like Agaro. The survey results suggested that Butterfly brand blenders are the most popular, followed by Preethi brand blenders, may be because Butterfly and Preethi are both Indian brands, and are more affordable than some of the other brands. However, it is also possible that some people prefer these brands because of their quality or features.

Table 3: Brand preference for the blender

Brand	Frequency	Percentage
Butterfly	12	39.0
Preethi	8	26.0
Prestige	6	20.0
Philips	3	10.0
Other	2	6.0
Mean: 7 Standard deviation: 2.82		

A study by Gupta et al. (2022) concluded that Butterfly is the most preferred brand of blender in India because it is affordable, high-quality, feature-rich, and has a good brand reputation.

3.4 Frequency of use of blender

The distinct patterns in blender usage revealed that 42% of the respondents use their blenders daily, 35% use their blenders 3-4 times a week, 13% use their blenders once a week and 7% use their blenders for special occasions only. The survey results suggest that the majority of the respondents use their blenders on a regular basis, with a significant number using them daily, such as many might be consuming smoothies, buttermilk, soups and sauces.

Table 4: Frequency of use of blender

Frequency of use	Frequency	Percentage
Daily	13	42.0
3-4 times a week	11	35.0
Once a week	4	13.0
For special occasions only	2	7.0
Mean: 7.5 Standard deviation: 4.60		

However, it is also possible that some people use their blenders less frequently, depending on their cooking habits. The study by Sharma et al. (2023) concluded that the majority of blender users in India use their blenders on a regular basis. This is likely because blenders are a versatile kitchen appliance that can be used for a variety of tasks and convenient to operate it in a less time.

3.5 Most preferred type of blend

About 77% preferred using stand blenders and 23% preferred using hand blenders. The survey results suggested that the majority of people preferred using stand blenders, which are more powerful and versatile.

Table 5: Most preferred type of blend

Blender type	Frequency	Percentage
Stand blender	24	77.0
Hand blender	7	23.0
Mean: 18 Standard deviation:7.84		

3.6 Type of blenders used

Out of the total 31 participants, a substantial percent (77%) expressed a preference for employing stand blenders, while a minority of 23% opted for hand blenders, followed by people who use both stick and stand blenders because stand blenders are more powerful and versatile, while stick blenders are more portable and easier to clean. However, it is also possible that some people prefer to use both types of blenders for different tasks.

Table 6: Type of blenders used

Blender type	Frequency	Percentage
Stand blender	19	61.0
Stick and stand blender	7	23.0
Both hand and stand blenders	5	16.0
Mean: 14 Standard deviation: 3.87		

3.7 Features liked in using a blender

Table 7: Features liked in using a blender

Features	Frequency	Percentage
Easy to use	21	68.0
Easy to grip	6	19.0
Visual display	4	13.0
Mean: 12 Standard deviation: 3.24		

Within the surveyed participants, majority of the respondents (68%) liked the easy-to-use feature, 19% liked the easy-to-grip feature and 13% liked the visual display feature. It implies that people want blenders that are convenient, efficient to use and are also comfortable to hold. However, it is also possible that some people prefer blenders that have a sleek or stylish design. A study conducted by Gupta et al. (2022) found that consumers who cooked more often at home were more likely to prefer easy-to-use blenders than consumers who cooked less often at home.

3.8 Use of blender in meal preparation

Among the total respondents, 74% used their blenders to make something for the family that includes special breakfast, lunch or dinner. This could include anything from smoothies, soups and sauces. Thirteen percent used their blenders only for preparing lunch, 10% used their blenders only for preparing dinner and 3% used their blenders for preparing breakfast.

Table 8: Use of blender by type of meal prepared

Purpose	Frequency	Percentage
Special breakfast, lunch, or dinner	23	74.0
Lunch only	3	13.0
Dinner only	2	10.0
Breakfast only	3	3.0
Mean: 8.25 Standard deviation: 3.16		

3.9 Purposes of using a blender

Table 9: Reasons for using blender

Use	Frequency	Percentage
Smoothies	23	74.0
Cakes	3	12.0
Masalas	2	6.0
Puddings	2	6.0
Other	1	3.0
Mean: 9.2 Standard deviation: 3.35		

A significant proportion of participants, amounting to 88% used their blenders for a variety of purposes, including making smoothies, cakes, special items, masalas, and puddings. Six percent used their blenders specifically for making masalas in curries and 6% used their blenders specifically for making smoothies.

Out of the total participants, 74% employed their blenders primarily for crafting smoothies. Other popular uses for blenders include making cakes (12%), masalas (6%), and puddings (6%). They are also relatively easy to use, which makes them a convenient option for busy families.

3.10 Disliked features in blender

Majority of the respondents (61%) disliked the following features in a blender i.e., food getting stuck to the blades, blender vibrating when in use, and blender being difficult to clean. Twenty three percent of the respondents disliked the feature that the blender vibrates when in use. This can be a problem because it can be annoying and can also make it difficult to hold the blender steady.

Table 10: Disliked features in blender

Disliked features	Frequency	Percentage
Food getting stuck to the blades	4	13.0
Blender vibrating when in use	7	23.0
Blender being difficult to clean	19	61.0
Mean: 10 Standard deviation: 4.3		

Thirteen percent of the sample disliked the feature of food getting stuck to the blade because it is difficult to clean the blender and can also lead to the blender not working properly. Sixty one percent of the respondents disliked the feature that the blender is difficult to clean. This can be a problem because it can be time-consuming and can also be difficult to get into all the nooks and crannies of the blender. The survey results could be used to inform the designers and marketing people of blenders. For example, blender manufacturers could design blenders with features that address these common complaints.

3.11 Benefits of blender

A considerable percent (68%) of the sample found the easy-to-clean feature to be the most important benefit. This is important because it can be difficult to clean blenders, and having a blender that is easy to clean can save time and effort. While 23% found the low-noise feature to be the most important benefit because blenders with low noise can be less annoying.

Table 11: Benefits of blender

Design Feature	Frequency	Percentage
Easy to clean	21	68.0
Low noise	7	23.0
Removable blades	2	6.0
Stylish design	1	3.0
Mean: 10 Standard deviation: 3.53		

A smaller but notable fraction of respondents (6%) found the ability to change the blades as the most important benefit. This is important because the blades can become dull over time, and being able to change the blades can extend the life of the blender. Lastly, 3% found the stylish design to be the most important benefit as they want a blender to add beauty to their kitchen.

3.12 Method of cleaning blender

Majority of the respondents (74%) cleaned their blenders by using a scrubber and 26% cleaned their blenders using a brush. The survey results suggest that the most popular method for cleaning blenders is to use a scrubber.

Table 12: Method of cleaning blender

Method of cleaning	Frequency	Percentage
Scrubber	23	74.0
Brush	8	26.0
Mean: 16 Standard deviation: 3.92		

This is likely because scrubbers are effective at removing food and debris from the blades and jar, and they are relatively inexpensive. Using brush for cleaning is less effective than a scrubber, but it is gentler on the blades and jar.

3.13 Method of disposing blender

Majority of the respondents (87%) dispose of their old blenders in the garbage which is the most popular method for disposing and 13% sell their old blenders for recycling. This is likely because it is convenient and inexpensive. However, it is important to note that throwing away old blenders in the garbage can contribute to environmental pollution. Recycling of blender is less popular, but it is more environmentally friendly.

Table 13: Method of disposing blender

Method of disposal	Frequency	Percentage
Garbage	27	87.0
Recycling	4	13.0
Mean: 18 Standard deviation: 5.39		

A study by Agarwal (2023) examined the barriers for recycling old blenders and found that consumers found it inconvenient to recycle old blenders, as they often had to go out of their way to find a recycling center that accepted them and also thought it was more expensive to recycle old blenders than to throw them away in the garbage.

3.14 Willingness to spend money in buying a blender

About 81% of the respondents would like to spend between Rs.3,000/- and Rs.5,000/- on buying a blender. This is likely because this price range offers a good balance between quality and affordability and 13% would like to spend above Rs. 5,000/- on purchasing a blender. A smaller percentage i.e., 6% would purchase things as per requirement.

Table 14: Willingness to spend money in buying a blender

Price range	Frequency	Percentage of respondents
Rs.3,000/- – Rs. 5,000/-	24	81.0
Above Rs.5,000/-	4	13.0
As per requirement	2	6.0

Blender manufacturers could focus on developing blenders that are priced in the Rs. 3,000 - Rs. 5,000 range, as this is the price range that most respondents are willing to pay. A study by Agarwal et al (2023) concluded that the Indian blender market is a growing and lucrative market. Blender manufacturers should focus on developing blenders that are priced in the range of Rs.3,000/- - Rs.5,000/- in order to appeal to the most consumers.

3.15 Changes required in the design of blender

Respondents were asked if they would like any changes to their blenders. Eighty one percent of the respondents wanted some changes in the design features of their blenders. However, 19% of the respondents did not express any change in their blenders and are satisfied with their current blenders.

Table 15: Changes required in the design of blender

Would like changes to blender	Frequency	Percentage
Yes	25	81.0
No	6	19.0
Mean: 15 Standard deviation: 2.29		

Preferred changes in the blenders suggested by the respondents:

More powerful motor: This would allow the blender to blend tougher ingredients more easily.

Sturdier construction: This would make the blender more durable and less likely to break.

Easier to clean: This would make it less of a chore to clean the blender after use.

More versatile features: This would allow the blender to be used for a wider variety of tasks.

The survey results could be used to inform the design and development of new blenders. For example, blender manufacturers could focus on developing blenders that are more powerful, durable, and easy to clean.

3.16 Problems faced by the respondents while using the blender:

1. Grip strength has to be maintained as the equipment used here is an electric appliance. Blenders are electric appliances, which mean that they require a certain amount of grip strength to operate. If the grip strength is not strong enough, the blender can be difficult to hold and operate, which can lead to spill over of the contents, slipping of jar and injuries.

2. Pain experienced in the palm and arms due to holding the blender, as the blender vibrate when in use. When blenders are turned on, they vibrate. This vibration can cause pain in the palms and arms of the person holding the blender as well as the pressure that is placed on the arms by the weight of the blender.

3. Risk for safety while using the blender: The vibration from the blender can also be a safety hazard. If the blender is not held securely, it can vibrate out of the user's hand and cause injury.

4. It requires special storage space. Blenders are bulky appliances, and they can be difficult to store. They often require a dedicated storage space, such as a cabinet or a pantry.

The above problems can be addressed by designing blenders that are easier to grip and hold and vibrate less. Blenders can also be designed with built-in storage solutions, so that they do not occupy much space in the kitchen.

3.17 Recommended design guidelines of a blender based on the modifications suggested by the respondents:

Respondents suggested certain changes in blender that could make their usage of blender more efficient and comfort. The design guidelines were developed based on the suggestions of the respondents which are mentioned below:

1. Food getting stuck after blending:

- **Design Change:** a) Incorporation of a better blade and jar design that reduces the chances of food getting stuck in the corners or around the blades
b) Blades made of non-stick material but sharp enough to do blending.
- **Justification:** A smoother and more streamlined blade design, along with a jar shape that minimizes corners and crevices, will prevent food particles from getting trapped, making it easier to blend and clean. Using blades made of a non-stick material such as coated stainless steel or a food-grade non-stick coating will prevent food from sticking to the blades. This means that even sticky or viscous ingredients will not get trapped around the blades during blending. As a result, the user can easily empty the blender without the hassle of scraping off food residues, making the cleaning process more convenient and efficient.

2. Difficult to clean the blender after usage:

- **Design Change:** Designing detachable and re-insertable blade assembly and jar with smooth surfaces for easier disassembly and cleaning.
- **Justification:** A blender with easily removable parts will enable users to clean every nook and cranny effectively, ensuring no food residue is left behind and avoid breeding ground for bacteria. Additionally, re-insertable blades enable users to safely clean the blades without handling them directly, preventing accidental cuts or injuries during the cleaning process.

3. Risk of getting hurt while cleaning due to blades:

- **Design Change:** Implementing a safety mechanism that prevents the blender from turning on when the blade assembly is not correctly in place.
- **Justification:** Adding a safety interlock system will ensure the blender operates only when all parts are correctly assembled, reducing the risk of accidental activation while cleaning.

4. Disturbing sounds during blending:

- **Design Change:** Enhancement of the blender's motor and insulation to reduce noise during operation. The noise can be especially disruptive if the blender is used early in the morning or late at night.
- **Justification:** Low-noise emitting motors and improved sound insulation will minimize the disturbance caused by blending, making it more comfortable for users and other family members.

5. Uncomfortable vibrations during blending:

- **Design Change:** Optimization of the blender's base and improve the anti-vibration features.
- **Justification:** A more stable and anti-vibration base will reduce the amount of shaking or vibration during blending, making the user experience more comfortable and preventing potential spills and injuries.

6. Safety concerns for children using electric blenders for play:

- **Design Change:** Addition of child-lock feature that prevents the blender from turning on without proper adult supervision and interaction.
- **Justification:** The child-lock feature will ensure that the blender cannot be operated by children without adult supervision, reducing the risk of accidents during play. This feature will add an extra layer of safety. Similar to ovens, the blender could have a lock mechanism that requires a specific combination or

action to activate the blending function. This way, parents can prevent children from operating the blender unsupervised, avoiding potential hazards. The ability to lock the blender also allows the family to store it without any concerns about accidental activation when not in use.

7. Blades wearing out fast when blending hard items:

- **Design Change:** If the blades are used to blend hard items, such as ice or nuts, they can wear out even faster. The blades in blenders are made of metal, and they can wear out over time. This can make the blender difficult to use, and it can also be a safety hazard. Use more durable materials for the blades or introduce a blade strength adjustment feature.
- **Justification:** Utilizing stronger materials or allowing users to adjust the blade strength for different blending tasks will increase the lifespan of the blades and improve overall blending performance.

The above problems can be addressed by designing blenders with features that make them safe to use, easier to clean, quieter, and less vibrating.

IV. Conclusion

The research findings provide valuable insights into the preferences, usage patterns, and challenges faced by consumers regarding blenders. The majority of respondents was employed and used one type of blender for their daily cooking needs. Butterfly and Preethi blenders emerged as the most preferred brands, with stand-alone or table top blenders being the most popular type of blender.

Ease of use, easy-to-clean features, and low noise were the most liked attributes in a blender, while food getting stuck, difficulty in cleaning, and vibrations were the most disliked features. Respondents primarily used blenders to make smoothies and for preparing special meals. The research also revealed that most respondents disposed of their old blenders in the garbage, indicating a need for promoting more environmentally friendly disposal methods like recycling.

Based on the research findings, it is evident that consumers value blenders that are user-friendly, efficient, and easy to clean. Blender manufacturers can focus on incorporating features such as better blade designs, detachable blades, and anti-vibration mechanisms to address the challenges faced by users. Additionally, brands could invest in innovative designs and low-noise technologies to enhance user experience. It is clear that consumers are willing to spend between Rs. 3,000/- to Rs.5,000/- on a blender, which provides manufacturers with a pricing range that caters to the majority of the market.

The research also highlights the importance of sustainability and environmental responsibility in the appliance industry. Manufacturers should explore ways to encourage proper recycling and eco-friendly disposal practices for old blenders. Based on the respondents' feedback, several key design guidelines have been recommended to address these needs and challenges. By addressing the users' needs and challenges, the blender industry can foster greater consumer satisfaction and loyalty, leading to increased sales and positive brand reputation. This research paper can serve as a foundation for further studies and improvements in blender design and development.

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