

Enhancing Athleisure bras design and construction for Sri Lankan consumers

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Abstract: Balancing work and wellness are central to modern Sri Lankan women, driving growth in athleisure wear, particularly athleisure bras that fuse style, comfort, and utility for both everyday activities and exercise. This study systematically explores the gap between Sri Lankan consumer needs and current market options. Research was conducted by combining shop visits, professional interviews, and laboratory experiments on fabric performance. Findings indicate that most athleisure bras available locally, mainly in Colombo are compression types, with prices ranging from LKR 2,500 – LKR 7,000 for local brands and up to LKR 12,000 for international offerings. But in Sri Lanka's hot and humid climate, common materials such as polyester/spandex and nylon/spandex usually don't offer enough comfort. Lab tests indicated that polyester/cotton/spandex blended interlock fabrics are superior in wicking, recovering, and absorbing moisture, all of which enhance fitness and comfort. To comply with international standards, interviewees recommended the use of alpha-numeric size methods, highlighting continuing sizing difficulties in the local market. As revealed, purchase behavior is influenced by cultural norms; for modesty, many women wear athleisure bras underneath their clothes which further highlights the need for comfortable fabrics. However, semi-bonding techniques provide more comfort. All things considered, the study shows unmet demand and substantial potential for Sri Lankan companies to develop cutting-edge fabrics, sizing, and culturally relevant designs to cater to an expanding population of active and health-conscious women.

Keywords: Athleisure Bra, Consumer Fabrics, Textile Innovation, Activewear Apparel

INTRODUCTION

In an era when health is an investment, the woman is considered at her best when she is healthy and active. Athleisure clothing emerged as a revolutionary fashion trend movement and has become a wardrobe essential for women. Athleisure is a hybrid style combining 'athletics' and 'leisure' and is defined as "A fashion trend that combines athletic and leisure wear, creating a comfortable and fashionable style that can be worn for various occasions, from casual outings to workout sessions." [1] "Athleisure is faux athletic gear sold largely to non-athletes who care about fashion, not necessarily function. Technical wear is for active individuals who value performance first, plus the flexibility of clothing stylish enough to wear on the street." [2] "Casual clothing designed to be worn both for exercising and for general use" [3].

Global market size for athleisure clothing was USD 330.97 billion by 2022, and it is anticipated to grow by 9.1% at a compound annual growth rate (CAGR) from 2023 to 2030. The well-known players in the international athleisure market are Nike Inc, Adidas, Lululemon, Athleta, Under Armor, and GAP, and they are targeting countries such as Europe, North America, Asia Pacific, the Middle East, South America, and Africa [4]. Athleisure clothing consists of sweatpants, leggings, bras, joggers, hoodies, and skinnies. Among the athleisure clothing, athleisure bras feature versatility and are designed to be stylish and comfortable yet functional for performance [5]. They are a perfect fusion for a comfortable style that transforms from gym to casual date [6].

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A. Athleisure bras in the Sri Lankan market

The Sri Lankan athleisure clothing market has enormous potential to grow because the upcoming consuming generation of Gen Z and alpha consumers are aware of and willing to follow health-conscious and sustainable trends [4]. In addition, the Sri Lankan sports apparel market is forecasted to increase by 5.1 % CAGR from 2020 to 2026 [7].

However, as per the initial observations of the Sri Lankan shops, most of the athleisure brands are international, such as Nike, Adidas, Puma, Lululemon, Carnage, FOA, Bolt Gear, Under Armor, and Moose. These brands consist of seasonal clothing that is not suitable for the Sri Lankan climate [8].

The commercial capital of Sri Lanka experiences an average temperature of 28 - 29 °C with a slight variation throughout the year [9]. Hence, problems with comfort, breathability, and sweat may arise. Meanwhile, as discovered in interviews Sri Lankan consumers prefer not to wear body- revealing clothes due to cultural and social restrictions, leading to higher need of moisture wicking and breathability in the fabrics. Also, the interviews and market observations identified the problem of sizing being underdeveloped in the local context.

Textiles of polyester, nylon, cotton and spandex are currently controlling most of the market, it is crucial to conduct an experimental assessment of their behavior in tropical environments to identify their technical advantages and disadvantages. Leading to a need for baseline assessment data-driven improvements for climate-appropriate product development by enabling objective comparison with alternative blends [10].

Therefore, it's necessary to find solutions through designs and construction methods with materials and trims to be used, and sizing solutions while considering cultural and social requirements for this growing market of athleisure bras suiting Sri Lankan consumers. This study focused on identifying the needs and gaps within the local market while evaluating the most suitable solutions through design and construction. The research question of the study is.

RQ — What are the most suitable solutions through design and constructions to bridge the gaps and needs of athleisure bras for Sri Lankan consumers?

LITERATURE REVIEW

A. Types of Athleisure Bras

The sports bras can be categorized into two different categories: according to the activity engaged and according to the main functionality of it, which is the breast support [6]. According to its main functionality, the bra can be categorized into two.

- Encapsulation bra — The encapsulation bra contains two molded cups that support two separated breasts. These are more effective for women with cup sizes C or above.
- Compression bras — The compression bra is designed to restrict breast movement by flattening the breasts against the chest wall. These have been thought to be more effective for women with smaller breasts (cup sizes A or B).

According to sports or the activities, sports bras are categorized into three [11].

- Low impact: less vigorous physical activities such as yoga, Pilates, swimming and stretching.
- Medium impact: moderate physical activities such as hiking, road cycling and skiing
- High impact: more vigorous activities such as running, trail running, triathlons, aerobics, dancing, boxing and racquet sports.

The categorization of sports bra is illustrated in Figure 1.

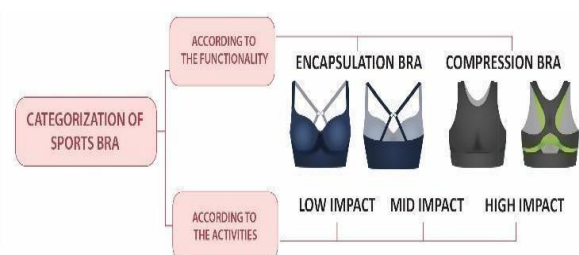


Figure 1: Types Of Sports Bras

B. Fabrics Used for Athleisure Bras

The choice of fabric is crucial in the dynamic realm of athleisure wear for its comfort and functionality. Moisture wicking, easy-to-care-for, stretchable, lightweight, and breathable properties of materials are acknowledged as important [12]. The current market is

compromised with polyester, nylon, cotton and spandex [10]. The most popular fabrics blends used in sports apparel are Polyester/spandex fabric.

It is a high-performance option for athleisure bras, offering moisture-wicking, breathability, durability, and flexibility [12]. The blend is highly durable, with polyester ensuring shape retention and spandex providing elasticity for continuous support. Its flexibility allows for a full range of motion, making it ideal for active wear [13].

Cotton/Spandex Fabric

It is a great choice for athleisure bras, offering softness, breathability, and flexibility [12]. Its gentle texture reduces irritation, making it ideal for all-day wear, while high breathability keeps the wearer cool in hot climates of Sri Lanka [10]. The moisture-absorbing properties help wick sweat away, though it dries slower than polyester blends. Spandex enhances stretchability and shape retention, ensuring a snug yet flexible fit for low to moderate-impact activities such as yoga [11].

Nylon/Spandex Fabric

It is lightweight, durable, and flexible for athleisure bras, offering breathability, moisture-wicking, and excellent stretch [12]. Its airy feel keeps the wearer cool and comfortable, making it ideal for hot climates of Sri Lanka. Known for its high strength and durability,

It resists tearing, abrasion, and sagging, ensuring long-lasting wear. The spandex blend provides exceptional stretch and recovery, allowing a full range of motion while maintaining a snug fit [11].

Polyester/Cotton/Spandex Fabric

This is an ideal blend for athleisure bras, offering a balance of moisture management, breathability, durability, and flexibility [12]. The polyester component enhances moisture-wicking and quick drying, while cotton provides breathability and natural softness, keeping the wearer cool and comfortable a key benefit for Sri Lanka's hot and humid climate [9].

C. Construction techniques and technologies used in athleisure bras.

One of the several techniques employed in the apparel manufacturing sector is cut and sewing.

Using specialized machinery, it entails cutting off pre-designed or patterned cloth pieces from big rolls or sheets. Industrial sewing machines or professional sewing machine operators then assemble these parts. Before being sewed together, each piece of cloth in cut and sew is precisely measured and trimmed to size. As a result, when the garment is finished, there is no excess material to trim off [14].

The process of joining two or more layers of material together by heat, pressure, or glue is known as bonding fabric. This method is well-liked in a variety of sectors, including the fashion, automotive, and medical industries, since it produces a strong and long-lasting connection that is resistant to abrasion [15].

Also, Seamless or circular knitting involves creating a garment by designing a three-dimensional fabric, as opposed to cut-and-sew knits, where the three-dimensional shaping of a garment is achieved by assembling flat, two-dimensional fabric pieces [16].

D. Consumers of athleisure bra

Consumers of athleisure bras can be based on their preferences and day-to-day activities.

Casual Activewear Consumers mainly focus on and consider the comfort and fashion style of athleisure wear in their day-to-day life.

Fashion - Conscious Consumers focusing on both style and functionality when they are choosing the clothes
Athletes and Fitness Enthusiast Consumers doing actual physical activities such as sports/heavy workouts, who need some actual support & comfort during their workouts.

Health and comfort-seeking consumers prioritize the comfort and well-being of their body
Athleisure bra consumers are usually looking for a combination of comfort and other qualities that enhance their overall experience of the sports bra. These are some major considerations when the consumer is focusing on them [17].

Versatility- For athleisure bras, versatility is key. Customers appreciate bras that seamlessly transition from workout to casual wear, offering comfort in various settings.

Comfortable Fit - a comfortable fit that provides good support without causing discomfort or chafing during both physical activities and day – to - day wear.

Moisture Wicking fabrics- Especially in sports bras, moisture-wicking properties are one of the most important things. Fabrics that remove sweat away from the body to keep the wearer dry and comfortable during workouts.

Breathability- Breathable materials and designs that help comfort by allowing air circulation and preventing overheating and sweating during activities.

Seamless Construction- Seamless designs help to reduce irritation, enhancing the overall comfort.

E. Global athleisure bra market

Popular athleisure bra brands are Lululemon, Nike, Adidas, Under Armor, Aerie, Athlete, Sweaty Betty are some of the many international brands in the Sri Lankan market. Lululemon is well known as a brand that caters high quality yoga and athleisure wear. Meanwhile, Nike is the world's largest athletic apparel brand. Nike is dominating the market with their performance driven product, new cutting end technology and sustainability. Adidas aims to be performance and style. Under Armor is known for specializing in performance athletic wear and their innovative designs. Athleta, owned by Gap Inc, focuses on women's athleisure and performance wear with sustainability. These brands are well known for their comfortable and well-designed activewear [18] however, these brands are targeting countries such as Europe, North America, Asia Pacific, the Middle East, South America, and Africa [4]. Hence, the suitability of these brands in the Sri Lankan market is questionable.

METHODOLOGY

Interviews, shop visits and experiments on fabrics were the data gathering techniques employed in this study.

A. Interviews

The sample for the interviews was chosen through purposive sampling, targeting athleisure related professionals to determine consumer and market needs regarding the Sri Lankan market. The number of interviews was seven, including professionals of senior designers, athleisure fit models, fabric technicians, research and developers, merchants, and pattern

technicians who had more than five years of experience in the apparel industry of manufacturing athleisure bras. Although consumers were not directly interviewed, these professionals regularly interact with consumers and have deep knowledge of consumer preferences, behaviors, and needs through their daily professions. Hence, their insights provide information to understand consumer and market demands. As recommended, purposive sampling for qualitative research the small sample is adequate for capturing a range of expert views within the exploratory study managing a focused samples for in-depth insights.

Therefore, the first section of the interview questions was to determine the interviewee's involvement in manufacturing athleisure bras. Identifying the construction techniques and fabrics used for athleisure bras was the focus of the questions of the second section. The questions of the third section concentrate on revealing the demand and preference of Sri Lankan consumers. The interviews were tape-recorded and transcribed.

B. Shop visits

Shop visits observed and explored the available brands, designs, and construction methods with fabrics and trims currently available in Sri Lanka. Shops in the Western province of Colombo were selected as a higher number of gyms and sport-related activities are located around Colombo. The four shops were Carnage (One Galle face, Colombo), FOA (One Galle Face, Colombo), Bolt Gear (Thibirigasyaya), and Triumph (majestic city, Colombo). The findings were recorded in a format.

C. Experiments (Fabric Tests)

Sri Lanka is considered a country closer to the equator, while consisting of only dry and wet seasons throughout the year. The warm climate in Sri Lanka requires breathability and moisture-wicking ability of a garment to make it comfortable.

The stretchability and modulus of fabrics are also important to achieve the fitness of the athleisure bras. Therefore, the focus of the experiments with fabrics was two-fold. The first objective of the experiments was to determine the best fabric composition, and the second objective was to identify the best fabric structure that supports stretchability and modulus.

C.1 Experiments to determine the best fabric composition

The most found fabric blends in the activewear market were selected for the experiments. Since athleisure bras need higher recovery, 6 to 10 percent spandex was selected. In addition, a GSM level of 240 - 260 was selected as it is the regular range seen in most brands.

- 90 % Polyester and 10 % spandex
- 92 % Cotton and 8 % spandex
- 94 % Nylon and 6 % spandex
- 33 % Polyester, 33 % cotton and 6 % spandex

C.1.1 Wicking test

To determine the moisture absorbency of the fabric, a wicking test was conducted. The wicking test is conducted in two ways: the horizontal method (AATCC 198 [19]) and the vertical method (AATCC 197 [20]). The vertical method was chosen in this study. Accordingly, 3 cm width and 27 cm length fabric strips were cut from each fabric composition. 1cm of fabric was immersed in the water, and fabrics were observed throughout an hour with every 15-minute recording of water level.

C.1.2 Moisture management test

The moisture management test (AATCC method) is an advanced method to identify moisture absorbency, wicking, quickness of absorbency, and transportation of liquid in fabrics. It is used to identify dynamic liquid transport properties in three dimensions: absorption rate (time of moisture absorbency in inner and outer layers), one-way transport capability (the ability of fabrics to transport moisture one way from the inner to the outer layer), and spreading/drying rate (speed of spreading of moisture from the inner to the outer layer). This test used a test solution of synthetic sweat (16 mS +/- 0.2 mS); hence, it increases the accuracy of determining the comfortability of an athleisure bra for a Sri Lankan consumer in sweaty weather. The test was done at an ambient temperature of 20 °C with 3 samples for each fabric composition.

C.2 Experiments to identify the best fabric structure

The EMR test (elongation, modulus, and recovery) helps to find the amount of stretch and recovery of a fabric (Ltd. 06). Therefore, after choosing the best fabric composition through the above-mentioned tests, it was tested again from different structures to find stretch and

recovery suitable for an athleisure bra. For this, some of the most common fabric structures are chosen by jersey structure, rib structure, and interlock structure.

FINDINGS

A. Findings From Interviews

The study interviewed seven professionals in the athleisure sector of Sri Lanka, including a pattern technician (interviewee 01), fabric technologists (interviewee 02 and 03), a merchant (interviewee 04), designers (interviewee 05 and 06), R&D Engineer (interviewee 07), to understand market and customer preferences for athleisure bras.

The first section explores Sri Lankan cultural and personal values regarding athleisure bras, revealing that usage is primarily among Colombo, indicating lower usage across the country. fabric technologist (Interviewee 02), notes women in Sri Lanka often wear tops or t-shirts above athleisure bras due to cultural difficulties. However, a designer, (Interviewee 04) suggests, there is a growing trend for sports bras among Gen Z and Alpha in Sri Lanka. Concluding, although there is a cultural barrier for Sri Lankan consumers, younger generations are increasingly embracing sports bras.

The second section addresses constructions, fabrics, trimmings, pricing, and suppliers in the current local market. Prices have risen from LKR 2000 to LKR 7000, with many suggesting Pettah and Pamunuwa markets for supplies, while few suggested online or international suppliers. Fabrics such as nylon/spandex and polyester/spandex are mentioned by fabric technologists, (interviewee 03) and a designer (interviewee 05) states that "hook and eye or the closure options and the adjustability ring and sliders are the key trims". The majority stated the construction method is cut and sew. The third section discusses prominent brands including Gap, Nike, Skims, Carnage, Puma, Asteroid, FOA, Amanté, and Adidas, buying habits, fitness, comfort, and tastings.

Many interviewees address the issue of sizes, with a designer (interviewee 05) suggesting a solution of "sizes indication in alpha and numeric." In the importance of comfortability in product design, R&D engineer (interviewee 07) suggested construction and modern technologies such as bonding with perforated adhesives can enhance comfort. Fabric technologist, (interviewee

03) highlighted the role of fabric in product comfort. Designer (interviewee 06) suggested fewer seams, comfortable fabrics, constructions, and trims. Pattern technologist highlighted (interviewee 01) the use of comfortable straps.

The last questions targeted consumer buying patterns and suggestions. Some suggested Sri Lankan consumers prioritize aesthetics over support, while others believe trends of wearing sports bras is increasing. R&D Engineer, (interviewee 07) stated that the increasing number of women attending gyms is causing a rise in demand for sports bras, indicating a potential future growth in the athleisure market.

B. Observation studies on shop visits

The information gathered through visits to Carnage, FOA, Bolt gear, and Triumph focused on 5 topics: bra types, fabrics, fastening, construction, and cost.

B.1. Shop visit findings from the Sri Lankan brands situated in Colombo

As observed in Figure 2, the cost of a FOA bra starts from LKR 2500, which is the lowest price in the Sri Lankan market and leads to a Triumph bra of LKR 21999. The price range of Carnage and Bolt gear bras is LKR 2990 to LKR 7500. Comparatively, FOA is the most affordable brand for Sri Lankan consumers. Carnage & Bolt gear brands are in the middle.

Hence, the average price point of the sports bra in the Sri Lankan market is LKR 6679.

Bra type available in the local market is divided into two segments of Encapsulation and Compression bras. Triumph is the only brand providing Encapsulation bras to the local market. while other brands provide compression bras.

The most used fabric combination is Polyester/Spandex. Secondly, Nylon/Spandex. FOA and Triumph use Polyester/Cotton/Spandex in very limited quantities. The least used fabric combination is cotton/spandex.

Although fastening methods of hooking and eye to zippers are used, the most common one is pullover. Cut and sew is the frequent construction method and the least used construction method is bonding. Triumph is using underwire, and all four brands are using cups.

Shop Observation format - Local brands									
Categories	Carnage One Galle face, Colombo		FOA One Galle face, Colombo		BOLT GEAR Thibirigasyaya		TRIUMPH Majestic City Colombo		
	Online	In-Store	Online	In-Store	Online	In-Store	Online	In-Store	
Bra Types									
Encapsulation Bra							Yes	Yes	
Compression Bra	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Fabrics									
Polyester / Spandex	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Cotton / Spandex							Yes	Yes	
Nylon / Spandex	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Polyester / Cotton / Spandex			Yes	Yes			Yes	Yes	
Any other fabrics			Yes	Yes			Yes	Yes	
Fastening									
Hook & Eye							Yes	Yes	
Magnets							Yes	Yes	
Zippers							Yes	Yes	
Any Other fastenings	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Trims									
Under-wire							Yes	Yes	
Cups	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Straps	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Sliders, Ring, J-hook							Yes	Yes	
Constructions									
Cut & Sew	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Engineered Fabrics			Yes	Yes	Yes	Yes	Yes	Yes	
Bonding							Yes	Yes	
Cost									
Lowest (LKR)	3500	3500	2500	2500	2990	2990	6150	6150	
Highest (LKR)	7500	7500	4900	4900	4900	4900	21999	21999	

Figure 2: findings from the Sri Lankan brands

B.2 Shop visit findings from the international brands sold in Colombo.

Comparatively as in Figure 3, the cost of Aerie bras starts from LKR 8697 and leads to Sweaty Betty bras at LKR 32389. The starting price range of Lululemon, Nike, Adidas, and Athleta bras is between LKR 11396 to LKR 29990. When comparing prices Aerie is the most affordable brand to Sri Lankan consumers. Lululemon, Nike, Adidas, and Athleta stay in the middle. Hence, the average price of international brands in the Sri Lankan market starts from a minimum of LKR 12595 leading to a maximum average price of LKR 25362.

Shop Observation format - International brands								
Categories	Lululemon	Nike	Addidas	Under Armor	Aerie	Athleta	Sweaty Betty	
Bra Types								
Encapsulation Bra	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Compression Bra	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Fabrics								
Polyester / Spandex	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Cotton / Spandex			Yes		Yes			
Nylon / Spandex	Yes		Yes	Yes		Yes		
Polyester / Cotton / Spandex			Yes		Yes			
Any other fabrics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Fastening								
Hook & Eye	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Magnets					Yes			
Zippers					Yes			
Any Other fastenings	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Trims								
Under-wire							Yes	
Cups	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Straps	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Sliders, Ring, J-hook		Yes	Yes	Yes	Yes		Yes	
Constructions								
Cut & Sew	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Engineered Fabrics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Bonding	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Cost								
Lowest (LKR)	11,396	11,996	11,996	8,997	8,697	14,695	20,393	
Highest (LKR)	29,390	26,391	29,999	23,992	14,695	20,693	32,389	

Figure 3: Findings from the selling of international brands in Sri Lanka

All international bras supply both Encapsulation and Compression bras to the local market. The most used fabric combination is Polyester/Spandex.

The second most used fabric combination is Nylon/Spandex. Only Adidas and Aerie are using Polyester/ Cotton / Spandex Cut and sew, and bonding are used by all international brands in Sri Lanka. As a design detail only Under Armor and Sweaty Betty brands are using underwire, All the brands are using cups.

C. Results of the Wicking Test

As per the wicking test results shown in Figure 4, cotton/polyester/spandex fabric had the highest water level of 17 cm within the first 15 minutes. This indicates that this fabric is highly absorbent when compared with the other fabrics. The nylon/spandex had the least water level of 9 cm.

The water level continued to increase for the next 45 minutes. Cotton/spandex had a difference of 2.5 cm to 1.5 cm in the timelines while the polyester/spandex had differences of 3.5 cm to 2 cm to 2 cm, but the polyester cotton spandex had a decelerating difference of 2 cm to 1.5 cm differences. The decreasing values of differences between levels of water rising shows that fabrics can easily release water to the outer layer. Hence, cotton/polyester/spandex shows a higher rate of releasing and drying than the other two combinations. Based on the wicking test, cotton/polyester/spandex combination is chosen as the fabric with the shortest time of absorbance and fastest drying among the other fabrics.

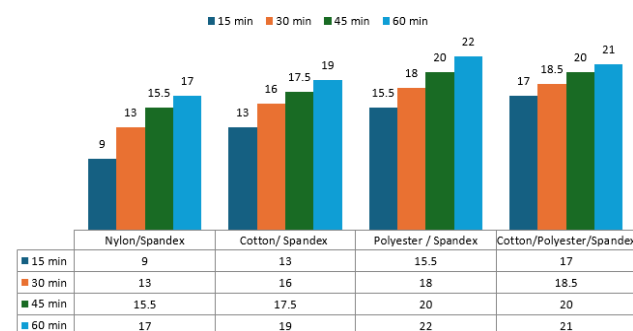


Figure 4: Wicking test results

D. Results Of the Moisture Management Test

The moisture management test uses a test solution of synthetic sweat (16 mS $\pm$ 0.2mS); hence, it increases the accuracy of determining the comfortability of an

athleisure bra for a Sri Lankan consumer in sweaty weather. The test was done at an ambient temperature of 20 $^{\circ}$ C with 3 samples for each fabric composition. The test results are given in Table 1.

Table 1: Moisture Management Test Analysis

Fabric	Nylon/Spandex	Cotton/Spandex	Polyester/Cotton	Cotton/Polyester/Spandex
Sample 01	0.716	0.4834	0.5078	0.7012
Sample 02	0.6974	0.4278	0.5165	0.6836
Sample 03	0.5656	0.447	0.5656	0.6614
Overall moisture management	0.6597	0.4527	0.4970	0.6820

The results show that the combination of cotton/polyester/spandex has a higher moisture management property than other fabrics.

E. Results of the EMR Test

Table 2 shows the load of stretch level at 40 % to warp and weft directions in 1ply and 2ply of fabrics. Interlock fabric is required with higher load of 0.90 lbs. when compared with other fabrics for weft direction. Further, recovery of a fabric is highly needed to a knit fabric to be in the right shape when going through various activities by the user. Snagging of a fabric will create discomfort and even various injuries. Table 2 also shows the recovery levels of each fabric. Interlock fabric is having highest recovery percentage.

Table 2: Load of stretch levels at 40 % and Immediate recover percentage

Structure	Warp or Weft Directions	Load of stretch levels at 40%		Immediate recover percentage	
		1ply	2ply	1ply	2ply
Rib	Warp	0.68	1.51	77%	84.6%
	Weft	0.31	1.06	80%	81.7%
Single Jersey	Warp	0.89	1.87	79.1%	83.4%
	Weft	0.47	1.13	76.4%	79.3%
Interlock	Warp	1.05	1.93	89.7%	92.4 %
	Weft	0.90	1.37	91.2%	94.1%

Hence, interlock structure was selected as having the highest rate modulus suiting for an athleisure bra with best recovery.

CONCLUSION

A balanced lifestyle between health and work is a prominent future trend. Living to adoptability athleisure bras play a major role in today's economy. With observantly growing demand, this research focuses on exploring the current market and existing product properties to understand available products, identifying Sri Lankan consumer's needs and preferences for athleisure bras, and propose the best construction solutions to bridge the gap in the local athleisure bras market.

Observations and interviews revealed that Sri Lankan brands situated in Colombo lead to a conclusion about major concerns as most buyers are from the western province. Accordingly, the average highest price point is LKR 6679 and affordable options ranging from LKR 2500 to LKR 7000. When compared to international brands, the maximum price could be up to LKR 12000.

Compression bras are dominating the local market with most used fabric combination of Polyester/Spandex. However, the wicking, moisture management and EMR tests, indicates the most suitable fabric is polyester/cotton/spandex with an interlock structure for comfort in Sri Lankan climate. This was observed only in two bras of triumph and FOA, clearly indicating the gap of fabrics comfort suiting for environment and climate of Sri Lanka.

The most common fastening method is pull over and construction method is cut and sew due to cost effectiveness. Though, few semi bonding bras are available with higher advantages of comfort to the consumers in brands such as Triumph.

Interviewees explained regarding cultural barriers experienced by Sri Lankan consumers where many consumers are wearing a top above athleisure bras. Here, the importance of the moisture management property of polyester/cotton/spandex fabric is further highlighted. Also, the sizing issue can be addressed by alpha and numeric sizing systems as of international brands such as Third love given in Figure 5 when compared with sizing of a local brand, carnage.

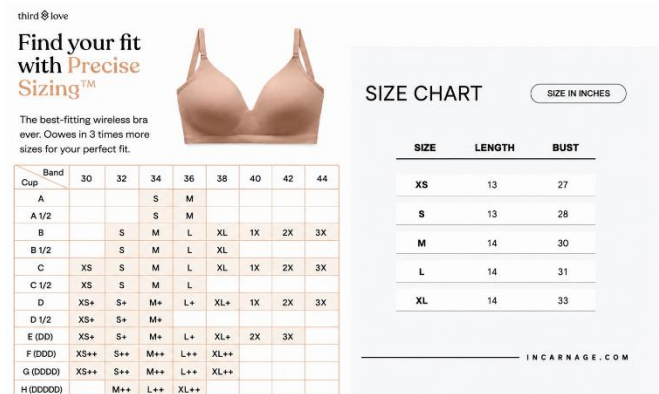


Figure 5: Sizing comparison of a local brand; carnage with Third love

In comparatively, no single parameter of fabric or construction excels independently when deciding to develop an athleisure bra but when analyzing for the most suitable constructions and design for solutions of comfort, cost effectiveness and sizing. The Figure 6 proposed a prototype of embodying optimum parameters through a compression bra for Sri Lankan market. This is a compression bra as it is the major type of bra found in the market and constructed using both cut and sew with semi bonding for comfort, support and durability. Made of cotton/polyester/spandex interlock fabric with two plies on the front from perforated glue for compression needed in low to mid impact and breathability. 1 ply on the back side for further breathability and moisture wicking. Razer back straps for higher support as it is consisting of pull over with no trims to have less cost in manufacturing. Turn bonded seams for neckline, armholes and waistline to provide support and durability as front panel needs a higher support in a bra (6). Used pullout seams for the sides to achieve less sewing construction to reduce cost and to increase durability due to being a pullover bra. Finally, the bra must be sized with numeric and alphabetic size to have a better fit and consumer satisfaction.

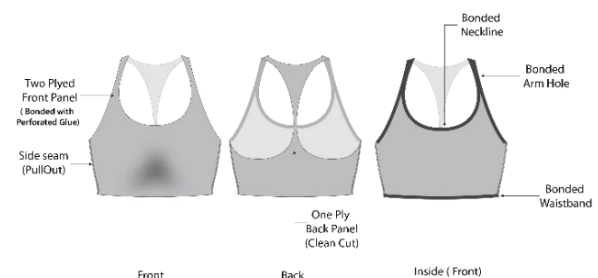


Figure 6: Prototyped bra suiting to Sri Lankan market

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