Category: Research Article

Knowledge on Prevention of Allergic Reactions and Associated Factors among Beauticians in Selected Beauty Salons in the Biyagama Medical Officer of Health Area

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ARTICLE DETAILS

ABSTRACT

An allergy is a hypersensitivity reaction initiated by immunological mechanisms. Beauticians work with cosmetic products which contain allergens. They should be able to identify and prevent allergies associated with cosmetics. The objective of study was to describe the knowledge of beauticians in selected beauty salons on prevention of allergic reactions and associated factors for their knowledge. A descriptive cross-sectional study was conducted among beauticians in selected beauty salons in Biyagama MOH area using a pretested interviewer-administered questionnaire. Knowledge was assessed by using a 10 item questionnaire. The possible range of the knowledge score was 0-25 which was then converted to 0-100 and categorized as 'Good' if ≥75%, 'Moderate' if 50%-75% and 'Poor' if <50%. Data analysis was carried out using SPSS version 26.0. Comparisons were made between mean knowledge scores of beauticians from different socio-demographic and service related categories using the independent sample t-test. The level of significance was considered as $p<0.05$. Response rate was 82% (n=107). The majority were females (57%,N=61). The mean age was 32.6 years (SD=±9.16). The mean knowledge score was 55.25% (SD=11.34) with 71.96% (N=77) having a 'Moderate' knowledge. Only 1.87% (N=2) had 'Good' knowledge. Knowledge scores were significantly higher among beauticians who are females (T=2.57, df=105, p=0.011), educated ≥A/L (T=-3.45, df=105, p=0.001), having professional qualifications (T=5.88, df=105, p=0.000), trained on skin care (T=2.26, df=105, p=0.026), and bridal dressing (T=2.52, df=105, p=0.013). The majority of beauticians had moderate level of knowledge on prevention of an allergic reaction. Higher level of knowledge was observed among female beauticians with higher educational, professional qualifications, trained on skin care, bridal dressing.

1. Introduction

An allergy is a hypersensitivity reaction initiated by immunological mechanisms [1]. The prevalence of allergic diseases worldwide is rising in both developed and developing countries. These diseases include asthma, rhinitis, anaphylaxis, drug, food, and insect allergy, eczema, and urticaria (hives) and angioedema [2]. The prevalence of cosmetic related contact allergy in the general population is about 6% [3].

Cambridge dictionary explains the definition of beautician as a trained person whose job it is to improve the appearance of a customer's face, body, and hair, using make-up and beauty treatments, often in a beauty salon [4]

The objective of this study was to describe the knowledge of beauticians in selected beauty salons on prevention of allergic reactions and associated factors for their knowledge. Knowledge regarding prevention of allergic reactions is directly associated

with beauticians' practices and quality of beauty services. Therefore enhancing their knowledge on prevention of allergic reactions and thereby improving quality of beauty services is important to decrease incidences of allergic reactions. The first step is assessing the knowledge regarding prevention of allergic reactions among beauticians.

India has over 61,000 beauty salons in salons that have population over one million [5]. More than 10,000 beauty salons were opened in United Kingdom between 2015 and 2016. This trend has been continued well into 2018 and then roughly 43.3 thousand was the total number of beauty salons [6].

Although there are no specific data available regarding to Sri Lanka, you can assume that the situation is same according to advertisements and beauty salons open daily basis [7].

1.1. Beauty Culture and Hairdressing Training

Beauty culture and hair dressing is an income-generating program that is functioning in the Community Learning Centers (CLCs). According to UNESCO Community Learning Centre (CLC) is a local educational institution outside the formal education system, usually set up and managed by local people [8].

In Sri Lanka most of the beauticians have achieved National Vocational Qualification (NVQ) [9]. Vocational Training Authority of Sri Lanka under Ministry of Skills Development and Vocational Training formulates and provides vocational training programs in vocational training centers and issues NVQ certificates level-1 to 7. Beauty culture and hair dressing courses are conducted by Vocational Training Authority of Sri Lanka in about two hundred vocational training centers and some qualified experienced beauticians conduct NVQ courses in their beauty salons or training centers. According to Vocational Training Authority of Sri Lanka NVQ level-1 holders are qualified to work under direct supervision, NVQ level-2 holders are qualified to work under guidance, NVQ level-3 holders are qualified to work independently and quality monitored, NVQ level-4 holders are qualified to work independently, NVQ level5 holders are qualified for self-working and give guidance, NVQ level-6 holders are qualified for managerial and NVQ level-7 holders are qualified for planning and implementation [9]. Health and safety is included in their course content as a chapter. Under that chapter NVQ students learn about cosmetic allergies [9].

1.2. How cosmetics cause allergies?

Various cosmetics including hair dyes, shampoo, hair conditioners, face creams, perfumes, shaving creams, makeup and nail polish are used in beauty salons. They contain harmful chemicals including synthetic resins such as polyurethane, polyester Dyes, preservatives, nail enamels, enamel hardeners. They can cause the allergic or irritant reaction of the respiratory tracts and the skin[10]. They use disinfectants containing chlorine compounds, peroxide compounds, alcohols, quaternary ammonium compounds, phenolic compounds that can cause allergic reactions within the respiratory system, and skin [10]. The allergic reactions of the respiratory tracts or irritation of the conjunctivas and oral mucosa can result as the presence of compounds of an aromatic structure (toluene and xylene), esters and ketones (ethyl acetate, acetone) and terpenes and camphor, dusts that contain in polluted air [10]. As well as *Staphylococcus aureus* contamination by people by air-droplet, airborne dust, food, and direct contact can cause inflammation of the upper respiratory tracts, and skin allergy [10]. As well as rubber sponge and applicators for cosmetics can cause contact dermatitis [11].

The aims of this study are to assess the knowledge on prevention of allergic reaction and associated factors among beauticians in selected beauty salons in the Biyagama Medical Officer of Health area.

2. Material and Methods

2.1. Method

A descriptive cross sectional study was conducted in beauty salons selected using convenient sampling in Biyagama Medical Officer of Health area, Sri Lanka during December 2020.

There were 49 Grama Niladhari (smallest administrative division) divisions in Biyagama MOH area and more than 500 beauty salons were registered according to 2019 data.

The target population was all the beauticians in Biyagama MOH area. Contact details of salons were taken from Public Health Inspectors of relevant areas.

Beauticians that work in registered (as a business) beauty salons were selected for the study. Beauticians who work domestically without their business registration were excluded.

Sample size was calculated using the sample size equation for a prevalence study after conducting a pilot study by using 15 beauticians from Mahara MOH area that was not included in the study proper. Expected proportion with the characteristics (P) was calculated using pilot study. Good knowledge percentage (26.67%) was taken as the expected proportion with the characteristics (P) for sample size calculation [12].

The calculated sample size was 333. Due to the COVID-19 pandemic situation in the country most of the beauty salons were closed and allowed limited number of people to enter the salon. With that condition calculated sample size was not able to achieve.

The participants were selected using convenient sampling method. The questionnaires were administered among easily accessible participants.

2.2. Data collection

Data was collected using a validated interviewer administered questionnaire.

Judgmental validation of questionnaire was done by three experts in the field, a physician specialized in allergy and immunology, a physician specialized in public health and an expert cosmetologist.

The purpose of the study was briefed verbally and detailed explanation was provided using an information sheet to the prospective participants inviting them to participate in the study. Informed written consent was obtained from the participants prior to administering the questionnaire by the investigator.

Pretesting of questionnaire was done to assess clarity, readability, relevance, and time required to complete the survey by conducting a pilot test by using 15 beauticians from Mahara MOH area that was not included in the sample.

An interviewer administered questionnaire was used to assess the knowledge using Sinhala and English languages. The questionnaire consisted of two parts. Part 1 consisted of ten questions and part 2 consisted of 25 questions. Part one was used to assess socio-demographic characteristics, working hours, qualifications, age, gender, *Grama Niladari* division, ethnicity, religion, working hours, type of the occupation, educational level and the qualifications and experience related to cosmetology. Part two was used to assess knowledge regarding prevention of allergic reactions and what they had heard about allergic reactions using closed ended 'yes/no' questions and 'true/false' questions as well as short answer questions on preventive measures of allergic reactions such as taking a history of allergies from the client, common allergens that can cause allergic reactions in the salon, whether they read the instruction leaflets of cosmetic products prior to use, questions on performing skin sensitivity tests and basically the

procedure of performing patch test and identification of positive patch test.

Scale was developed giving 1 mark for each correct answer and incorrect answers were given 0 mark. The possible range of the knowledge score was 0 to 25 which was then converted to 0-100 and then categorized as 'Good' if the score was 75% or more than 70%, 'Moderate' if the score was 50% - 75% and 'Poor' if the score was less than 50%.

2.3. Statistical Analysis

All the data collected by the questionnaires was entered in to Microsoft Excel (2010) software, after checking for the accuracy of the data then transferred and subsequently analyzed using Statistical Package for Social Sciences (SPSS) 26.0 version.

Descriptive statistics, frequency, percentages, mean, standard deviation (SD) was used to describe socio demographic and service related characteristics and independent sample T-test was make comparisons associated factors to the knowledge on prevention of an allergic reaction. Level of significance was considered as $p < 0.05$.

2.4. Ethical Approval

Ethical approval was obtained from the Ethics Review Committee of Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka (Ref No: Nur/10/20).

Permission to conduct the pilot study was taken from the Medical Officer of Health, Mahara. Permission to conduct the main study was taken from Medical Officer of Health, Biyagama.

Every participant was given an information sheet describing the purpose, the methods, benefits and risks and investigators. Investigator answered all doubts and questions posed by the participant before starting the research. Every person was taken into the research, if and if only the participant had completely understood the information given to him/her and wished to take part in the study voluntarily. Every participant was explained that they had the right to leave the study at any given moment of time without giving reasons and was allowed to do so.

Data collected from every participant was accessed by and only by the investigator. Data processed in the computers was locked with a data protection system. . Raw data was kept until analysis and then destroyed.

Participants were not had any immediate health or financial gain from the study. But the researcher expected the study to open pathways into more

researches and health interventions that would help enhance the knowledge regarding prevention of allergic reactions among beauticians and help the community as a whole to improve their knowledge regarding prevention of allergic reactions to cosmetics.

3. Results and Discussion

3.1. Results

Only 130 eligible participants were contacted

Table 1: Knowledge on common causes and development of allergic reaction in salons

Question	Correct answer frequency (%)
Client can develop certain allergic reactions during beauty therapy	92 (85.98%)
You should ask about allergic history before their procedure	107 (100%)
Cosmetic products contain some ingredients that can cause allergic reactions	99 (92.5%)
Rubber gloves and sponges can act as allergens	78 (72.9%)
Microorganisms can grow in uncleaned combs, sponges and brushes that can act as some allergens	99 (92.5%)

which 23 declined to participate. Therefore, 107 participants were recruited with a response rate of 82%. Hundred and thirty participants were contacted and 23 declined to participate. Therefore, 107 participants were recruited with a response rate of 82%.

- **Socio-demographic characteristics**

The majority of the participants was females (57%, N= 61). The mean age of the participants was 32.6 years (SD=9.16). The majority of them was Sinhalese (98.1%, N=105) and Buddhists (91.6%, N=98). Fifty one point four percent (N=55) had educated up to A/L. Ninety one point six percent (N=98) do their job as full time and others do their job as part time. Sixty three point six percent (N=68) were owners of the salon and other participants work as an employee under the owner of the salon.

Seventy nine point four percent (N=85) participants have obtained a training in a beauty salon during their course.

- **Total score for knowledge on prevention of allergic reactions**

The possible range of the knowledge score was 0 to 25 which was then converted to 0-100 and

categorized as 'Good' if >75%, 'Moderate' if 50%-75% and 'Poor' if <50%. The mean knowledge score was 55.25% (SD±11.34). Majority had 'Moderate' level of knowledge while only 1.87% (N=2) had 'Good' level of knowledge.

Figure 1 shows the knowledge score distribution on prevention of an allergic reaction.
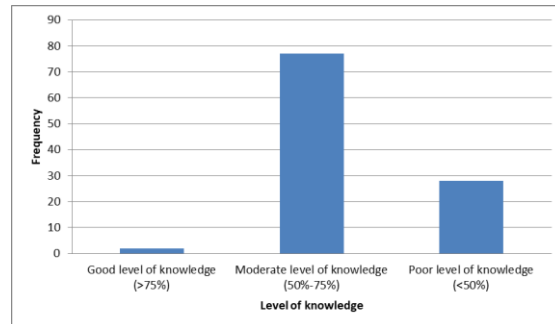
Figure 1: Overall knowledge score on prevention of an allergic reaction (N=107)

All the participants had heard of the term "Allergy". Among them 71% (N=76) came to know about it by attending professional training in the field of cosmetics.

Table 1 shows the response to the questions to assess knowledge on common causes and development of allergic reaction in their beauty industry.

All the beauticians (100%) in beauty salons in the study sample read instructions given in the leaflets/ container of cosmetic products before buying and or applying for client and they perform skin sensitivity test (patch test) before apply cosmetics to the client but they are not adhere to correct method.

Table 2 shows the medications that beauticians should asked to stop after consultation of a medical officer prior to perform patch test.

Table 2: Knowledge on medications that need to be stop prior to patch test (N=107)

Medication	Frequency (%)
Antihistamines (Cetirizine, Chlorpheniramine (Piriton))	29 (27.10%)
Certain heartburn treatment medications, such as famotidine/cimetidine	1 (0.93%)
Benzodiazepines, such as diazepam (Valium) or lorazepam	3 (2.80%)
Tricyclic antidepressants, such as amitriptyline	9 (8.14%)
Total	**107 (100.00%)**

Table 3: Associated factors to the knowledge on prevention of allergic reactions (N=107)

Characteristic	Frequency	Knowledge mean score (Standard deviation)
Gender		
Male	46	52.09 ($\pm$ 13.56)
Female	61	57.64 ($\pm$ 8.71)
Total	**107**	

(T= 2.572, df = 105, p= 0.011)

Characteristic	Frequency	Knowledge mean score (Standard deviation)
Educational level		
O/L or Below O/L	59	52.00 ($\pm$11.95)
A/L or above A/L	48	59.25 ($\pm$9.18)
Total	**107**	

(T=-3.454, df =105 , p= 0.001)

Characteristic	Frequency	Knowledge mean score (Standard deviation)
Qualifications related to cosmetology		
Have qualifications	92	57.52 ($\pm$8.89)
Self-learned	15	41.33 ($\pm$14.79)
Total	**107**	

(T= 5.882, df =105 , p= 0.000)

Characteristic	Frequency	Knowledge mean score (Standard deviation)
Coverage of beauty culture/ skin care during training period		
Yes	84	56.52 ($\pm$9.45)
No	23	50.61 ($\pm$15.94)
Total	**107**	

(T=2.259, df =105 , p= 0.026)

| Characteristic	Frequency	Knowledge mean score (Standard deviation)
Coverage of bridal dressing during training period		
Yes	62	57.55 ($\pm$9.54)
No	45	52.90 ($\pm$12.89)
Total	**107**	

(T=2.519 , df =105 , p= 0.013)

All medications that mentioned bellow should be stopped prior to patch test with doctor's order. According to the Table 2, majority of the beauticians do not ask to stop certain medications taken by the client prior to the patch test after consulting a doctor for the prescribed medications.

Ninety four percent (N=101) of beauticians correctly responded that antiasthmatic drugs should not be stopped prior to the patch test.

Among the participants 31.78% (N=34) had correctly answered that allergy alert test (patch test) must be carried out at least 48 hours before using the cosmetic product.

Only 28.97% (N=31) beauticians performed the sensitivity test although their client had used the cosmetic product safely in the past.

Figure 2 shows how the participants identify positive allergy test. The majority (58.88%, N=63) identified itching as indicative of a positive allergy test. Among the participants only 18.69% (N=20) had heard about photo patch test and only one participant (0.93%) had performed the photo patch test.
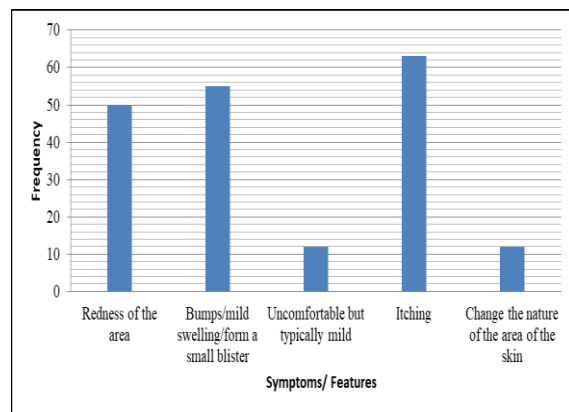
Figure 2: How to identify positive patch test (N= 107)

- **Factors associated with the knowledge on prevention of allergic reactions**

An independent-sample-t-test was conducted to compare mean knowledge score with socio-demographic characteristics.

Knowledge scores were significantly higher among beauticians who are females (T=2.57, df=105, p=0.011), educated >A/L (T=-3.45, df=105, p=0.001), having professional qualifications (T=5.88, df=105, p=0.000), and trained on skin care (T=2.26, df=105, p=0.026), and bridal dressing (T=2.52, df=105, p=0.013). Table 3 shows the associated factors to the knowledge on prevention of allergic reactions.

3.2. Discussion

This descriptive cross sectional study was a quantitative research assessing the knowledge on prevention of allergic reactions among beauticians and workers in selected beauty salons in Biyagama MOH area. Hundred and seven beauticians working in conveniently selected beauty salons in the study area were included as study participants to describe the knowledge on prevention of allergic reactions and the factors associated with knowledge. An

interviewer administered questionnaire was used as the study instrument and data was analyzed to achieve the objectives of the study.

The majority was females. The mean age of the participants was 32.6 years. The mean knowledge score was 55.25%. Majority had 'Moderate' level of knowledge while only 1.87% (N=2) had 'Good' level of knowledge. Knowledge scores were significantly higher among beauticians who are females, educated ⩾A/L, having professional qualifications, and trained on skin care, and bridal dressing . The majority of beauticians had moderate level of knowledge on prevention of an allergic reaction. Higher level of knowledge was observed among female beauticians with higher educational and professional qualifications trained on skin care and bridal dressing.

A similar study that was conducted on "knowledge on identification, immediate management and prevention of allergic reactions among beauticians in Gampaha district" among 400 randomly selected beauticians. In that study also the majority of participants were female (86%) and the mean age of participants was 30years (SD=±7.3).

Mean age difference between both studies is diminutive. In that study almost all (99.8%) of participants knew the word "allergy" and 96.8% had appreciated that allergies can occur with cosmetics [13] compared to present study where only 85.96% of participants knew that allergic reaction can occur during beauty therapy.

In above previous study 98% inquire the past history of allergy and 85% perform patch test before procedures [13]. However, present study 100% of participants ask about the allergic history and perform patch test prior to procedures.

There are some differences with the results when comparing both studies. That might be due to the sample size was high in previous study than this study.

- **Strengths and Limitations of the study**

This study was very cost effective and avoided using too many resources.

Due to the COVID-19 pandemic situation in the country most of the beauty salons were closed and allowed limited number of people to enter the salon. With that condition calculated sample size was not able to achieve. Failure to achieve the required sample size and the use of non-probability sampling method due to the COVID-19 pandemic prevailed are major limitations in the study. Therefore, certain factors that are actually associated with the knowledge on allergy prevention might have failed to achieve a significant level and the sample may not be representative of the study population. Hence, interpretation of the findings to be done with caution.

4. Conclusion

Findings of this study describe the knowledge regarding prevention of allergic reactions among beauticians in selected beauty salons in Biyagama MOH area and associated factors for their knowledge.

The majority of participants had moderate level of knowledge on prevention of an allergic reaction.

Knowledge scores were significantly higher among beauticians who are females, educated ⩾ A/L, having professional qualifications, and trained on skin care, and bridal dressing.

The calculated sample size was 333. Due to the COVID-19 pandemic situation in the country most of the beauty salons were closed and allowed limited number of people to enter the salon. With that condition as a limitation of this study the calculated sample size was not able to achieve.

According to the findings of the study, the following recommendations are made.

- To improve accessibility for the hair and beauty culture professional training programmes for every self-learned workers in the beauty salons/barber shops without qualifications

- To include chapters to the every professional hair and beauty culture training programs on prevention of allergic reactions including patch test

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