PREVALENCE OF DIETARY SUPPLEMENTS INTAKE FOR AESTHETIC/BEAUTY PURPOSES IN FEMALE UNIVERSITY STUDENTS AND EVALUATION OF LABELLING CLAIMS

Research Supervisor

Ms. Asma Khan

Head Supervisor

Dr. Muhammad Salman Bashir

Submitted By

Name	ID
Areej Tariq	S2019370001
Hafiza Rida Azeem	S2019370016
Iqra Ahmed	S2019370026
Maham Sadiq	S2019370019
Sitara Arshad	S2019370013

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School of Health Sciences

University of Management and Technology

SHS
UMT

DEDICATION

We dedicated our research work to Allah Almighty, Prophet Muhammad (PBUH) and our beloved parents.

ACKNOWLEGMENT

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DECLARATION

We declare that the research project **"Prevalence of dietary supplements intake for aesthetic/beauty purposes in female university students and evaluation of labelling claims"** is based on our own work carried out during the course of our study under the supervision of **Ms. Asma Khan**. We assert that statements made and conclusions drawn are an outcome of our research work. We further certify that the work contained in the report is original and has been done by us under the general supervision of our supervisor.

The work has not been submitted to any other institution for any other degree in this university.

We have followed the guidelines provided by the university in writing the report.

Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them in the text of the report and have given their details in the references.

Researcher's Signatures

Name	ID
Areej Tariq	**S2019370001**
Hafiza Rida Azeem	**S2019370016**
Iqra Ahmed	**S2019370026**
Maham Sadiq	**S2019370019**
Sitara Arshad	**S2019370013**

APPROVAL CERTIFICATE

Research Project entitled *"Prevalence of dietary supplements intake for aesthetic/beauty purposes in female university students and evaluation of labelling claims"* is accepted by the faculty of School of Health Sciences, University of Management and Technology, Lahore, in partial fulfillment of the requirement for the degree of *[BS Nutrition Science]*.

DR. UMAR BACHA
Chairperson / Associate Professor
Department of Nutrition and Dietetics
School of Health Sciences
University of Management and Technology

14/4/2023

Chairperson of Department

Dr. Umar Bacha

Department of Nutrition and Dietetics

Supervisor

Ms. Asma Khan

Lecturer Department of Nutrition and Dietetics

Prof. Dr. Muhammad Salman Bashir (PhD)
Dean
School of Health Science (SHS)
University of Management & Technology

Dean SHS

Dr. Muhammad Salman Bashir

School of Health Sciences

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ABSTRACT

Dietary supplements have been widely used all over the world to enhance diet, beauty and health. Now a day's youngsters use dietary supplements majorly for beauty purpose because they can be easily purchase from drugstore, online website, departmental store etc. Youngsters who follow social media habitually think that the supplements are the secret of those "perfect faces" and start taking those supplements without prescription and proper guidance and find "Hope in a capsule". This shows multiple challenges for physicians i.e. which supplements are approved from FDA and either it will meet RDA requirement or not. The aimed of our study was to check the prevalence of dietary supplements intake among university female students for aesthetic purpose and their labelling claims. The study sample size was 400 female university students and the data was collected through modified questionnaire. Majority of the respondents used the dietary supplement for glowing, hydrating and fair skin. The most common supplement were used; vitamin C, E and biotin. The top 35 beauty supplements from our sample were collected to check about labelling claims. Majority of the supplements are not updated the daily values according to the recent list of FDA but have third party approval and give clear dosage instruction. None of the beauty supplements give any information about allergen. The most ordinary beauty claim was "For Healthy, Glowing Skin". In conclusion, majority of our sample use dietary supplements for aesthetic purpose and most of the labeling factors are according to standards.

Keywords: Prevalence, Dietary Supplements, Aesthetic/Beauty Supplements, Labelling Claims, Beauty Claims, FDA

CHAPTER 1 INTRODUCTION

1.1. Background

Dietary supplements are the substances which are used to enhance diet, health, beauty, strength, to meet the nutrient needs of public and to lower the health risks. The intake of health and beauty supplements (dietary supplements) has been staggeringly increased in people specifically in young female adults globally. Dietary supplements publicized for “skin, hair, & nails” and to “boost beauty protein collagen”. Dietary supplements are now purely used for the beauty purposes as people misunderstood the concept that “Beauty belongs to nutrition”.

Despite of proper evidence based knowledge to support its effective usage, the global supplement market is tremendously flourishing. The global market of beauty supplements flourished 3.5 billion dollar or so in 2016 & projected to increase by 7 billion dollar at the end of the 2024 (Perez-Sanchez et al., 2020). The online selling channels/medium has made the easy access to dietary supplements in developed and developing countries like Pakistan too. One of the major reasons of its enormous use is the factor “with or without prescription access”. People may hear about that a supplement is causing brightening effects, they will start to take it without its proper background research, purpose and knowledge.

Many consumers lack knowledge about nutrition and supplements and they tend to find their health and beauty solutions in supplements as a “hope in a capsule”. People ignore the reality that first, they have to maintain healthy lifestyles then include the

supplements if needed. They rush to have a “quick-fix” to their health and beauty problems which are not even related to dietary supplements.

Dietary supplements can be made up of different micronutrients (like selenium, zinc etc.), vitamins (vitamin C, A, B complex), protein (collagen, glutathione) depending upon the sort of usage. There is a lot of variety of dietary supplements and their brands which makes it challenging for consumers as well as for physician too to prescribe the right sort and brand. FDA approved dietary supplements meetup the RDA needs but “over the counter” intake is either exceeding or less than the actual need. Some supplements RDA are not even according to FDA list. Most of them exceeding the limit of daily intake. Some supplements do not even have a clear dosage instructions, which make people perplexed. People need to understand that supplements are not the regular gummies, we should take them according to proper prescription, dose and understand the drug nutrient interaction of that specific supplement with our daily diet routines.

Today, in the era of glamour, everybody wants brighter, healthier and radiant skin. That’s why trend of beauty supplements usage is increasing. Companies connect with social media influencers to promote their supplements. People who religiously follow social media trends think that these supplements are the secret behind those “perfect faces”.

Due to internet and social media trends supplements usage for aesthetic purposes has been tremendously increased around the globe without the proper guidance and prescription.

1.2. Statement of the Problem

Excessive use of beauty supplements in female university students and their false labelling claims can create confusion in clients.

1.3. Significance

a) Our study results will help future consumers to check the labelling factors for purchasing of beauty supplements

b) This study conducted among young female students, as supplements intake had already been studied in athletes, children and overall adults for weight management, muscle mass buildup, strength & growth but not in females for aesthetic purposes specifically.

1.4. Objectives

a) To find the prevalence of dietary supplements intake for aesthetic/beauty purposes by young female university students

b) To evaluate and document the labelling claims of beauty supplements

CHAPTER 2 LITERATURE REVIEW

According to (Kobayashi et al., 2017) study was conducted in Japan, through online survey questionnaire. The survey was subcategories into two. First survey questionnaire was about the prevalence of dietary supplements usage and the knowledge they know about supplements, food, and nutrition. The total number of respondents on this survey was 9066 out of 10,000 college students, out of which 2966 were male and 6100 were the female participants.

The participants who are already using the dietary supplements or recently start taking supplements were move to the second part of survey. The second survey was consisting of 2745 students and the respondents were 2060. Majority complete the survey. The survey questionnaire included nutritional sources Dietary supplement purchased, intended for use as a dietary supplement (i.e., dietary supplement Nutrients, health management, strength promotion, beauty effects, weight reduction, muscles buildup, prevention from disease and disease therapy), types of supplements to use. Any side effects that occur and how they reacted to side effects.

Sources of dietary supplement information are listed. Most of the students get information about dietary supplements is through online which is 38.3% and then from B store (33.6%), TV, relatives, friends, drugstores and advertisements / pamphlet. Nutritional supplements, most of which students buy from pharmacies and dispensary, through online websites, and retail. There is a gender gap in access to information sources and nutritional supplements, with more men than women using the Internet as a source of

information and making purchases. Women, on the other hand, relied on family members for information on nutritional supplements.

Intended use of dietary supplements were examined. Students who used nutritional supplements were designed to enhance their diet with nutrients, various reasons; Health management, aesthetic effect, weight reduction, strength promotion, disease prevention, muscle build up. Minority of the respondents take supplementation to treat illness (3.7%). there was a gender difference about the intended use of nutritional supplements. Specifically, quite a few men use Dietary supplement for muscle building as a woman. Conversely, women are overwhelmingly more those for aesthetic purpose and weight reduction than men.

The kind of supplementation they were taking is; individual vitamins or minerals are the most well-known then multivitamin and multi-mineral. Single vitamins like B vitamin, ascorbic acid and alpha-tocopherol (E-vitamin) and single minerals calcium ion, zinc, iron. Iron supplements were majorly used supplements by women. Supplements for weight reduction were commonly used and the supplements based on protein, blueberry, fish oil, lactic acid bacteria product. The most ordinary supplement was protein for both gender and in women the most supplements used were for weight reduction where blueberry lutein supplement rank on second most general in men and women.

Side effects of supplementation were also examined on students. The prevalence of side effect was higher in men than in women. Diarrhea was the most common side effect face side. Nausea, puking, stomach pain, followed by difficulty in defecating and headache were faced by the users.

The symptoms may be occur due the use of dietary supplement as there is no difference in symptoms of men and women. Use of supplements containing lactic acid bacteria is associated with abdominal discomfort. Also, the number of supplements were taken at a single time was also associated with more side effects.

It is important to notify higher authorities on side effects associated with supplements use, to highlight the issue and prevent it for further cases. Through questionnaire we asked students about the step they take after they faced side effect. Nearly most of the respondents stopped the supplementation immediately and the remaining respondents did not repot anywhere and some of them consulted with the people surrounding them.

According to (Perez-Sanchez et al., 2019) research, dermatological or cosmetic supplements, also referred to as skin, hair, and nail vitamins, are gaining popularity. According to studies, more than 50% of Americans consume dietary supplements of some kind. The estimated valuation of the worldwide market for beauty supplements in 2016 was US$ 3.5 billion, and by 2024, it is expected to hit US$ 7 billion. Celebrities and social media promotion play a part in this growth. A total of 255 distinct chemicals were found on the supplement information labels for these products, according to research done on 176 supplements in December 2019. It has a total of 15 minerals and 14 vitamins. There were 188 different culinary extracts and plants found in all. 38 different compounds, including 10 microorganisms, were present in them. Animal products, amino acids, and hormones are all included in the ingredient "collagen," even though they are not mentioned separately. Numerous products had vitamin and mineral dosages that were significantly higher than the FDA's suggested daily limit.

The nutritional Supplements Health Education Act, which was established in 1994, is the body of law governing nutritional supplements. Despite the fact that there is no definitive inventory of chemicals used before 1994, the law expressly protects all ingredients used before it was passed. Additionally, even if we use raw components from before 1994, we cannot ensure safety. For instance, nutritional supplements containing ephedrine were prohibited in 2004 as a result of numerous adverse events that were recorded. A seal signifying third-party testing by recognized organizations, such as the Pharmacopeial Convention and the National Sanitation Foundation, was present on only 6 items (3.4%) in total. Nine biotin supplements, out of the entire group, had amounts that exceeded 10,000 mcg. None issued any cautions regarding potential cross-reactions with laboratory procedures. The acceptable upper intake limit, the necessity of taking into account dietary sources of nutrients, or pregnant caution categories were not mentioned in any of the dietary supplements. The hair product contained saw palmetto. Her 5-alpha reductase is inhibited by this substance. Concerns also exist regarding potential teratogenic hazards. The dangers of consuming many minerals in large doses have not been thoroughly investigated.

According to (AlTamimi, 2019) reported in their study that, The Saudi nutraceutical market is growing along with the number of Saudis consuming nutraceuticals. About 68% of adults in US adults were taking supplementation. But in 2013, Asia and pacific region was the largest nutritional supplement market for dietary supplements, which include 31.2% share of the global market. The Middle East, especially the gulf countries, is in increasing demand for supplements both organic and dietary. In Saudi Arabia, rapid population growth has accelerated market growth. The

study was conducted at King Abdul Aziz Hospital in Jeddah found that dietary supplement use was 22% (24% of whom were women) in a sample of patients. Usage is even higher, at 44.6% among medical students at Imam Abdul Rehman Bin Faisal University in Dammam, Saudi Arabia and is even more common in women university student 76.6% students at King Saud University. Less than half of the sample does not know about the adverse effect of these products. The aimed of this study was to demonstrate general perceptions of dietary supplement consumption among female students at Princess Noora bint Abdulrahman University, Riyadh, Saudi Arabia Most of the participants were taking supplementation for aesthetic effects such as for growing health hair and nails, and most likely to but it from drugstore. Most of the participant have a knowledge of dietary supplements and nearly half of the respondents get benefits from taking supplementation .Less than half of the participants take single vitamin as compared to the participants who take multiple types of dietary supplements.

Most participants accurately know the daily serving of fruits and vegetables. A secondary objective was to examine about the student daily intake of fruits and vegetables, if students are taking the recommended serving for fruits and vegetables or not. But most of the students use supplement as an alternative for vegies and fruit. To date, there are no studies examining both dietary supplement use and vegetable and fruit consumption in Saudi Arabia.

According to (Perez-Sanchez et al., 2020) a research was conducted on 176 supplements which use the word skin, hair, beauty and glow. Supplements were taken from seven stores drugs and cosmetic stores to check the supplement fact and beauty claim. The daily values, instruction regarding daily doses, information about allergen,

testing on seal quality and advertising claim. The daily values on the supplement fact were compared with FDA list 2016. Upon 44 (25%) products were found with old FDA values list established in 1968. Daily values of some nutrient which tend to have higher value are 10 and 18 were falls on the lower value. Some of the products from the sample use the old measurement unit.

On 12 (7%) products use different dosing instruction. Some of products create confusion about daily dose instruction, some products does not match the serving size with the daily values given on the fact of supplement. The samples products were also examine for third party by organization such as USP (U.S. Pharmacopiel Convention) and NSF (National Sanitation Foundation) only 6 product were such show such monogram. On the other hand contamination and adulteration of supplements has been tested. In lab testing 15 of the collagen were under examined out of which 1 product was contaminated with high levels of metal cadmium.

Under the sample some products mention allergen such as gluten free which is 69% in total sample, no artificial flavors 48% and in collagen supplements they use fish as a source in 10 products out of which 9 products didn't mentioned allergen. In their sample they were multiple health and beauty related claims. One of the most ordinary one was related to healthy skin, hair and nails which consist 32% of the sample products. (21%) of the products were used "beauty from inside out" and skin hydration related products were (16%), 16% promotes the anti-aging ,for support healthy growing skin and nails they were 12%, and 11% supports synthesis of collagen in the skin,10% products claims anti-wrinkles or wrinkle free. Claims uses the word "supports" and "helps" does not mean that these supplement can be used as an alternative of medical treatment.

FDA requires that statements must include a disclaimer when structure/function claims are made. It has not been evaluated by the FDA. In a collected sample of 176 supplements, there were 11 products with no disclaimer, out of which 4 don't need a disclaimer as they make no structural/functional claims remaining. However, seven dietary supplements made claims that could be considered either health or structural/functional expectations. If the claim is structural/functional in nature, the lack of a disclaimer US FDA regulation. Functional claims define the role of a nutrient and its effect on body's function" Examples of claims include "hair, skin and nails support "and, "Joint Support" etc. Supplements that claims to be "Helps support healthy hair and block DHT". The other claims was about gluten free 69%, dairy free were about 40% sugar free products were 20%.

On the difference between evidence-based treatment and advertising. Doctors need to prepare and educate patients about labeling and marketing of skin, hair and nail supplements and confusing products. Claims are common on these products, but these claims are often based on unsubstantiated or malnutrition use. Consumers are advised to look for products that have been third-party tested to ensure they are free of foreign substances and contaminants.

According to (Abd Ghani et al., 2020) research was conducted among university students in three universities of Tokyo with sample size 379. The study was conducted through an internet survey, Dietary Supplements, Sources, Aiming Employments, Recognitions, and Side Impacts. The overview concluded that 37.9% of understudies gotten more data, approximately dietary supplements, through the web. Pharmaceuticals and drug stores (40.2%) were the foremost well-known buyers. Dietary supplement

utilization was utilized 44.1% for wellbeing purposes and 21.8% for corrective purposes. Vitamin supplements are most utilized. The respondents are mindful for the utilization of dietary supplements.

This study thinks about centers on the Terengganu understudy populace. These thoughts are diverse from others. It comes about of each think about are distinctive due to distinctive foundations and characteristics. Translation of investigative goals. Items devoured as dietary supplements or substitutes too utilized for avoidance. It avoids malady, keeps up great wellbeing, and keeps up excellence reason and gives the body additional vitality. Numerous experts have verified that over half of the US population uses nutritional supplements. In expansion, increasingly individuals are utilizing dietary supplements. The Joined together States is on the rise and its rate is drawing closer 100%. Related with more prominent utilization of the foremost commonly expended VMS dietary supplements. Respondents were on vitamin C and multivitamins/micro minerals. Dietary supplements are expended for an assortment of reasons counting wellbeing, medicine and more. More vitality and charm. As a result, approximately a third of Malaysians are eat less supplement.

According to (Puścion-Jakubik, et al., 2021) research was conducted among young women. The authors evaluated consumption of selected antioxidant food ingredients, composition of body, lubrication and hydration of skin. 172 participants participated in the study. Using the Diet 6.0 program, component consumption of vitamins (A, C, D, E), minerals (Copper, manganese, and Zn" were analyzed, composition of body was assessed using electrical bio-impedance, and skin moisture was measured. Replenishment and lubrication were each assessed using cephalometric

methods. Sabermetric technology. Third of students were deficient in vitamin C, E and micro mineral Zn. The eyes, decollate and chin were the most hydrated. The areas with the highest amount of sebum were the nose and forehead. There is little favorable relationship between hydration and lubrication.

Human skin work as a boundary and isolates the body from surroundings. It's included in numerous forms such as digestion system and resistance. Capacities of thermoregulation and security against pathogenic microorganisms. This body can perform its capacities once it's hydrated in addition, the hydro fatty layer is appropriately joined. The condition of the skin depends on hereditary and natural components (slim down, smoking, climate conditions, etc. Numerous of these components can compound oxidation/reduction conditions. Extracellular and intracellular oxidative push caused by receptive oxygen species can lead to pigmentation and untimely maturing. Over the top introduction to bright (UV) light can quicken this preparation. An adjusted eat less ought to contain basic supplements, vitamins, minerals and all sorts of fixings that meet measures set by specialists. Fixings that play a part and have antioxidant properties are missing. An awkwardness in oxidation contributes to untimely maturing of the skin, skin break out, different skin diseases and straightened skin.

It can lead to illnesses such as lichen and unremitting venous ulcers. Leads to the arrangement of vitamin A and is included in security against oxidizing species, legitimate working of the resistant framework, cell division and changes, and upkeep of its claim structure, etc. It ought to be emphasized that it contributes to the ordinary upkeep of topical application of retinol can help decrease wrinkles. Advances the aggregation of hyaluronic corrosive in the epidermis. It is fundamental for hydration of skin. Retinoid

repress trans epidermal water misfortune (TEWL), move forward epidermal security, and anticipate collagen corruption. It can be a chemo preventive operator. Water soluble vitamin C, takes an interest in biosynthesis of collagen, and also contributes antioxidant security against UV harm.

Vitamin has tendency to neutralize the free radicals in polar circumstances. Writing information appears that it can ensure against the hazard of creating atherosclerotic injuries and coronary supply route malady. It is utilized both as a verbal supplement and as a topical treatment because of its boundary soundness and the skin-protective properties. Superoxide dismutase contains copper, a key protein included in this preparation of breaking down free radicals. It is included within the arrangement of bonds between “collagen” and “elastin”, and the blend of melanin, that colors hair and skin. The aforementioned nutritive ingredients and antioxidant properties have a favorable impact on the forms happening within the skin.

CHAPTER 3 RESEARCH METHODOLOGY

3.1. Research Design

This research was descriptive cross sectional study in which we conducted survey and collected data about prevalence of dietary supplements intake for aesthetic/beauty purpose. Survey was conducted in January 2023 and data was collected from female students of different universities in Pakistan.

3.2. Sampling Strategy

We selected sample through non probability convenience sampling technique and sample size is 400 female university students who were in the range of 16 – 35 years and use dietary supplements.

3.2.1. Inclusion and Exclusion Criteria

Inclusion criteria:	Exclusion criteria:
▪ Females ▪ Age 16 - 35 years old ▪ Students ▪ Dietary supplement users	▪ Male ▪ Females aged < 16 & >35 ▪ Non students ▪ Non supplement users ▪ For any specific disease(medical reason)

Table 1 Inclusion and Exclusion Criteria

3.3. Data Collection Tool

A physical and electronic well developed, modified and tested questionnaire were designed and fill from female students of different universities from all over the Pakistan to check the prevalence of dietary supplement intake for aesthetic/beauty purposes by asking different questions which includes demographic information (Age, university name, level of education), knowledge about dietary supplements, information based question includes (dietary supplements intake for aesthetic/beauty purpose, dietary supplements intake by oral route, which brand and supplement they use) and consumption pattern of dietary supplements includes (reasons for taking dietary supplements, kind/type of dietary supplements, brand and supplement name, who prescribe the supplements, where they purchase, quantity of supplementation at a time, regularity of supplementation per week, supplements usage for more than three months, benefits and continuation of consuming dietary supplement). By visiting the pharmacies, online websites, drug and cosmetic stores we checked the labelling claims (daily values according to FDA updated daily values, 3rd party approval for quality assurance, clear dosage instructions, allergen information and beauty claims) of top 35 beauty supplements which were commonly used by respondents.

3.4. Ethical Considerations

An informed consent were taken by every participants which includes the objectives of the research, their authorization of confidentiality and their acceptance or rejection to participate in the research study by their own willingness.

3.5. Statistical Procedure/Analysis Techniques

All the data which were collected by filled questionnaire and reading labelling of the supplements analyzed by using Statistical Package for the Social Sciences (SPSS) software version 22.0. The descriptive analysis tests perform that includes mean, frequencies and percentages of the variables and all the results have been mentioned in the form of tables and graphs.

CHAPTER 4 RESULTS

4.1. Demographic Information

Variable		Frequency	Percent
Age	**16 – 20**	111	27.8
	21 – 25	242	60.5
	26 – 30	40	10.0
	31 – 35	7	1.8
	Total	400	100.0

Table 2 Respondent's Age

Table 2 displays the respondent's age which participate in this research study. Out of 400 responses 111 participants fall in range of 16 – 20 years, 242 participants are in range of 21 – 25 years, 40 participants are in range of 26 – 30 years and 7 participants are in range of 31 – 35 years. (Mean age is 22.8)

Variable		Frequency	Percent
Level of Education	**Undergraduate**	301	75.3
	Master of Philosophy (MPhil)	95	23.8
	Doctor of Philosophy (PhD)	4	1.0
	Total	400	100.0

Table 3 Level of Education

Table 3 indicates that out of the total sample of 400, 301 respondents (75.3%) have an undergraduate level of education, 95 respondents (23.8%) have a Master of Philosophy (MPhil) level of education, and only 4 respondents (1.0%) have a Doctor of Philosophy (PhD) level of education.

4.2. Knowledge Based

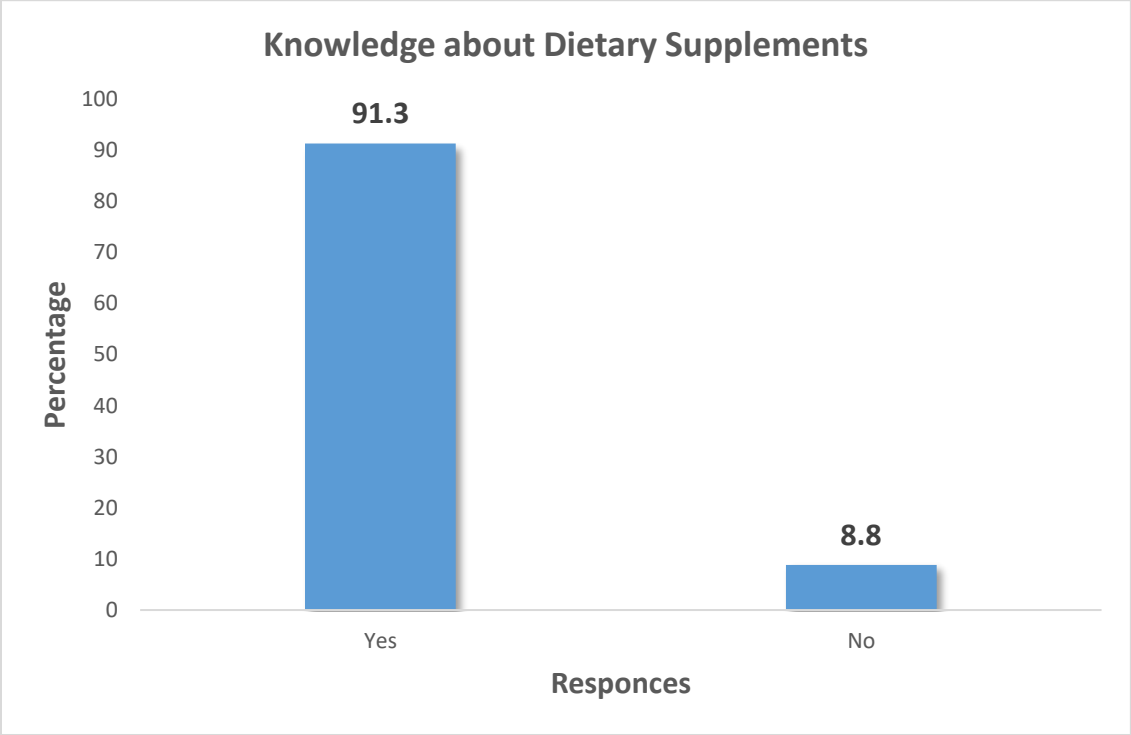

Figure 1 Knowledge about Dietary Supplements

Figure 1 shows the level of knowledge of targeted audience that they know about the dietary supplements. Out of the 400 respondents, 365 of them (91.3%) answered "Yes" indicating that they knew what dietary supplements are, while 35 respondents (8.8%) answered "No", indicating that they did not know what dietary supplements are. The percentages add up to 100%, indicating that all the respondents answered the survey question and there were no missing data.

4.3. Information Based

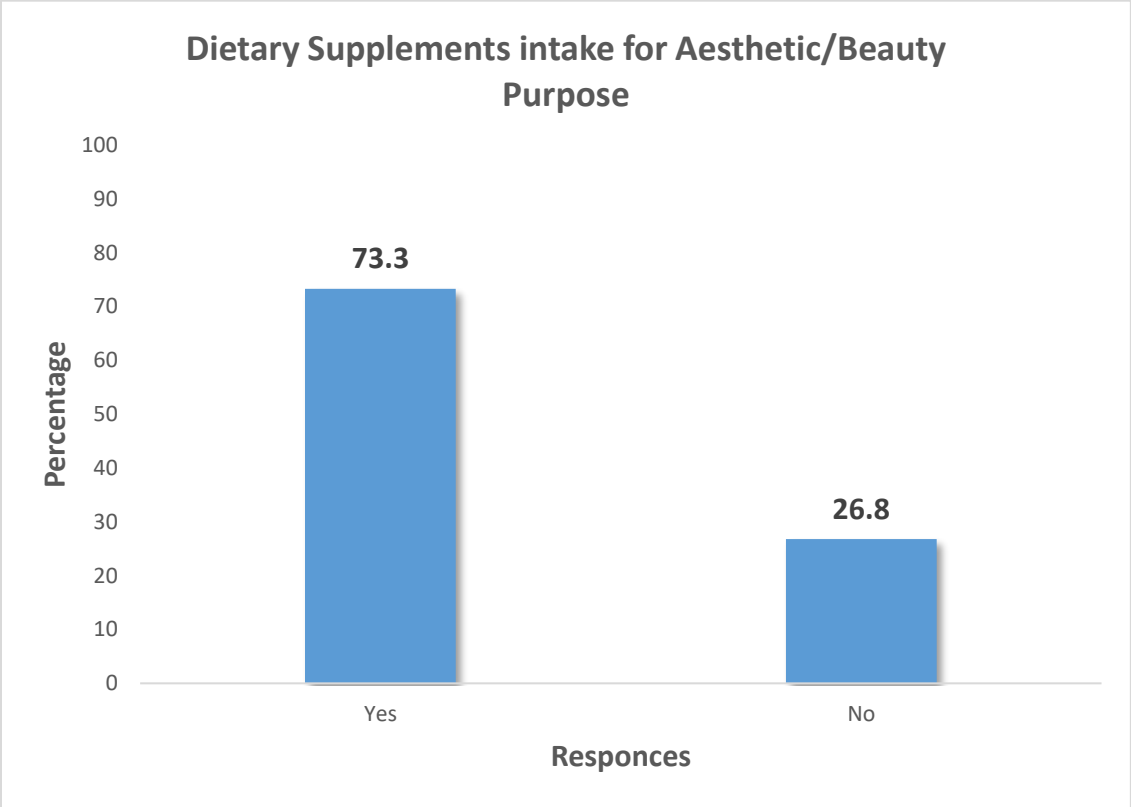

Figure 2 Dietary Supplements intake for aesthetic/beauty purpose

Figure 2 shows the results of whether the respondents take dietary supplements for aesthetic/beauty purposes. Out of the 400 respondents, 293 of them (73.3%) answered "Yes", indicating that they take dietary supplements for aesthetic/beauty purposes, while 107 respondents (26.8%) answered "No", indicating that they do not take dietary supplements for aesthetic/beauty purposes.

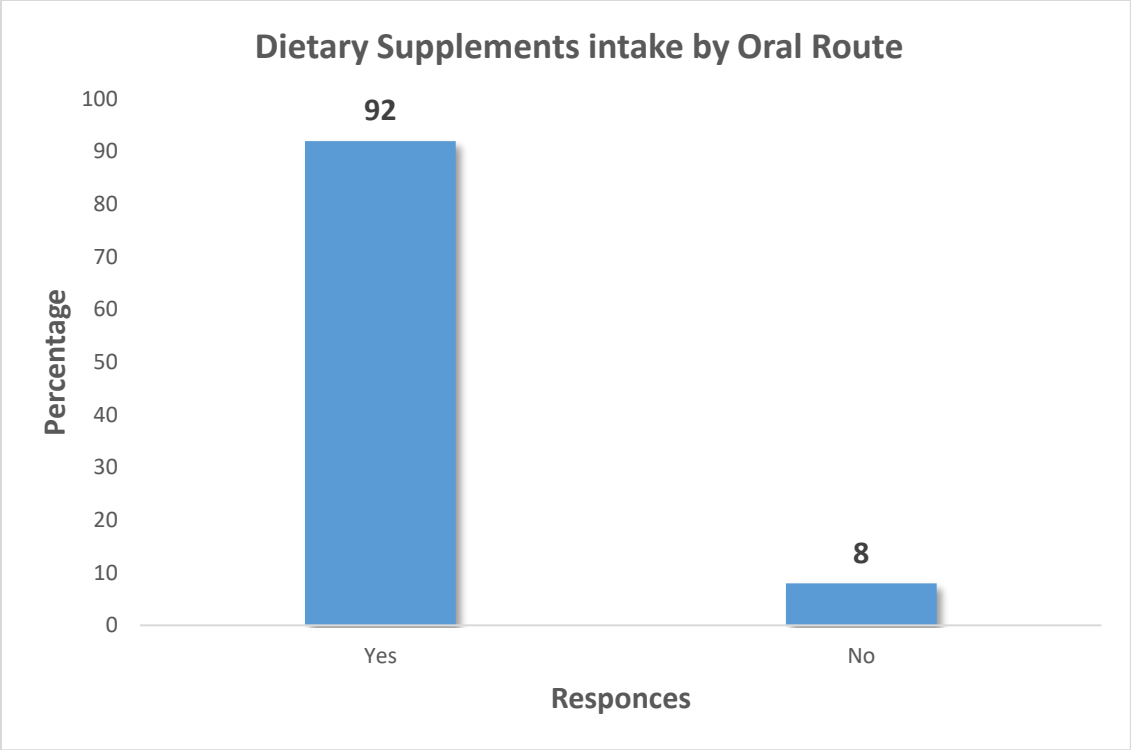

Figure 3 Dietary Supplements intake by Oral Route

Figure 3 shows that 368 of the respondents (92.0%) take dietary supplements orally, while only 32 respondent (8.0%) do not. This finding suggests that oral consumption is the most common method of taking dietary supplements among the surveyed population. This information could be useful for healthcare professionals, manufacturers, and marketers in designing and promoting dietary supplements in a form that is convenient and easily consumed by consumers.

4.4. Consumption Pattern of Dietary Supplements

Variable	Frequency	Percent
For glowing skin	72	18.0
For fair skin	23	5.8

Reason for taking Dietary Supplements	**For growing and healthy nails**	24	6.0
	For healthy hair	66	16.5
	Above all	110	27.5
	For any other	99	24.8
	Total	394	98.5
	Missing	6	1.5

Table 4 Reasons for taking Supplements

Table 4 shows the reasons why the respondents take dietary supplements. Out of the 394 respondents who provided valid responses, 72 respondents (18.0%) reported taking supplements for achieving glowing skin. 23 respondents (5.8%) of the respondents reported taking supplements for achieving fair skin. 24 respondents (6.0%) reported taking supplements for promoting the growth and health of their nails. 66 respondents (16.5%) reported taking supplements for promoting healthy hair. 110 respondents (27.5%) reported taking supplements for glowing skin, fair skin, growing and healthy nails and healthy hair. 99 respondents (24.8%) reported taking supplements for the general aim of improving overall well-being and health.

Variable		Number of responses	Percent
	Vitamin A	35	3.6%
	Vitamin C	227	23.5%
	Vitamin D	46	4.8%
	Vitamin E	110	11.4%
	Beta-carotene	4	0.4%
	B-Complex	34	3.5%

Kind of supplements normally consume	**B2 Riboflavin (alone)**	7	0.7%
	B5 Pantothenic acid (alone)	3	0.3%
	B6 Pyridoxine (alone)	5	0.5%
	B7 Biotin (alone)	108	11.2%
	B12 Cyanocobalamin (alone)	10	1.0%
	Collagen	55	5.7%
	Glutathione	68	7.0%
	Calcium	70	7.2%
	Folate	38	3.9%
	Iron	54	5.6%
	Magnesium	7	0.7%
	Phosphate	4	0.4%
	Potassium	6	0.6%
	Selenium	7	0.7%
	Zinc	52	5.4%
	Others	11	1.1%
	Missing	7	0.7%
	Total	968	100.0%

Table 5 Kind of Supplements normally consume

Table 5 shows that respondents were asked about the kind of supplements they normally consume, and they were allowed to select multiple options.

35 respondents (3.6%) reported consuming Vitamin A supplements. 227 respondents (23.6%) reported consuming Vitamin C supplements. 46 respondents (4.8%) reported

consuming Vitamin D supplements. 110 respondents (11.4%) reported consuming Vitamin E supplements. 4 respondents (0.4%) reported consuming Beta-carotene supplements. 34 respondents (3.5%) reported consuming B-Complex supplements. 7 respondents (0.7%) reported consuming B2 Riboflavin (alone) supplements. 3 respondents (0.3%) reported consuming B5 Pantothenic acid (alone) supplements. 5 respondents (0.5%) reported consuming B6 Pyridoxine (alone) supplements. 108 respondents (11.2%) reported consuming B7 Biotin (alone) supplements. 10 respondents (1.0%) reported consuming B12 Cyanocobalamin (alone) supplements. 55 respondents (5.7%) reported consuming Collagen supplements. 68 respondents (7.1%) reported consuming Glutathione supplements. 70 respondents (7.3%) reported consuming Calcium supplements. 38 respondents (4.0%) reported consuming Folate supplements. 54 respondents (5.6%) reported consuming Iron supplements. 7 respondents (0.7%) reported consuming Magnesium supplements. 4 respondents (0.4%) reported consuming Phosphate supplements. 6 respondents (0.6%) reported consuming Potassium supplements. 7 respondents (0.7%) reported consuming Selenium supplements. 52 respondents (5.4%) reported consuming Zinc supplements. 11 respondents (1.1%) reported consuming other kinds of supplements. It is important to note that since respondents were allowed to select multiple options, the whole amount of responses (961) which is greater than the total respondents (400).

	Variable	Frequency	Percent
Who prescribes the supplements	**Doctor/Nutritionist/Pharmacist**	218	54.5
	Over the Counter (without a prescription)	177	44.3

	Total	395	98.8
	Missing	5	1.3

Table 6 Prescription of Supplements

Table 6 shows that who prescribe the supplements. Out of the 395 respondents who provided valid responses, 218 respondents (54.5%) reported being advised to use dietary supplements by a healthcare professional such as a doctor, nutritionist, or pharmacist. 177 respondents (44.3%) of the respondents reported using dietary supplements without a prescription, likely purchased over the counter at a pharmacy or health food store.

Variable		Frequency	Percent
Where they purchase Supplements	**Pharmacies**	240	60.0
	Electronic websites	37	9.3
	Social media sites	58	14.5
	Stores where dietary supplements are sold	60	15.0
	Total	395	98.8
	Missing	5	1.3

Table 7 Purchase of Supplements

Table 7 shows that participants were asked about where they usually buy their dietary supplements. The data is presented in a frequency table with four valid options:

pharmacies, electronic websites, social media sites, and stores where dietary supplements are sold. The table also includes the number and percentage of participants who selected each option. 240 out of 395 participants (60%) reported buying dietary supplements at pharmacies. 37 participants (9.3%) reported buying dietary supplements on electronic websites. 58 participants (14.5%) reported buying dietary supplements on social media sites. 60 participants (15%) reported buying dietary supplements in stores where dietary supplements are sold. 5 participants did not respond to the question.

Variable		Frequency	Percent
Number of supplements actually taken	**1**	295	73.8
	2	64	16.0
	3	19	4.8
	More	8	2.0
	Total	386	96.5
	Missing	14	3.5

Table 8 Number of Supplements at a time

Table 8 aims to investigate the number of dietary supplements that participants usually consume at the same time. The frequency and percentage of responses are provided in the table. The majority of respondents (73.8%) reported taking only one dietary supplement at a time, while 16.0% reported taking two, 4.8% reported taking three, and 2.0% reported taking more than three. The interpretation of this data could be used to inform recommendations for safe and effective use of dietary supplements.

Variable		Frequency	Percent
Frequency of taking supplements	**>5**	106	26.5
	2 – 5	143	35.8
	<2	137	34.3
	Total	386	96.5
	Missing	14	3.5

Table 9 Frequency of taking Supplements

Table 9 shows the interpretation for the frequency of taking supplements per week is as follows: The data shows that out of 386 respondents, the majority take dietary supplements 2-5 times per week (35.8%), followed by those who take them less than 2 times per week (34.3%). Additionally, 26.5% of respondents reported taking more than five times a week. The question had a 3.5% missing rate with 14 respondents not providing an answer.

Variable		Frequency	Percent
Usage of supplements more than 3 months	**Yes**	67	16.8
	No	257	64.3
	Sometimes	62	15.5
	Total	386	96.5
	Missing	14	3.5

Table 10 Usage of Supplements for more than 3 months

Table 10 shows the frequency of dietary supplements usage for 3 months. Out of the 386 respondents, 257 (64.3%) answered "No", indicating that they do not usually take dietary supplements continuously beyond three months without seeking medical

guidance. 67 (16.8%) respondents answered "Yes", indicating that they do usually take dietary supplements continuously beyond three months without seeking medical guidance. 62 (15.5%) respondents answered "Sometimes", indicating that they do not always follow medical advice when taking dietary supplements.

Variable		Frequency	Percent
Benefits of supplements	**Yes**	282	70.5
	No	36	9.0
	I don’t know	68	17.0
	Total	386	96.5
	Missing	14	3.5

Table 11 Benefits of taking Supplements

Table 11 aims to investigate that participants noticed benefits from taking supplements. Out of 386 respondents, 282 (70.5%) answered "Yes", 36 (9.0%) answered "No", and 68 (17.0%) answered "I don't know". This suggests that the majority of participants perceive some kind of benefit from taking dietary supplements, while a smaller proportion reported no benefits and a significant number were uncertain about the effects.

Variable		Frequency	Percent
Continuity of supplements	**Yes**	160	40.0
	No	35	8.8
	When necessary	191	47.8
	Total	386	96.5

	Missing	14	3.5

Table 12 Continuity of taking Supplements

Table 12 asking about the continuity of taking supplements. Out of the 386 respondents, 160 (40.0%) indicated that they will buy dietary supplements again in the future, while 35 (8.8%) said they will not. The majority of the respondents, 191 (47.8%), said they will buy dietary supplements again when necessary. There were 14 missing responses.

4.5. Labeling Claims

Variable		Frequency	Percent
Updated daily values	**No**	30	85.7
	Yes	5	14.3
	Total	35	100.0

Table 13 Updated Daily Values

Table 13 shows that 30 beauty supplements (85.7%) do not update their daily values according to the FDA, while 5 beauty supplements (14.3%) update their daily values according to the FDA.

Variable		Frequency	Percent
3rd party approval for quality assurance	**No**	5	14.3
	Yes	30	85.7
	Total	35	100.0

Table 14 3rd party Approval for Quality Assurance

Table 14 shows that 3rd party approval for quality assurance. 5 beauty supplements (14.3%) out of 35 are not approved by 3rd party for quality assurance and 30 beauty supplements (85.7%) are approved by 3rd party for quality assurance.

Variable		Frequency	Percent
Clear dosage instructions	**No**	12	34.3
	Yes	23	65.7
	Total	35	100.0

Table 15 Clear Dosage Instructions

Table 15 shows that dosage instructions of beauty supplements. 12 beauty supplements (34.3%) do not give clear dosage instructions and 23 beauty supplements (65.7%) give clear dosage instructions.

Variable		Frequency	Percent
Allergen information	**No**	35	100.0

Table 16 Allergen Information

Table 16 aims to investigate the allergen information on beauty supplements. All beauty supplements do not give any allergen information on their labels.

Variable		Number of Supplements	Percent
	For Healthy, Glowing Skin	22	24.4%

Beauty Claims	**For Strong, Shiny & Growing Nails**	17	18.9%
	For Healthy, Lustrous & Strong Hair	17	18.9%
	For Brightening & Whitening of Skin	13	14.4%
	Promotes Collagen Synthesis	2	2.2%
	Promotes Skin Hydration	3	3.3%
	Promote Antioxidant Status	6	6.7%
	Without Beauty Claims	10	11.1%
	Total	90	100.0%

Table 17 Beauty Claims

Table 17 shows the frequencies and percentages of different beauty claims of beauty supplements. The most common claims were "For Healthy, Glowing Skin" (24.4%), "For Strong, Shiny & Growing Nails" (18.9%), and "For Healthy, Lustrous & Strong Hair" (18.9%). Other claims included "For Brightening & Whitening of Skin" (14.4%), "Promotes Collagen Synthesis" (2.2%), "Promotes Skin Hydration" (3.3%), and "Promote Antioxidant Status" (6.7%). Additionally, 10 supplements (11.1%) did not make any beauty claims.

CHAPTER 5 DISCUSSION AND LIMITATIONS

5.1. Discussion

We collect responses from 67 different universities of Pakistan, total sample size of study is 400 out of which 19 is incomplete and then total responses is 381. The mean age of our sample is 22.8 years. Level of education of all these responses are undergraduate, M.Phil. and PhD.

The results of research show that 91.3% respondents have knowledge about dietary supplements and 8.8% do not have knowledge about dietary supplements. In 2017, study reported that intended use of dietary supplements were examined. Students who used nutritional supplements were designed to provide nutrients to enhance their diet (59.0%) [3]. In 2019 study reported that 89.9% correctly defined the dietary supplements [2].

Result shows that most of the participants 73.3% confirm that they take dietary supplements for aesthetic purposes and 26.8% take dietary supplements for other purposes (for health and any other). In 2019, study reported that 45.6% took dietary supplements for aesthetic purpose and 42.4% took for health purpose [2]. In 2020, study reported that 21.8% took dietary supplements for beauty purpose and 44.1% for maintenance of health [1]. In 2017, 36.7% participants took dietary supplements for beauty benefits and 52.9% for maintenance of health [3].

92.0% respondent’s shows that they take dietary supplement orally but 8.0% do not take dietary supplements by oral route. So study confirms that the most common

method of taking dietary supplements for (aesthetic/beauty purposes) is orally. This information could be useful for healthcare professionals, manufacturers, and marketers in designing and promoting dietary supplements in a form that is convenient and easily consumed by consumers.

Result shows that 18.0% participants take dietary supplements for glowing skin, 5.8% for fair skin, 6.0% for growth and health of their nails, 16.5% for hair growth and health. Most ordinary one is 27.5% for glowing skin, fair skin, growing and healthy nails and healthy hair. 24.8% respondents shows that they used dietary supplements for general purpose (promoting of heath).

54.5% reported that they use supplements by prescription of doctor and health care and 44.3% reported they use supplements over the counter. In 2020, study reported that 21.8% were used for beauty purpose dietary supplements prescribe by healthcare professional such as a doctor, nutritionist, or pharmacist were 54.5% and the respondents which used dietary supplements without prescription or over the counter are 44.3% [1]. In 2019, study reported that participants purchased supplements from pharmacies were 67.9%, additionally from online and social media platforms were 3.7%, (43.6%) participant's advice from doctor [2].

The percentage of respondents buy supplements from pharmacies is 60%, the respondents buy supplements from electronic website are 9.3%, respondents buy supplements from social media sites are 14.5% and 15.0% buying from stores where dietary supplements are sold. In 2017, study reported that most of students were buying dietary supplements from pharmacies (63.7%), internet (19.6%), and close relatives

(14.8%), mail order (12.1%) or retail [3]. Moreover in 2020, study reported that 40.2% people were taking supplements from pharmacies, internet stores 12.5%, shopping centers 10.5%, family and friends 10.1% and 5.9% respectively [1].

Result shows that the number of supplements taking at a time. 73.8% participants take 1 supplement, 16.0% take 2 supplements, 4.8% take 3 supplements and 2.0% take more than 3 supplements at a time. In 2019, study reported that 32.6% participants were taking more than one supplements at a time [2].

Results show the frequency of taking supplements per week. 35.8% participants take dietary supplements 2-5 times per week, 34.3% take supplementation less frequently than twice a week and 26.5% take supplementation minimum of five days per week. In 2019, study reported that 35.1% took supplementation 5 or more times a week and 34.7% took supplementation minimum of 2 times a week [2].

In our research, results show that the supplements intake for more than 3 months. 64.3% participants' shows that they do not use supplementation in excess of three months, 16.8% use supplementation in excess of three months, furthermore 15.5% sometimes taking supplementation in excess of three months. In 2019, study reported that 66.4% respondents reported that they were taking dietary supplements regularly and without interruption [2].

Results shows that 70.5% feel benefits by taking supplements, 9.0% do not feel any benefit and 17.0% are confused about that they feel any benefit from taking supplements. In 2019, study reported that 70.5% participants said supplements are

effective and 17.0% said they did not show effectiveness [2]. Another study in 2019 reported that 58.9% said using the supplement gave those benefits and effects [2].

Results show that 40.0% will buy in future, 8.8% will not buy in future 47.8% said that they will buy dietary supplements when it is mandatory. In 2019, study reported that 53.4% participants confirmed that they purchased supplements in future when necessary while 35.7% will continue in future [2].

3.6% confirms that they consuming Vitamin A, 23.6% consuming Vitamin C, 4.8% consuming Vitamin D, 11.4% respondents Vitamin E, and 0.4% consuming Beta-Carotene supplements 3.5% consuming B-Complex supplements, 0.7% consuming B2 Riboflavin (alone) supplements, 0.3% consuming B5 Pantothenic acid (alone) supplements. 0.5% consuming B6 Pyridoxine (alone) supplements, 1.0% consuming B12 Cyanocobalamin (alone) supplements.11.2% consuming B7 Biotin (alone) supplements, 0.5% consuming B6 Pyridoxine (alone) supplements. 11.2% consuming B7 Biotin (alone) supplements. 1.0% consuming B12 Cyanocobalamin (alone) supplements. 5.7% consuming Collagen supplements. 7.1% consuming Glutathione supplements. 7.3% consuming Calcium supplements. 4.0% consuming Folate supplements. 5.6% consuming Iron supplements. 0.7% consuming Magnesium supplements. 0.4% consuming Phosphate supplements. 0.6% consuming Potassium supplements. 0.7% consuming Selenium supplements. 5.4% consuming Zinc supplements. 1.1% consuming other kinds of supplements. In 2020 study reported that the most common supplements taken by respondents was vitamins 37.2%. Mineral supplementations were the other type of supplements used by respondents (10.9%) [1]. In 2017, study reported that frequently

consumed supplementation among participants were vitamin supplementations 22.9% and the other were mineral supplementations 17.8% [3].

In second part of the research, where the labelling claims of the beauty supplements are checked according to standards. Table 19 listed 70 supplements which include beauty supplements and health supplements but we consider those 35 beauty supplements which are more commonly used among people and give us full information about both the supplements and brand names. Then we visited the pharmacies, online websites of different brands to check the labels of the supplements.

We read the labels and check the daily values according to FDA, 3rd party approval for quality assurance, clear dosage instruction, allergen information and beauty claims.

Daily values

From the sample of 35 supplements, 30 beauty supplements (85.7%) have not updated daily values according to FDA and only 5 beauty supplements (14.3%) have updated daily values [4]. In 2020, 44 products (25%) were found with old FDA values list established in 1968. Daily values of some nutrient which tend to have higher value are 10 and 18 were falls on the lower value [6].

3rd party approval for quality assurance

5 beauty supplements (14.3%) are not approved and 30 beauty supplements (85.7%) are approved from third party for quality assurance by showing stamps of organization on their product. In 2020 the samples products were also examine for third party by organization, only 6 product were show such monogram [6].

Clear dosage instructions

From the total 35 beauty supplements, 12 supplements (34.3%) are lack of dosage instructions and do not give the proper and clear instructions about dose of the supplements while 23 supplements (65.7%) are provided the clear daily dosage instruction on supplement fact. In 2020, 12 products (7%) used different dosing instruction. Some of products were created confusion about daily dose instruction, some products does not match the serving size with the daily values given on the fact of supplement [6].

Allergen information

All the beauty supplements (100%) from our sample do not provide any information regarding allergen. In 2020, some products mentioned allergen such as gluten free which was 69% in total sample, no artificial flavors 48% and in collagen supplements they use fish as a source in 10 products out of which 9 products didn't mentioned allergen [6].

Beauty supplements labeling claim

Among our sample there are multiple beauty claims. The most usual one is; For Healthy, Glowing Skin" (24.4%), "For Strong, Shiny & Growing Nails" (18.9%), and "For Healthy, Lustrous & Strong Hair" (18.9%). Other claims included "For Brightening & Whitening of Skin"(14.4%), "Promotes Collagen Synthesis" (2.2%), "Promotes Skin Hydration"(3.3%), and "Promote Antioxidant Status" (6.7%). In addition, 10 respondents (11.1%) reported using beauty supplements that do not make any beauty claims. In 2020, there were multiple health and beauty related claims. One of the most ordinary one was

related to healthy skin, hair and nails which consist 32% of the sample products. (21%) of the products were used “beauty from inside out” and skin hydration related products were (16%), (16%) promotes the anti-aging ,for support healthy growing skin and nails they were (12%), and (11%) supports synthesis of collagen in the skin, (10%) products claims anti-wrinkles or wrinkle free. Claims uses the word “supports” and “helps” did not mean that these supplement can be used as an alternative of medical treatment [6].

5.2. Limitations

a) Our study did not include male participants.

b) Only university students were included.

c) People aged less than 16 and more than 35 were not included.

CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

A survey was conducted in which we explored the prevalence of dietary supplements intake for aesthetic/beauty purpose in female university students and the results found that the majority of our sample population which includes young female university students (age ranges 16-35) buy prescribed supplements from pharmacies and take them orally for aesthetic/beauty purposes. Majority take one supplement at a time and for 2-5 days per week. Total 70 supplements and brand names were obtained, out of which 35 are most commonly used supplements for glowing, hydrating, fair skin and for healthy, growing nails and hair. More than half percentage of people do not take supplements for more than 3 months. Our research results reported that people consider these supplements useful for aesthetic/beauty purposes so, they will purchase them again in future when they want to purchase. Most commonly used kind of supplements are vitamin C, vitamin E and biotin. According to our study results about labelling claims, majority claims about healthy and glowing skin, strong, shiny hair & nails. Most of the supplement's values are not according to the updated FDA approved daily values. Almost all supplements have 3rd party approval for quality assurance. More than half supplements have clear dosage instructions while all of the studied supplements do not mention any allergen information.

6.2. Recommendations:

For future implications,

a) Our study results will help people understand the usage of dietary supplements for aesthetic purposes.
b) To check about the labelling factors of different brands.
c) Its will help people to understand which kind of supplements are most commonly used for beauty purpose and also their effectiveness.
d) To check efficacy of supplements for beauty purpose.

APPENDICES

Appendix 1

University Names	Frequency	Percent
COMSATS Institute of Information Technology Lahore	15	3.8
University of Engineering and Technology	5	1.3
University of Health Sciences	1	0.3
University of the Punjab	12	3
University of Veterinary and Animal Sciences	8	2
Virtual University of Pakistan	4	1
Avicenna Medical College	4	1
NUR International University	4	1
Lahore College for Women University	3	0.8
Institute for Art and Culture	3	0.8
University of Lahore	9	2.3
Bahria University, Lahore	11	2.8
SCAFA (School of Culinary And Finishing Arts)	3	0.8
University of Lahore Gujrat Campus	3	0.8
Women University Multan	2	0.5
University of Central Punjab	12	3
University of Sargodha	3	0.8
Shalamar Medical & Dental College	3	0.8
Bahauddin Zakariya University	3	0.8
Government College University Lahore	16	4
Minhaj University Lahore	3	0.8
The University of Faisalabad	4	1
University of Agriculture Faisalabad	1	0.3
Institute of Chartered Accountants of Pakistan	3	0.8
Liaquat University of Medical and Health Sciences	4	1
Pir Mehr Ali Shah Arid Agriculture University	3	0.8
Superior University	8	2
Riphah International University	13	3.3
CPE – Center For Professional Excellence	1	0.3
University of Education	5	1.3

Muhammad Nawaz Shareef University of Agriculture	2	0.5
Ziauddin University Karachi	1	0.3
Virtual University of Pakistan	1	0.3
Amna Inayat Medical College	3	0.8
Fatima Jinnah Dental College, Karachi	2	0.5
Jinnah Sindh Medical University	3	0.8
Air University Islamabad	1	0.3
Iqra University	1	0.3
Hussain College of Health Sciences Lahore	1	0.3
Gulab Devi Educational Complex	2	0.5
University of Home Economics	1	0.3
The Physio College of Rehabilitation Sciences Multan	2	0.5
National College of Business Administration & Economics (NCBAE)	1	0.3
University of Lahore Islamabad campus	6	1.5
Islamia University of Bahawalpur	2	0.5
Gomal University	1	0.3
University of South Asia	2	0.5
Government College University Faisalabad	5	1.3
Sargodha Medical College	2	0.5
COMSATS Institute of Information Technology Vehari	5	1.3
Kinnaird College for Women	14	3.5
Shaikh Zayed Medical College Rahim Yar Khan	7	1.8
Forman Christian College (A Chartered University)	22	5.5
Beacon house National University	18	4.5
Akhtar Saeed Medical and Dental College	15	3.8
FAST National University of Computer and Emerging Sciences	10	2.5
Pakistan Institute of Fashion and Design	10	2.5
Nishtar Medical University Multan	15	3.8
Laeeque rafiq institute of health sciences, Multan	1	0.3
Allama Iqbal Medical College Lahore	3	0.8
University of Management and Technology	40	10
Fatima Jinnah Medical University	1	0.3
Government College Women University Faisalabad	1	0.3

Riphah International University Islamabad Campus	3	0.8
University of Lahore Islamabad Campus	1	0.3
Lahore University of Management Sciences	13	3.3
Aga Khan University Karachi	11	2.8
Total	398	99.5
Missing	2	0.5
Total	400	100

Table 18 Universities participate in Research

		Number of Responses	**Percentage**
Brand and Supplements Name	Nutrifactor	91	18.70%
	No	33	6.80%
	Nutrifactor (Biotin Plus)	18	3.70%
	Merck (Evion)	18	3.70%
	Nutrifactor (Dermazon)	14	2.90%
	GSK	13	2.70%
	Serum	13	2.70%
	Abbott	12	2.50%
	Nutrifactor (Butex)	11	2.30%
	Nutrifactor (Maxzoom)	11	2.30%
	Nutrifactor (Grape C)	11	2.30%
	Viviscal (Hair Growth)	10	2.10%
	Nutrifactor (Glutafair)	9	1.80%
	GNC (Collagen)	9	1.80%
	Nutris (Gluthen)	9	1.80%
	Abbott (Cecon)	8	1.60%
	Nutrex Labs (Nutra White)	7	1.40%
	Surbex Z	7	1.40%
	Herbiotics (Biotin)	7	1.40%
	Cac1000Plus	7	1.40%
	Retain (HNS)	7	1.40%
	Nutra Whiz (Epiwhiz)	7	1.40%
	Centrum (Multi+Beauty)	6	1.20%
	Biolotric (Glutamine)	6	1.20%
	Nutris (Biotris)	6	1.20%
	Nature Bounty (Clear Complexion Gummies)	6	1.20%
	GSK (Revitale)	6	1.20%
	Nutrifactor (Gencell)	6	1.20%

	Nature Bounty (Skin, Hair, Nail Gummies)	6	1.20%
	NeoCell (Collagen)	6	1.20%
	Surbex T	6	1.20%
	Nutrix Health Care (Epivit)	6	1.20%
	Derma Care (Himalaya)	6	1.20%
	Gumi Plus (Hair, Skin, Nail Gummies)	6	1.20%
	Searle (Vitrum)	5	1.00%
	Nutrex Labs (Nutra C)	5	1.00%
	AlphaPharm (Alpha Hair and Nail)	5	1.00%
	Sundown Naturals (Hair, Skin, Nail)	5	1.00%
	Nutrifactor (Glutazon)	4	0.80%
	Nutrix Health Care (Biotin)	4	0.80%
	Herbiotics (Herbifactor)	4	0.80%
	Nutrifactor (Extra C)	3	0.60%
	Herbiotics (White-Vit)	3	0.60%
	Nature Bounty (Biotin)	3	0.60%
	Qalsan D	3	0.60%
	Sundown Naturals (Biotin)	3	0.60%
	Vitamin D3	3	0.60%
	Iberet Folic	3	0.60%
	Sundown Naturals VitaminD3	2	0.40%
	Biolotric (Biotin)	2	0.40%
	Folic acid	2	0.40%
	Calcium Supplements	2	0.40%
	NeoCell (Beauty Builder)	2	0.40%
	D sun	2	0.40%
	Eagle	2	0.40%
	Polymalt Tab	2	0.40%
	Vidaliein	1	0.20%
	Hiton Pharma	1	0.20%
	Sangobion	1	0.20%
	Vis plus	1	0.20%
	Ferrosoftiron	1	0.20%
	Medifer	1	0.20%
	Rubifer	1	0.20%
	NeoCell (Biotin)	1	0.20%
	GNC (Biotin)	1	0.20%
	Sunny D	1	0.20%
	Nature Valley	1	0.20%
	Gumi Plus (Cleanse and Boost)	1	0.20%

	Nature Bounty Gummies	1	0.20%
	Herbiotics Folic Acid	1	0.20%
	Missing	19	4.8%
	Total	487	100.00%

Table 19 Brand and Supplement Names

Appendix 2

Consent Letter

PREVALENCE OF DIETARY SUPPLEMENTS INTAKE FOR AESTHETIC/BEAUTY PURPOSES IN FEMALE UNIVERSITY STUDENTS AND EVALUATION OF LABELLING CLAIMS

PURPOSE OF STUDY

You are being asked to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information.

The purpose of this study is to find the prevalence of dietary supplements intake for aesthetic/beauty purposes among female university students.

Participant's Initials: _____

CONFIDENTIALITY

Your responses to this survey will be anonymous. Every effort will be made by the researcher to preserve your confidentiality.

VOLUNTARY PARTICIPATION

- Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study.
- If you decide to take part in this study, you will be asked to sign a consent form.
- After you sign the consent form, you are still free to withdraw at any time and without giving a reason.
- Withdrawing from this study will not affect the relationship you have, if any, with the researcher
- If you withdraw from the study before data collection is completed, your data will be destroyed.

CONSENT

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant signature _____ Date _____

Appendix 3

RESEARCH QUESTIONNAIRE

Name: _____ **Date:** _____

Please read each question carefully and mark your answer by putting an ✓ in the box beside your answer, or by writing an answer on the line provided.

Q No 1. What is your Age?

□ 16 – 20

□ 21 – 25

□ 26 – 30

□ 31 – 35

Q No 2. University Name.

_____

Q No 3. What is your level of education?

□ Undergraduate

□ Master of Philosophy (MPhil)

□ Doctor of Philosophy (PhD)

Q No 4. Do you know what dietary supplements are?

□ Yes

□ No

Q No 5. Do you take dietary supplements for aesthetic/beauty purpose?

□ Yes

□ No

Q No 6. Do you take dietary supplements orally?

□ Yes

□ No

Q No 7. Why do you take dietary supplements?

□ For glowing skin

□ For fair skin

□ For growing and healthy nails

□ For healthy hair

□ Above all purpose

□ For any other

Q No 8. Who advised you to use dietary supplements?

□ Doctor / nutritionist/ Pharmacist
□ Over the counter (without a prescription)

Q No 9. Where do you usually buy dietary supplements?

□ Pharmacies

□ Electronic websites

□ Social media sites

□ Stores where dietary supplements are sold

Q No 10. What kind of supplements do you normally consume?

(Choose one or more)

□ Vitamin A

□ Vitamin C

□ Vitamin D

□ Vitamin E

□ Beta-carotene

□ B-Complex Supplements

□ B2 (Riboflavin) alone

□ B5 (Pantothenic acid) alone

□ B6 (Pyridoxine) alone

□ B7 (Biotin) alone

□ B12 (Cyanocobalamin) alone

□ Collagen

□ Glutathione

□ Calcium

□ Chromium

□ Folate

□ Iron

□ Magnesium

□ Phosphate

□ Potassium

□ Selenium

□ Zinc

□ Others

Q No 11. Mention the brand & supplement name.

_____

Q No 12. How many dietary supplements do you usually take at the same time?

□ 1

□ 2

□ 3

□ More

Q No 13. How many times per week do you take dietary supplements?

□ >5

□ 2-5

□ <2

Q No 14. Do you usually continuously take them for more than three months without medical advice?

□ Yes

□ No

□ Sometimes

Q No 15. Have you noticed benefits from taking supplements?

□ Yes

□ No

□ I don't know

Q No 16. Will you buy them again in the future?

□ Yes

□ No

□ When necessary

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