2023-2025

Muhammad Bilal Aslam

SU91-MSAHW-S23-224

FAHS

Unveiling the Role of High Glycemic Diets on Acne Formation

SUPERIOR UNIVERSITY

Thesis Submitted to

The Superior University Lahore

In Partial Fulfillment of the

Requirement for the Degree of

Master of Science in Allied Health Sciences

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No part of this thesis has been submitted anywhere else for any other degree. This thesis is submitted to the Faculty of Allied Health Sciences, The Superior University, Lahore in partial fulfillment of the requirements for the degree of Master of Science in the field of "**Allied Health Sciences"** in Faculty of Allied Health Sciences at The Superior University, Lahore.

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DEDICATION

This research report is dedicated to my parents and siblings. People who never stop believing in me and who along **ALLAH ALMIGHTY** have been me

"FOOTPRINTS IN THE SAND"

It starts with giving thanks to **Allah Almighty** acknowledging the divine support and direction that made the scholastic path easier. The dedication then pays tribute to the **parents,** whose unselfish love, support, and sacrifices have greatly influenced the person's accomplishment. It also acknowledges the important role that **mentors and teachers** play in inspiring a love of learning and sharing their knowledge. Lastly, the dedication expresses gratitude to friends, family, and coworkers who have supported and encouraged the academic endeavor.

ACKNOWLEDGEMENT

In the name of Allah ,the most Gracious, the most Merciful. I am extremely thankful lot Almighty ‘Allah ‘Who is the entire source of knowledge and wisdom endowed to mankind ,for providing me with the acumen a division to complete this endeavor.

"I am deeply grateful to my ,Supervisor **Dr.Muhammad Adnan Hafeez** for their expert guidance and unwavering support throughout my MS AHS program. I also extend my sincere appreciation to the Head of Department, MS AHS **, Dr.Hafiz Shehzad Muzammil** for their leadership and facilitation, which enabled me to access the necessary resources and infrastructure. Their collective support has been instrumental in shaping my academic journey, and I am thankful for their contributions."

I would like to express my heartfelt gratitude to my family and friends, who have been my pillars of strength throughout this journey. Their unwavering support, encouragement, and love have helped me overcome countless challenges. I am forever grateful for their presence in my life. Thank you for believing in me and helping me achieve my dreams."

Muhammad Bilal Aslam

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LIST OF ABBREVIATIONS

HOMA IR	Homeostatic Model Assessment Insulin Resistance
GI	Glycemic Index
GL	Glycemic Load
AV	Acne Vulgaris
PCOS	Polycystic Ovary Syndrome
BMI	Body Mass Index
GAGS	Global Acne Grading System
FDA	Food and Drug Administration

ABSTRACT

Background: Acne vulgaris represents a commonly occurring dermatological issue which affects substantial population sections particularly among young people and teenagers. Studies now reveal that food consumption plays an essential part in acne development because high GI diets tend to contribute to this condition. The high consumption of refined carbohydrates together with processed foods in Western-style diet has been associated with greater acne prevalence. The science still has questions about how high GI diets affect acne and how closely these dietary factors relate to acne development.

Objective: This study aims to unveil the role of high glycemic diets in acne formation among university-going adults. By assessing dietary patterns and acne prevalence, this research seeks to establish a correlation between high GI food consumption and the severity and distribution of acne lesions.

Methodology: A cross-sectional investigation was carried out at Punjab University and Superior University and also included subjects from Government College University Lahore and the University of Lahore. The research incorporated random selection which yielded participants within the 18 to 30 years age range. Specific data was gathered through questionnaires about diet alongside dermatological evaluations of participants. Acne severity together with acne type and location was recorded while statistical evaluations examined how high glycemic intake influenced acne formation.

Results: Research data showed that a high consumption of glycemic foods resulted in a stronger relationship with acne development rates. Acne affected more participants who consumed high levels of glycemic food ($p=0.003$) and these participants showed worse acne severity ($p=0.006$) with acne mostly appearing on their faces (85%, $p=0.025$). The research demonstrated significant findings about acne type distributions as blackheads (28%) and whiteheads (30%) and bumps (19%) along with nodules (23%) stood out as the main acne presentations. Statistical data ($p=0.001$) showed that females presented a higher incidence of acne at 57% than males who had 43% prevalence. The study found that 53% of participants formed acne with severe acne affecting 48% among the examined cohort.

Conclusion: The investigation shows conclusive evidence that diets high in glycemic index lead to acne development while increasing its intensity and map it to specific spots on the body. Acne symptoms become worse when patients consume excessive refined carbohydrates and sweet foods because these items enhance insulin resistance and sebum production along with inflammation. Researchers should perform interventional studies to verify cause-effect relations while studying dietary guidelines as alternative treatments for acne.

Keywords: Acne vulgaris, high glycemic index, diet, insulin resistance, dermatology, dietary patterns, acne severity.

Chapter1

INTRODUCTION

The medical condition called Acne vulgaris or acne exists widely throughout Western cultures where it impacts most of teenage populations and studies indicate its occurrence between 79% to 95% of this group. About half of people from 25 years or older suffer from facial acne according to studies which show that 40% to 54% have acne and 12% of women and 3% of men experience ongoing clinical acne in middle age. Studies show that acne occurs at lower frequencies among populations not influenced by Western traditions demonstrating environmental and cultural factors might affect its frequency(1).

The Brazilian acne prevalence rate reaches 96% in urban regions but remains at 2.7% in the tropical Purus Valley according to rural statistics. Epidemiological research reveals that the risk of acne tends to grow when people shift from lower-income to higher-income countries. Acne functions as a disease specific to Western cultures which develops through diet-related elements of Western lifestyles (2).

Acne vulgaris exists as a common skin illness that impacts approximately 85% of young people together with adolescents across worldwide populations. Acne Vulgaris proves to be the most common skin condition affecting people in society since roughly 11% of patients experience moderate to severe form of the disorder. Acne impacts almost every teenager and fifty percent of people sustaining acne manifestations remain symptomatic well into adulthood. The percentage of men and women older than 40 with acne lesions reaches 1% for male patients and 5% for female patients. Various complications emerge because Acne Vulgaris includes multiple causes together with antibiotic-resistant concerns. The condition creates broad-ranging negative effects because its physical symptoms frequently generate major depression and in extreme situations elevate suicide risk(3).

Scientific research into the connection between dietary habits and acne emergence has existed for numerous decades. Investigators in 2012 performed research on this subject to identify positive correlations between acne vulgaris frequency and ice cream and milk use and dietary carbohydrate consumption. Acne vulgaris tends to worsen due to specific dairy products and GI and GL diets according to studies that help prove dietary effects on

skin health (4).

The research shows a clear link between acne occurrence and intake of fat together with sugar and fast-food consumption (5).High glycemic diets both increase the instances of acne and make them more severe. The reduction of carbohydrates and selection of low GI carbohydrates led to decreased acne severity indicators on the skin surface and hormones in male young adults(6).

Adult acne seems to manifest when people consume milk and sweet beverages along with fatty sweet products. Extensive further research must examine how nutrition relates to adult acne while white rice intake seems to correlate with worsened acne symptoms(7). Thai people consume white rice each day because this staple carbohydrate forms the base of Asian diets. The GI value for white rice equals 89 and GL equals 83 and brown rice exhibits GI 50 together with GL 16 for each 150 g serving. Medical research points to white rice consumption as a possible factor which intensifies acne conditions. Sweets along with bread are known as high-glycemic carbs in the diet.

The relationship between food intake and skin health stands out as very important because researchers study the prevalence of acne. Secondarily the approach underlines that both diet-related factors and stress management need attention for skin health solutions. Food products with high glycemic index trigger swift blood sugar level increases in consumers and result in increased cases of acne. A high-glycemic diet index leads to blood glucose elevations which result in body wide inflammation throughout the system. Reaction from inflammation stimulates skin glands to produce higher amounts of sebum leading to acne formation. Inflammatory responses together with increased sebum levels work as factors that drive acne vulgaris formation. Multiple processed snacks together with sugary drinks and fast-food items as well as white bread and refined-grain cereals represent examples of such foods. Students must learn about how food choices impact skin health because this knowledge enables them to create better methods for acne management and general health promotion. Different physical groups have received research focus regarding their eating behavior patterns. The results of the low glycemic weight loss study demonstrated that 87% of participants experienced improvements in their acne symptoms among the 2258 people enrolled in the United States research. Within an Australian study researcher examined 143 young male participants aged 15-25 with acne through a 12-week

intervention which evaluated regular diet against low glycemic diet plan consumption. Test participants who followed the low glycemic diet plan noticed a diminished acne condition rate when compared to control participants who maintained their standard diets(9).

Acne produces noticeable adverse effects on the life quality therefore adequate therapy becomes necessary. Acne medical nutrition therapy has never been considered a fresh therapeutic approach even though research about diet and acne contained inconsistent findings for the past century. Acne-related dietary supplements became popular for treatment throughout the periods spanning the late 1800s and early 1900s. During the 1960s the relationship between diet and acne experienced a decline in its recognition. The profession of dermatology together with registered dietitians increasingly looks at medical nutrition therapy as a method to treat acne during the current period (10).

Women throughout the world experience acne at a rate of 10% irrespective of age group [2, 3] yet the expression of acne differs between age groups. Researched data shows that 15 to 20 percent of adult females suffer from acne but hirsutism affects 20 to 30 percent and high testosterone levels are found in 18 to 88 percent of adult women [5]. Most scholars describe acne as an inflammatory skin condition which affects pilosebaceous glands leading to increased sebum production because they either believe androgen secretion is increased or that the skin becomes more sensitive to androgens. Adult female acne functions as a persistent inflammatory illness affecting the pilot-sebaceous follicle that mainly affects the lower face region of female adults past age 25 but their clinical presentation resembles acne vulgaris(11).

The complex origins of acne vulgaris (AV) affect primarily adolescent populations through its skin manifestations of papules and pustules as well as come done and cysts leading to various long-term physical impact and social consequences and psychological challenges. The critical importance of social along with physical changes in adolescence makes acne during this developmental period become the main source of anxiety for young people. The performance of teenagers along with their interpersonal relationships and self-esteem tend to degrade when acne comes into play. Growth and development of living a long productive healthy life requires consuming and using nutrients at appropriate quantities. Throughout adolescence people dedicate themselves to determining their

identity and pursuing independence as they seek social acceptance. The period brings forth a notable increase in preoccupation with outer looks among young people. Teenagers have established the practice of eating outside the home combined with customarily consuming fast-food style foods throughout the day. Eating attitudes tend to alter under the influence of multiple emotional state changers including family relationships and peer relationships and media exposure. (12)

Nutritional preferences affect both dermatological disorder development and associated risks as well as their potential prevention and disease outcomes. Scientific investigations have established that acne becomes worse when people consume dairy products. Growth hormones and anabolic steroids with milk carbohydrate levels act together to determine the intensity of acne symptoms. High glycemic index diets produce increases of insulin and insulin-like growth factor IGF-1 in the bloodstream.(13)

Acne vulgaris serves as a very common skin problem with multiple known contributing causes. The developing trend of consuming coffee might affect acne development and nutrition functions as one of the key variables of this relation. Scientific research currently overlooks the interrelation between coffee intake and acne vulgaris as well as the two conditions' relationship. The main research goal centered on measuring coffee consumption effects on acne conditions.(14)

A diverse and complicated disorder affects 5 to 10 percent of women between the ages of reproductive age in the United Kingdom. Alongside diabetes and endometrial cancer along with increased cardiovascular morbidity highlight the long-term health risks of this condition and its clinical issues which include infertility and obesity. The research indicates that insulin resistance functions as a major component in PCOS development therefore improving insulin resistance through diet and exercise and Metformin medications may help alleviate both symptoms and long-term health risks of the condition. A study suggests that a diet with low calories and low glycemic index (GI) helps specifically reduce endometrial cancer risks as well as other health concerns associated with PCOS. The consumption of low-GI carbohydrates leads to decreased post-meal glucose shifts and prolonged reduction of hyperinsulinemia. Long-term advantages from the low GI diet require strict adherence to the dietary regimen. The study evaluated whether a low GI diet decreased endometrial cancer risk for women with PCOS by using

food records recorded for six months during a pilot randomized control trial running at Nottingham University Hospital [17]. Women participated in returning weekly food diary entries at all times during week one and months one, three and six. (15)

Acne vulgaris stands as the eighth most prevalent disease worldwide since it represents a chronic inflammatory disorder that happens to every age group. The side effects of acne include severe and frequently untreatable scars together with decreased self-esteem specifically when the acne occurs in easily noticeable facial regions. Most research has investigated facial acne but this condition can affect any body area which has numerous sebaceous glands specifically the face and the chest and shoulders and also the back. 3. Healthcare professionals increasingly recognize truncal acne importance because the condition exists in roughly half to two-thirds of acne patients. 3, 6, 9 Furthermore, few high-quality studies focus on face and truncal acne although studies indicate that facial acne develops in approximately fifty percent of patients with truncal involvement. 4, 5 The main causes of complex multifactorial acne development include immune system disturbances, elevated sebum release, Cut bacterium acnes colonization, and improper follicular keratinocyte function. Acne depends on dietary choices leading to increased development when consuming food with high glycemic index and dairy products. All three elements play a substantial part in contributing to acne development (16).

These endocrine symptoms make up the disease profile of PCOS (Polycystic Ovary Syndrome) which affects women during their reproductive years and creates potentially dangerous situations for them. Research shows that several environmental elements influence this illness development by including obesity with inadequate eating habits coupled with physical inactivity and a lack of exercise. Health issues cause PCOS diagnosis rates to increase annually among women who lead unbalanced lives each year. Early diagnosis of PCOS followed by suitable treatment allows individuals to control or predict the problems associated with this condition. The prevalence of PCOS among women between childbearing ages leads experts to elevate their medical scrutiny towards this disorder. The occurrence of PCOS affects numerous teenage girls during their puberty development period. The medical community faces immense challenges when it comes to performing appropriate care despite the fact that PCOS is the leading

reproductive health disorder for women. Women with PCOS tend to develop anxiety and depression more frequently when their condition becomes worse because of weight gain and infertility problems plus excessive facial hair development. Proper immediate treatment of PCOS becomes essential because untreated PCOS creates negative impacts on an individual's standard of living. combination therapy including nutritional eating patterns, calorie reduction, physical activity programs combined with behavior change support represents the optimal initial approach to treat pcos (17).

Acne vulgaris creates major negative effects on the physical wellness as well as emotional well-being of affected people. The link between high-glycemic diets and serious acne symptoms exists according to recent research although the mechanisms that result in this relationship remain unknown. Most recent observational studies need to be followed by controlled trials to establish causation. Non-pharmacological acne treatment options together with dietary guidelines could benefit from knowledge about high-glycemic diet effects on acne for creating better comprehensive acne care that produces improved patient outcomes. The main goal of this research is to fill an existing literature gap through evidence-supported assessments of food-acne development connections. The research objective investigates how high glycemic diets influence adult university students to develop acne. The research evaluates dietary pattern consumption in relationship to acne severity and lesion distribution while assessing food intake to confirm GI food effects on acne.

AIMS AND OBJECTIVES

- To investigate the correlation between high glycemic index diets and the prevalence and severity of acne in different adult groups.
- To compare the impact of high glycemic index diets on acne formation with other dietar factor and lifestyle choices, determining their relative influence on skin health.

Chapter2

LITERATURE REVIEW

The author obtained multidrug-resistant Staphylococcus epidermidis isolates from 100 face and neck skin samples of acne patients for examining honey's antibacterial effect on the in vitro development of Acne vulgaris. The 100 samples received Muller-Hinton agar and blood agar treatment followed by 37 degrees Celsius incubation for 18 to 24 hours. Acne vulgaris patients belonging to both sexes aged 15 to 30 years presented with all grades of clinical conditions. Additionally, researchers included demographic information about lesion duration and development period. Acne vulgaris isolates proved resistant to all treatments of cephalosporins, fluoroquinolones, and β-lactams and 80% resisted amoxiclav treatment while 100% resisted both ceftazidime me and cefotaxime, gentamycin, ciprofloxacin and nalidixic acid treatments. The bacteria exhibit strong resistance patterns toward fluoroquinolones at their most extreme levels. The research data shows that among the total patients 61% were between 16 and 23 years old with 37% in the 23 to 25 age bracket and 2% from 25 to 27 years old but the study included sixty-two female isolates versus thirty-eight male isolates. Among the examined isolates there was complete sensitivity to honey even though they demonstrated prior resistance to multiple drugs. (18)

According to the author's research acne is a common multifactorial inflammatory skin condition yet studies about it happen rarely in multiethnic groups.

A multiethnic research needs to study acne prevalence together with its contributing factors among teenagers right when they enter puberty. The cross-sectional investigation part of the Generation R study lies within this prospective population-based research from Rotterdam, the Netherlands. The research team graded acne severity based on images obtained from Global Evaluation of Acne Severity (GEA) measurements taken during the 2016-2019 center visits with about 13-year-olds. The analyses evaluated by multivariable ordinal logistic regression and chi-square tests used biological sex as a stratification variable. The analysis included 4561 children whose median age rested at 13.5 years with an IQR of 13.3 to 13.6. Girls constituted 51% of the participants. Acne visibility ranging from GEA 2-5 appeared in 62% of girls and 45% of boys with moderate-to-severe acne

affecting 14% of girls and 9% of boys. A person's puberty stage and their skin color V or VI both produced a staggering increase in severe acne development among girls and boys respectively. Boys who were overweight also had higher odds of severe acne. Limitations Cross-sectional design. Acne affected a large number of adolescents aged 13 years because they had more advanced puberty development while also showing darker skin tones and weight fluctuations.(19)

Acne vulgaris affects people at all ages therefore author investigated this prevalence and psychosocial effects on secondary school pupils of Benin City in South-South Nigeria's Local Government Area. A random descriptive cross-sectional study recruited 410 secondary school students through basic selection methods that enrolled 263 females and 147 males. Each student underwent specific evaluations resulting in clinical diagnosis made by a dermatologist through standardized questionnaires containing both open-ended and closed-ended questions. The data analysis was conducted using IBM SPSS Version 20 and $P < 0.05$ established the statistical significance. Acne vulgaris affected 37.3% of all participants while showing a slight difference between the female and male populations where women had 37.6% affected cases while men had 36.7% cases. The occurrence of acne was higher among students in private educational institutions (51.4%) compared to those in public institutions (32.2%). Results showed that respondents between 15 and 19 years of age had a higher prevalence rate of 41.2% compared to those between 10 and 14 years of age who had a prevalence rate of 35.8%. Among the participants, 170 or 41.5% had psychological illnesses. Acne vulgaris showed a statistical correlation with the combination of students from private schools and their academic year ($P < 0.001$) together with their responses to sadness ($P < 0.004$), anxiety ($P < 0.015$), and their levels of concern ($P < 0.001$), fear ($P < 0.001$), and anger ($P < 0.001$). Likewise, the parents' marital status ($P < 0.001$) and educational background ($P < 0.007$) (20).

The main objective involves examining insulin resistance (HOMA IR) and its connection to acne vulgaris development in female patients. A screening process was conducted at a tertiary care center in Western Maharashtra during September 2020 through August 2022 against patients attending the dermatology venerology and leprology outpatient services. Acne vulgaris diagnosis could be confirmed through proper dermatological examination methods. Global Acne Grading System (GAGS) defined the disease severity while

clinical researchers obtained fasting insulin and fasting glucose results apart from anthropometric measures including height and weight and BMI assessments. Research data stemmed from 65 female subjects medically confirmed with acne vulgaris while their average BM value was at 23 kg/m2. Fasting and glucose levels. Research data showed insulin at 10.4 μU/mL together with blood glucose measurement of 96.4 (±5.7) mg/dl. HOMA-IR was 2.5 units (±0.5). All participants received a total global acne grading score of 14.2 and among them 48 (73.9%) presented with mild acne while moderate acne affected one-fourth (17,26%) of the participants. Acne severity levels were highest among subjects above 30 years of age when compared to all other age demographics. Positive correlations were found between F insulin and average GAGS and insulin resistance levels (HOMA IR) as demonstrated by an all-around p value of <0.001. Statistical differences appeared between the average GAGS scores of individuals in mild and moderate acne categories (p=0.007). This research established that regular BMI young female individuals show a clear correlation between insulin resistance and acne development. Scientific researchers require additional investigations to understand pathogenesis and risk factors because the reasons for varying disease severity between groups and anti-acne treatment effects remain unclear. (21)

Author examined in this study that acne affects numerous adolescent patients who are suffering from the multifactorial inflammatory follicular disease. Scientific studies have proven that acne vulgaris belongs to a cluster of diseases known as metabolic syndrome. This research aims to evaluate how often Met's occur in male post-adolescent AV patients who are older than 20 years and it evaluates the connection between Met's severity and AV severity at the same time. A controlled case study including 52 men with acne vulgaris after adolescence and 52 patients who matched by age and sex served as participants. A clinical test that measured BMI values as Weight (kg) / height (m)2 and waist circumference together with biochemical parameter assessments of fasting serum triglycerides and HDL and fasting blood glucose was performed on all patients. Dermatological evaluation was used to assess the severity of acne disease. The study revealed that Met's prevalence was significantly higher in AV patients (19.2%) compared to controls (5.8%) with a statistical value of p=0.037 and x2=4.37. The computed odds ratio demonstrated a statistical association between Acne vulgaris and Metabolic

syndrome development with a value of 3.9 (1.003 to 15.07, p=0.049). The study revealed a weak statistical correlation between Met's frequency and the extent of skin condition severity. Patients suffering from severe acne had greater chances of developing Met's than individuals without acne along with higher Met's occurrence among AV patients when compared to standard population groups. Research shows that Met's likelihood occurs with statistical significance when patients have AV.(22).

Health relies on the availability of antioxidants that dissolve in lipids such as vitamins A and E. Antagonistic health conditions develop because of vitamin deficiencies. Medical research has proved that treating acne patients with vitamin A and E will lead to better results in their skin condition. The plasma levels of vitamins A and E in 100 acne patients were measured through the technique of high-performance liquid chromatography at the time of their newly diagnosed and before any treatment began. The study results compared the findings from these 100 age-matched healthy controls. Medical professionals graded patients through the utilization of the Global Acne Grading System. The study examines whether acne affects the plasma vitamin A and E concentration levels of patients. The measured plasma vitamin A levels among acne patients fell beneath those of the control group by 81.6 μg/L (336.5 μg/L versus 418.1 μg/L) (P = 0.007). Acne patients demonstrated significantly lower plasma vitamin E levels than those found in controls with readings of 5.4 mg/L compared to 5.9 mg/L P = 0.05. The results showed an evident association between reduced plasma vitamin A content and improved acne severities. The plasma levels of vitamin A and E showed lower concentrations in severe acne patients compared to subjects with low acne severity and healthy control participants from the same age group.(23)

Acne vulgaris as a chronic inflammatory disorder results in inflammation in sebaceous follicles. The substance isotretinoin functions as the most powerful sebum controlling agent. Acquired biotin insufficiency occurs due to how isotretinoin lowers the activity of biotinides. The heavy emotional toll from severe acne produces feelings of sadness together with suicidal thoughts even though the medication isotretinoin is not responsible for these reactions. The research explores the effects of isotretinoin on acne patient serum biotinides concentrations and examines these changes when connected to depression scores and acne severity evaluations. The research design implemented a randomized

control trial as its methodology. The research design splits into two separate parts where each part contains 22 subjects who fall between 18 to 30 years old. During two months researchers administered isotretinoin treatment to the interventional group participants. Acne and depression levels together with biotinides measurements occurred at both studies start and completion. The control group started with depression scores of 10 ± 4.32 while the interventional group had higher depression scores at 16.27 ± 9.93 having a p-value 0.01. Both groups' biotinides levels remained statistically equal during initial testing. After two months the interventional group's biotinides' level decreased from (1389.09 ± 499.68) to (716.86 ± 212.18) p-value <0.001 while depression scores increased from (16.27 ± 9.93) to (24.59 ± 12.11) The scores for acne and depression showed a major positive relationship during the period of isotretinoin use. The application of isotretinoin for acne treatment resulted in decreased biotinides concentration while producing an improvement in depression scores.(24)

Acne vulgaris as a chronic inflammatory disease affects the normal functioning of the pilosebaceous unit. Research evidence confirms dermatologists that acne begins and ends at the skin yet recent medical studies show this condition generates ongoing whole-body symptoms. This paper investigates the multiple medical conditions which develop from acne vulgaris while establishing associations between disease severity and pre-existing disorders. The prospective multicenter investigation was conducted by the Turkish Society of Dermatology Acne Study Group. This research included fourteen doctors who worked at twelve dermatology clinics located across Turkey. A clinician distributed structured questionnaires to gather demographic data about patients together with clinical data as well as lifestyle information. The medical records kept by doctors included participant data regarding smoking, drinking history, and ongoing and previous comorbidities duration. Analysis of patient BMI through the use of body mass index computation took place. The control group consisted of 897 patients while adolescent acne patients reached 3022 individuals. The prevalence rates of nonmigraine headaches were higher among adolescents with acne compared to those without acne (P = 0.019). A total of 545 patients participated in the control group while 680 patients belonged to the post adolescent acne group. Post adolescent patients exhibited less frequency of metabolic illness compared to the control participants (P = 0.003). PCOS and premenstrual

syndrome appeared more often in subjects from the post adolescent group in comparison to subjects from the control group according to statistical findings ($P = 0.007$ and $P < 0.001$). The results of this study disproved that acne vulgaris cannot trigger systemic comorbidities. Future research with extensive patient populations needs to examine diseases which frequently occur with acne vulgaris.(25).

Chapter3

METHODOLOGY

Research Design

A cross sectional study carried out, Participants assessed to fill out dietary surveys and undergo dermatological assessments to investigate how dietary glycemic index, insulin levels, and the occurrence of acne lesions might be linked in adults.

Clinical Settings

Data gathered from university going students, Punjab University, Superior University, Government College University Lahore, and University of Lahore included.

Sample Size

A large sample size taken out around one hundred and eighty. (180)

Sampling Technique

Random sampling technique because random sampling helps minimize bias and ensures that each individual in the population has an equal chance of being selected for the study, thereby increasing the reliability and validity of the results.

Inclusion criteria

This study included adults among university going students, age range between 18-30 years, both male and female.

Exclusion criteria

Individuals ages above 30 years, and those did not fill consent form also excluded.

Data collection procedure

Dietary survey questionnaire to participants, ensuring clarity and consistency in instructions. We Provided assistance if need to ensure accurate completion.

We performed dermatological assessments on participants to document acne lesions. Ensure assessments are conducted in a controlled environment with adequate lighting and privacy.

DATA ANALYSIS TOOL

Data analysis was done through SPSS 27th version and M.S EXCEL 2021.

Statistics, Chi square test and crosstabs were used.

Chapter 4

RESULTS

The study showed that consumption of high-glycemic diets creates strong correlations with acne development. The individuals who consumed extensive amounts of food with high glycemic values had increased acne severity along with higher frequency ($p=0.003$) and more severe acne condition ($p=0.006$). Facial acne was dominant in this group (85%, $p=0.025$). Different variations of acne appeared throughout the patients with blackheads noted in 28% of cases alongside 30% with whiteheads and 19% developing bumps and 23% experiencing nodules. Acne presented at higher rates among females (57%) than males (43%) according to statistical data ($p=0.001$). The research revealed that acne affected 53% of the evaluated patients while 48% experienced severe acne manifestations. The study demonstrated a specific pattern between acne prevalence and subject age groups since persons aged 18-22 years showed a stronger 65% prevalence rate compared to the 35% rate of those aged 23-26 years. Youthful individuals demonstrate a greater tendency to develop acne because their biology responds positively to hormonal changes and dietary decisions. The intensity of individuals with high glycemic consumption remained lower than the numbers of those with moderate or severe intake patterns.

Acne primarily affects the face because facial skin experiences higher glycemic diet-triggered sebum production and inflammatory reactions than body skin (85% vs. 15%). People who eat large amounts of refined carbohydrates along with sugar-filled foods and packaged snacks demonstrate higher levels of acne according to the study results.

The research results from this study join existing academic literature which demonstrates that eating foods with high glycaemic index contributes to both acne development and disease intensification. Acne management can potentially benefit from dietary modifications based on the statistical importance that researchers identified across multiple factors.

Age Distribution:

This demographic data represents the age-wise distribution of acne cases among individuals aged 18-26 years, based on a pie chart analysis. Population Overview, the total sample size consists of individuals aged 18-26 years. The majority of cases (65%) were in the 18-22 age group, while the remaining 35% occur in the 23-26 age group. (Figure No. 4.1)

Gender Distribution:

This demographic data represents the gender-wise distribution of acne cases, highlighting the percentage of affected individuals among males and females. Population Overview, the total sample consists of both male and female participants. Gender distribution, Females (57%). The acne study comprised a broad range of individuals, including 57% women and 43% men. (Figure No. 4.2)

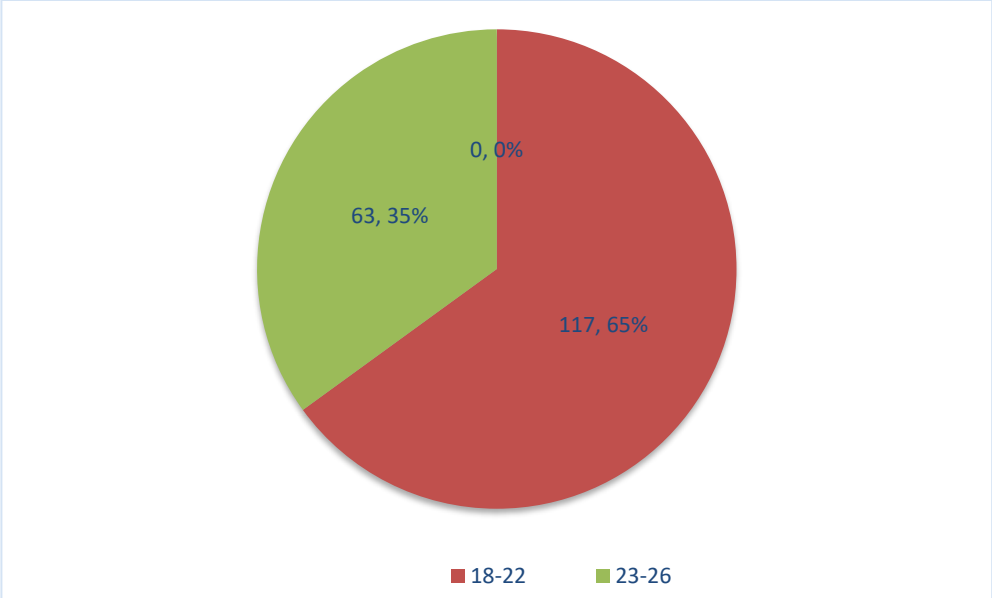


Figure No. 4.1: Age Distribution

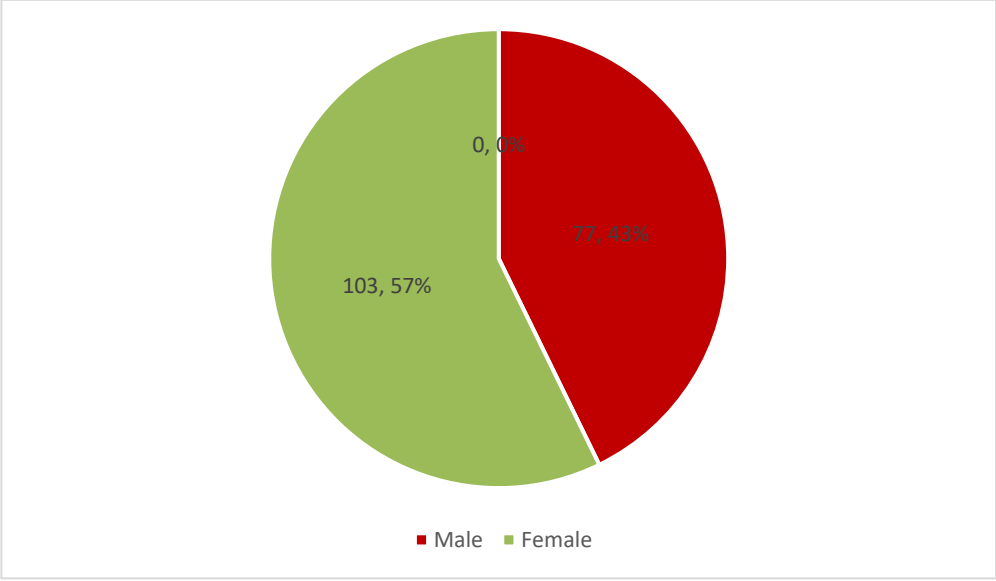


Figure No. 4.2: Gender Distribution

Distribution of Acne Formation:

This demographic data represents the distribution of acne cases, showing the proportion of individuals affected by acne compared to those without acne.

Population Overview. The total sample includes both individuals with and without acne. 53% of individuals have acne ,while 47% do not acne. (Figure No. 4.3)

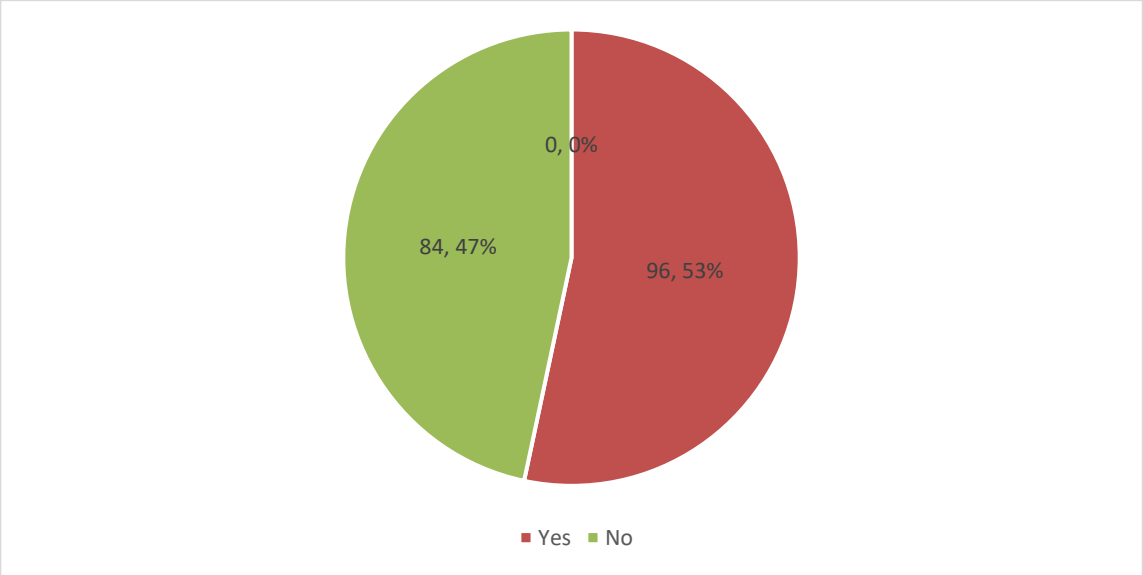


Figure No. 4.3: Distribution of Acne Formation

Distribution of Acne Severity:

This demographic data represents the distribution of acne severity, showing the proportion of individuals experiencing severe acne compared to those without severe acne. The total sample includes both individuals with and without severe acne.

48% of individuals have severe acne while 52% do not acne severity. (Figure No. 4.4)

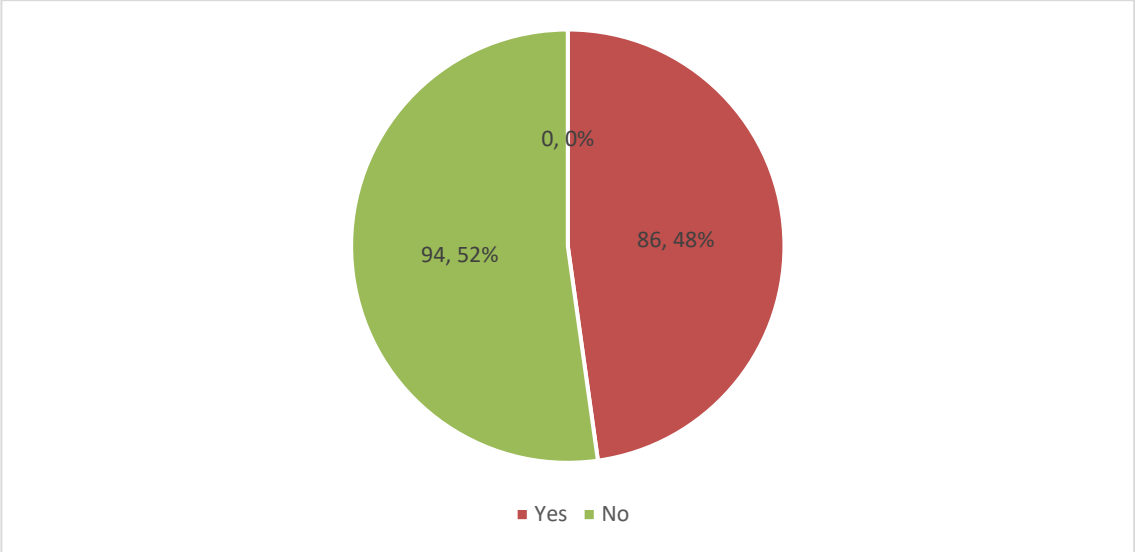


Figure. No 4.4: Distribution of Acne Severity

Distribution of Acne Location:

This demographic data represents the distribution of acne based on location, showing the proportion of individuals experiencing acne on the face compared to the body.

The total sample includes individuals with acne occurring on different parts of the body. 85% of individuals have acne on the face, while 15% have acne on the body. (Figure No. 4.5)

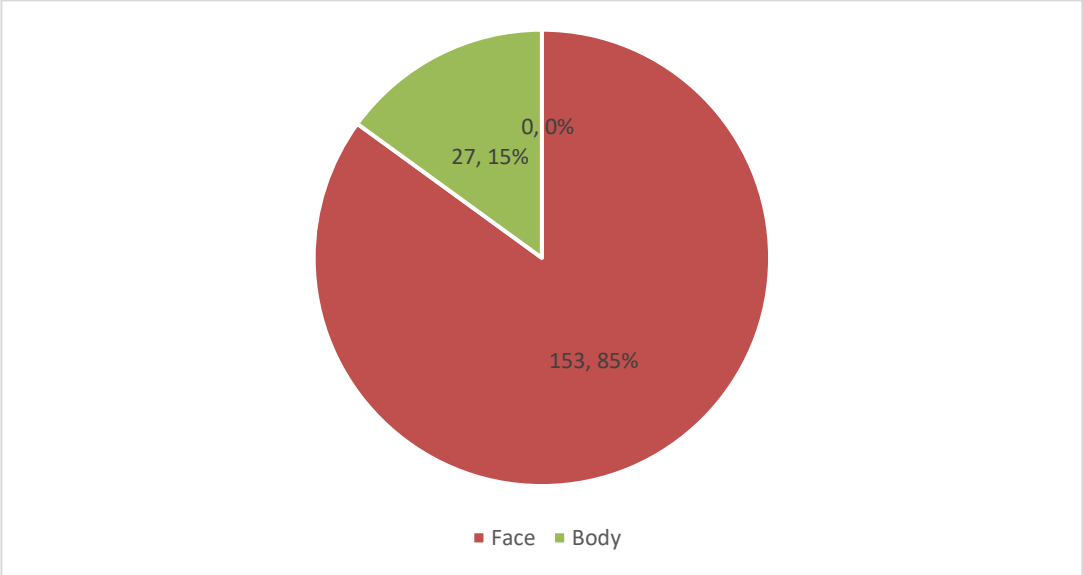


Figure No. 4.5: Distribution of Acne Location

Distribution of Acne Types:

The total sample includes individuals with different forms of acne.

The acne types are distributed as follows:

Blackheads: 28%, Whiteheads: 30%, Bumps: 19%, Nodules: 23%. (Figure No. 4.6)

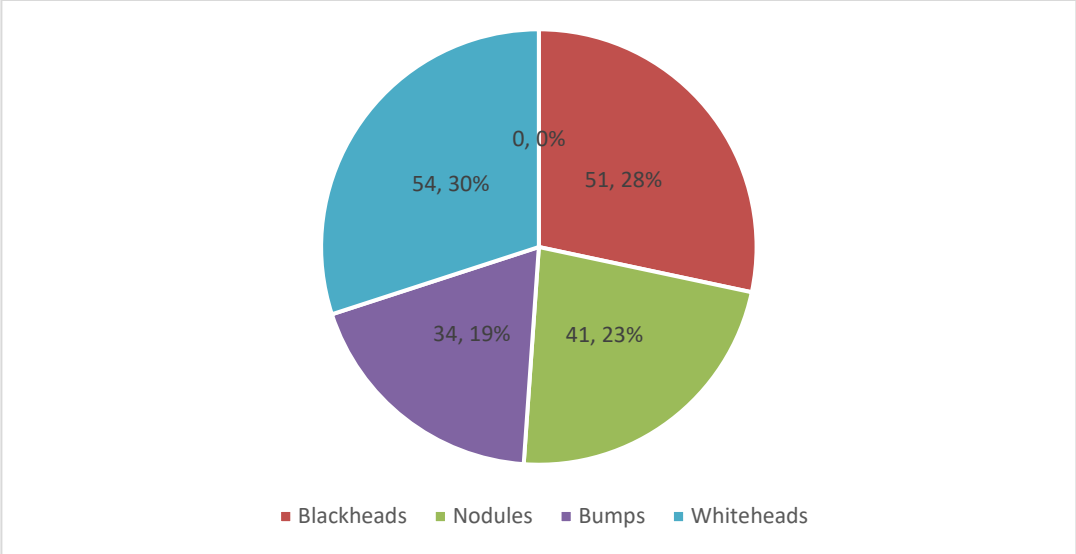


Figure No. 4.6: Distribution of Acne Types

Distribution of High Glycemic Intake:

Total sample includes individuals with different levels of high glycemic intake. The distribution is as follows Mild High Glycemic Intake: 30%, Moderate High Glycemic Intake: 36%Severe High Glycemic Intake: 34%. (Figure No.4.7)

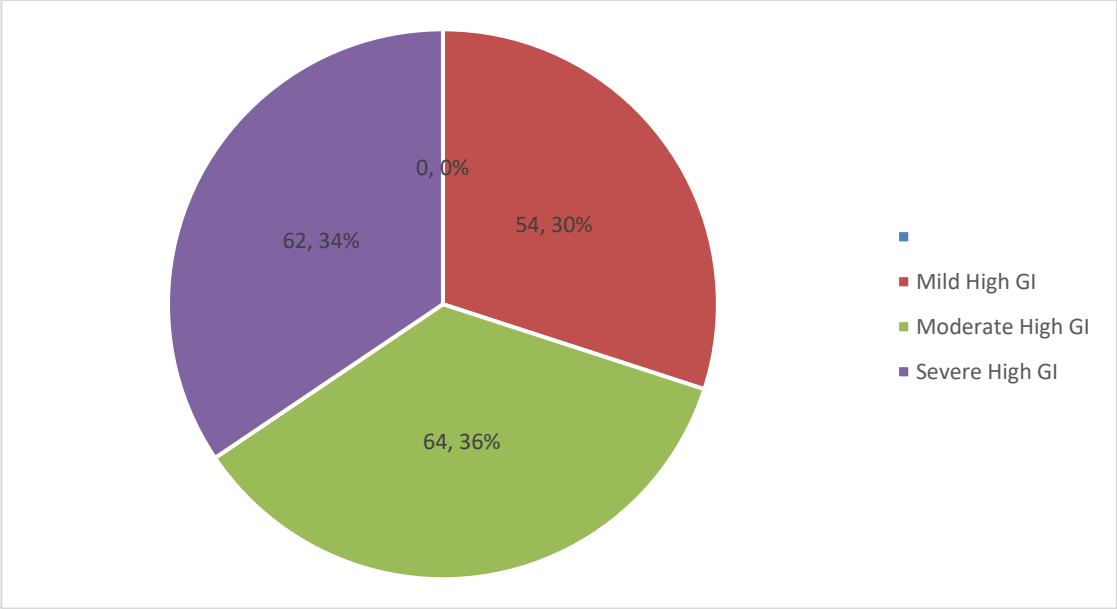


Figure No. 4.7: Distribution of High Glycemic Intake

Age vs Acne Formation:

Among the total of 117 participants from ages 18 to 22 years, acne affected 68 individuals which accounts for 58.1% while 49 respondents did not have acne, making up 41.9% of the sample. A total of 28 out of 63 participants in the 23 to 26 years age range (44.4%) experienced acne but 35 respondents (55.6%) reported they did not have acne. A majority of 180 participants showed that 96 individuals (53.3%) have acne but 84 respondents (46.7%) did not experience acne symptoms. A p-value of 0.079 indicates the lack of statistical significance in most age-based correlations to acne formation because traditionally 0.05 is the accepted level for significance. The information shows that subjects within the 18-22-year-old age bracket experience higher acne prevalence than the participants who fall within the 23-26-year range. Acne affects younger people aged 18-22 years according to the observed trend because these individuals experience hormonal changes during late adolescence. The observed difference in the data shows a potential chance effect since the p-value barely surpasses the 0.05 threshold.

Table No. 4.1: Age vs Acne Formation

Age	Acne Formation		Total	P Value
	Yes	No		
18-22 Years	68	49	117	0.079
23-26 Years	28	35	63	
Total	96	84	180	

Graphical Representation of Age vs Acne Formation:

Among the study population acne is more common in the 18 to 22 years age range because this group showed 68 acne cases while the 23 to 26 years group exhibited 28 acne patients but 35 participants without acne. Acne prevalence within the population descends with each passing year of age. The number of people without acne grows in the group which consists of adults aged 23 to 26 years which suggests acne prevalence may decrease with age. The visual decline in acne development with advancing age cannot be considered significant because the calculated p-value reaches 0.079. Although the data indicates this pattern the study cannot show age as the sole reason behind acne reduction. Results from the bar graph show acne affects people most in their late teenage years yet the 23-26 age group reports lower occurrence of acne. (Figure No. 4.8)

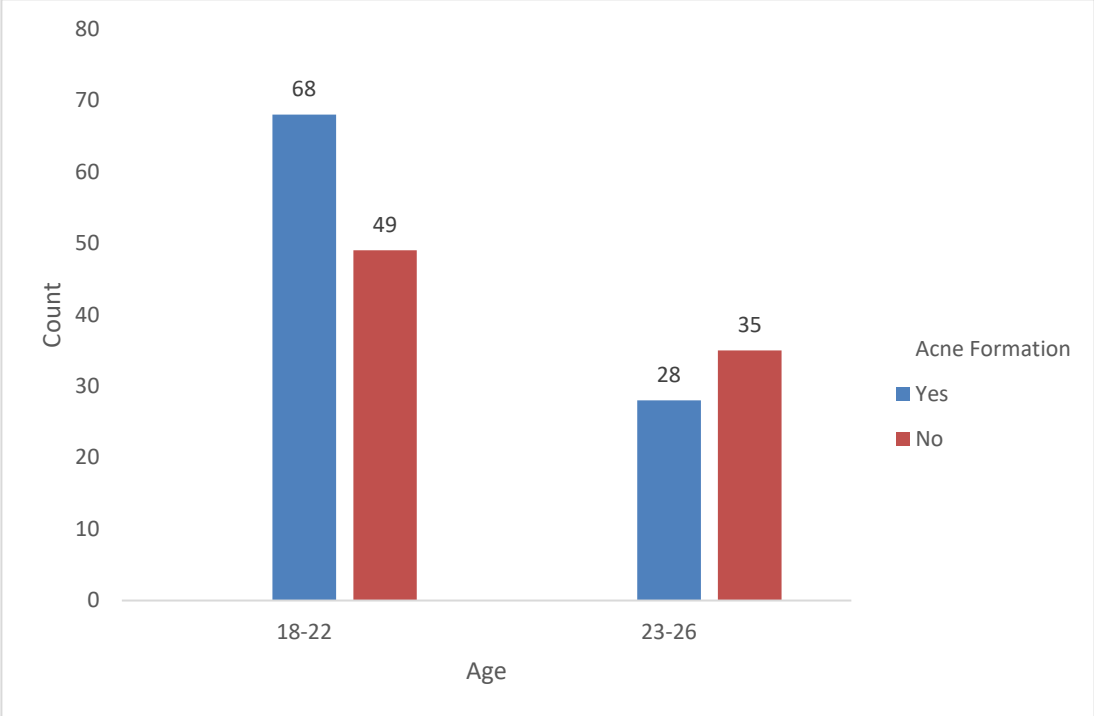


Figure No. 4.8: Age vs Acne Formation

Acne Formation by Gender:

Out of 77 males, acne was reported by 27 participants representing 35.1% of the group but the other 50 subjects formed 64.9% of the group. Acne existed in 69 females from a total sample of 103 participants with an occurrence rate of 67.0%. On the other hand 34 females did not have acne making up 33.0% of the total. Acne exist in 53.3% of 180 participants although 46.7% of them remained free from the condition. Statistical data show a strong relationship between gender and acne development since the computed p-value equals 0.001. The low probability of chance explains why male and female populations show different levels of acne occurrence. Acne occurs in females at a notably higher rate of 67% than in males at 35.1%. The data shows female participants in this study may naturally show increased acne susceptibility. Hormonal changes due to menstrual cycles, pregnancy or hormonal disorders along with skincare practices and cosmetic usage might cause acne development among female patients. Acne occurs less frequently in male patients who represent 35.1% of the population compared to females who make up 67.0%. A statistical relationship exists between gender and acne development because females experience higher incidences than males do according to research data. Additional studies are needed because the strong statistical data to research underlying factors such as hormonal variations and skincare practices as well as diet choices and stress levels to determine why females develop more acne.

Table No. 4.2: Gender vs Acne Formation

Gender	Acne Formation		Total	P Value
	Yes	No		
Male	27	50	77	0.001
Female	69	34	103	
Total	96	84	180	

Graphical Representation of Acne Formation by Gender:

Acne cases occur more commonly in females at 69 but males present non-acne cases more frequently at 50 while acne cases (96) exceed non-acne cases (84) and most acne cases arise from females. Acne affects females to a significantly greater extent because their frequency of skin condition stands at 67.0% while males present at 35.1%. Nevertheless, males demonstrate higher non-acne case counts than females. Statistical analysis reveals a strong link between gender differences and acne formation because the obtained p-value reaches 0.001. Random variation does not explain the differences that appear in the bar graph since they indicate an actual pattern. The visualized data indicates that a higher percentage of participants with acne suffer from the condition as female patients in comparison to male patients. The study participants may have different levels of acne because of hormonal activity and lifestyle choices as well as how they care for their skin. Research should continue to examine hormonal changes together with cosmetic use as well as dietary factors that might strengthen the observed trend. (Figure No 4.9).

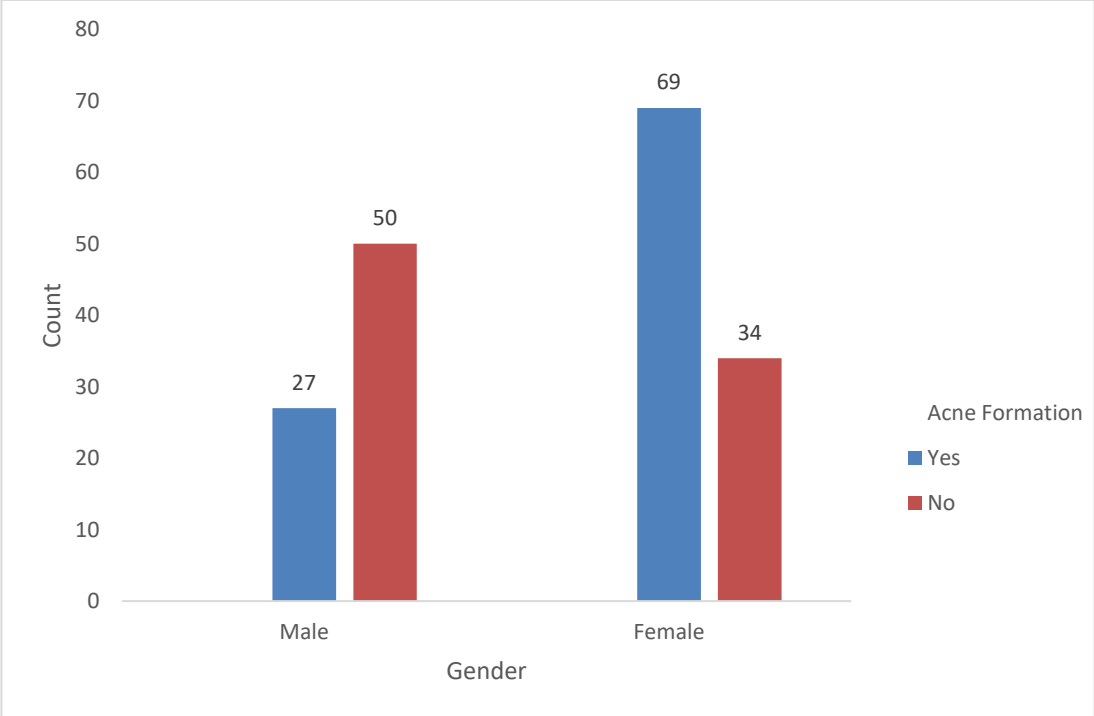


Figure No 4.9: Gender vs Acne Formation

Acne Formation by High Glycemic Intake:

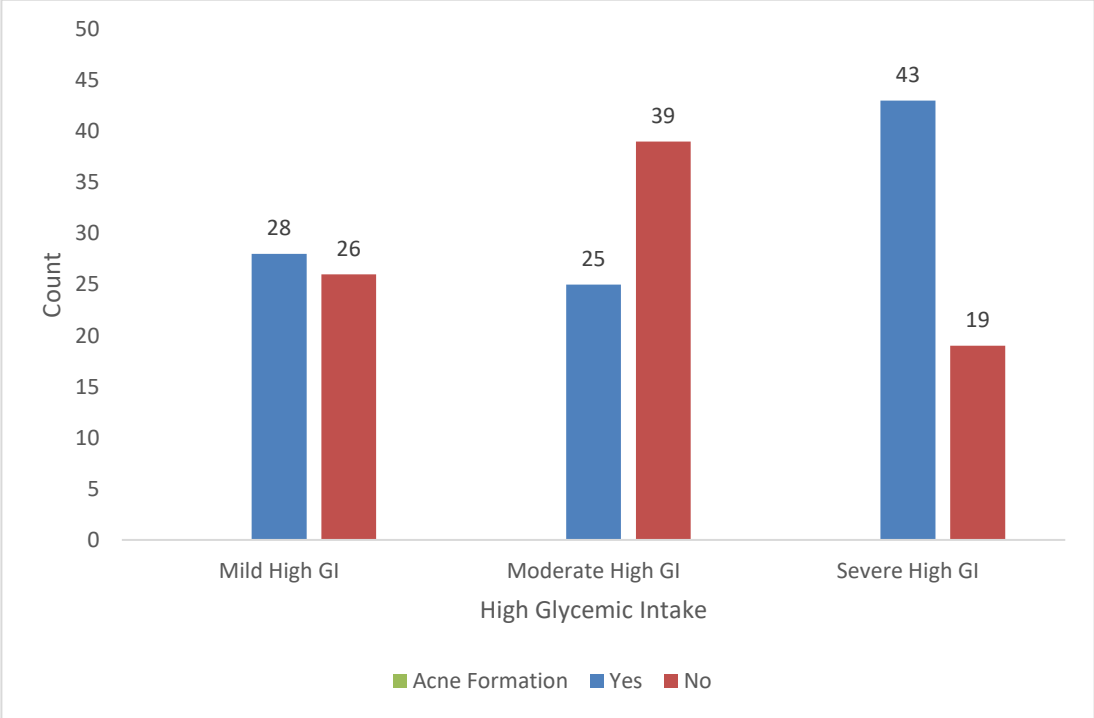
From the 54 participants classified as Mild High GI Intake group, acne was present in 28 individuals who accounted for 51.9% of the total group. The remaining 26 participants who made up 48.1% of the group reported no acne. A total of 25 participants among the 64 individuals who consumed Moderate High GI had acne (39.1%). 39 individuals (60.9%) did not have acne. Severe High GI Intake (n=62), acne existed in 43 individuals who made up 69.4% of the total participants while 19 individuals without acne comprised 30.6% of the total participants. Acne was present in 53.3% of individuals while 46.7% did not show signs of the condition (n=180). High glycemic intake confirms its strong link to acne development through the statistically significant p-value of 0.003. The research shows that high GI foods have a true connection with acne development rather than occurring by random chance. Higher glycemic diet consumption leads to greater acne appearance rates. Mild High GI, 51.9% acne cases. High GI intake levels produced 39.1% less acne cases than the mild GI group thus suggesting alternative probable contributing elements. Severe High GI, 69.4% acne cases (highest prevalence). Research shows that the rate of acne development is highest among individuals who consume high levels of High GI food which amounts to 69.4% of the population. Individuals who followed moderate-high GI diets experienced fewer acne breakouts compared to those on mild GI diets. This difference might be caused by individual habits and metabolic factors and extra lifestyle elements. Glycemic intake levels bear a direct positive correlation to the development of acne. The trend demonstrates how eating sugary foods together with white bread and processed carbohydrates as well as all high glycemic diets might help create acne.

Table No. 4.3: High Glycemic Intake vs Acne Formation

High Glycaemic Intake	Acne Formation		Total	P Value
	Yes	No		
Mild High GI	28	26	54	0.003
Moderate High GI	25	39	64	
Severe High GI	43	19	62	
Total	96	84	180	

Graphical Representation of High Glycemic intake Versus Acne Formation:

Severe High GI intake group was the highest acne prevalence (43 cases), showing a strong relationship between high glycemic intake and acne. The moderate high GI group has fewer acne cases (25 cases) compared to the mild high GI group (28 cases), which may suggest additional influencing factors. The number of non-acne cases is highest in the moderate high GI group (39 cases), indicating that acne risk is not uniform across all levels of high GI intake. Statistical Insight P-Value: 0.003The p-value (0.003) confirms statistical significance, indicating that high glycemic intake strongly correlates with acne formation. The bar graph effectively demonstrates that individuals consuming severe high GI foods are at a much greater risk of developing acne. The bar graph clearly shows that severe high GI intake is associated with the highest acne occurrence. The findings support the idea that dietary habits, especially the consumption of high glycemic foods, play a role in acne formation. This suggests that reducing high GI foods in the diet may be beneficial for acne prevention and management. (Figure No 4.10)



(Figure No 4.10)

Acne Severity by High Glycemic Intake:

Among the 54 participants with Mild High GI Intake distribution showed 31.5% developed severe acne yet 68.5% did not experience severe acne. The minority of individuals who consumed moderate high GI (n=64) displayed severe acne while most of them (n=33) avoided serious acne. Among those with Severe High GI Intake (n=62), severe acne was observed in 38 individuals (61.3%). Acne severity affected 38.7% of the 62 participants but the remaining 24 (38.7%) people did not suffer from severe acne. The research showed that severe acne affected 86 of 180 participants (47.8%) but 94 participants (52.2%) had no severe acne manifestations. Statistical research indicates that high glycemic intake creates a substantial relationship with severe acne symptoms because the p-value reaches 0.006. A rise in glycemic intake levels corresponds to increased severity of acne symptoms. The proportion of individuals with severe acne among those consuming high GI foods stood at 31.5% according to Mild High GI results. The Moderate High GI group contained 48.4% of participants affected by severe acne symptoms. Out of all the tested subjects with severe High GI intake 61.3 percent presented with severe acne. With higher glycemic consumption there is a rise in the number of people affected by severe acne. The population showing severe high GI intake shows the highest rate of severe acne occurrences (61.3%). This evidence indicates dietary consumption contributes to worsening acne symptoms. Research findings indicate that high glycemic consumption reduction shows potential as an acne management strategy because the calculated p-value stands at 0.006.

Table No. 4.4: High Glycemic Intake vs Acne Severity

High Glycaemic Intake	Acne Severity		Total	P Value
	Yes	No		
Mild High GI	17	37	54	0.006
Moderate High GI	31	33	64	
Severe High GI	38	24	62	
Total	86	94	180	

Graphical Representation of Acne Severity by High Glycemic Intake:

The severe high GI group has the highest number of severe acne cases (38 cases), confirming that higher glycemic intake is associated with more severe acne. The moderate high GI group also shows a considerable number of severe acne cases (31 cases), but slightly fewer than the severe GI group. The mild high GI group has the lowest severe acne cases (17 cases), indicating that those who consume lower glycemic foods are less likely to develop severe acne.

Statistical insight (P-Value is 0.006). The p-value (0.006) is statistically significant, reinforcing that glycemic intake plays a role in acne severity. The bar graph visually supports the statistical finding that severe acne is more common among individuals consuming higher glycemic foods. The bar graph effectively demonstrates that as glycemic intake increases, acne severity also increases. This supports the idea that dietary modifications, particularly reducing high GI foods, may help in managing acne severity. The significant p-value suggests that further research into low glycemic diets and acne control could be beneficial for individuals suffering from severe acne. (Figure No. 4.11)

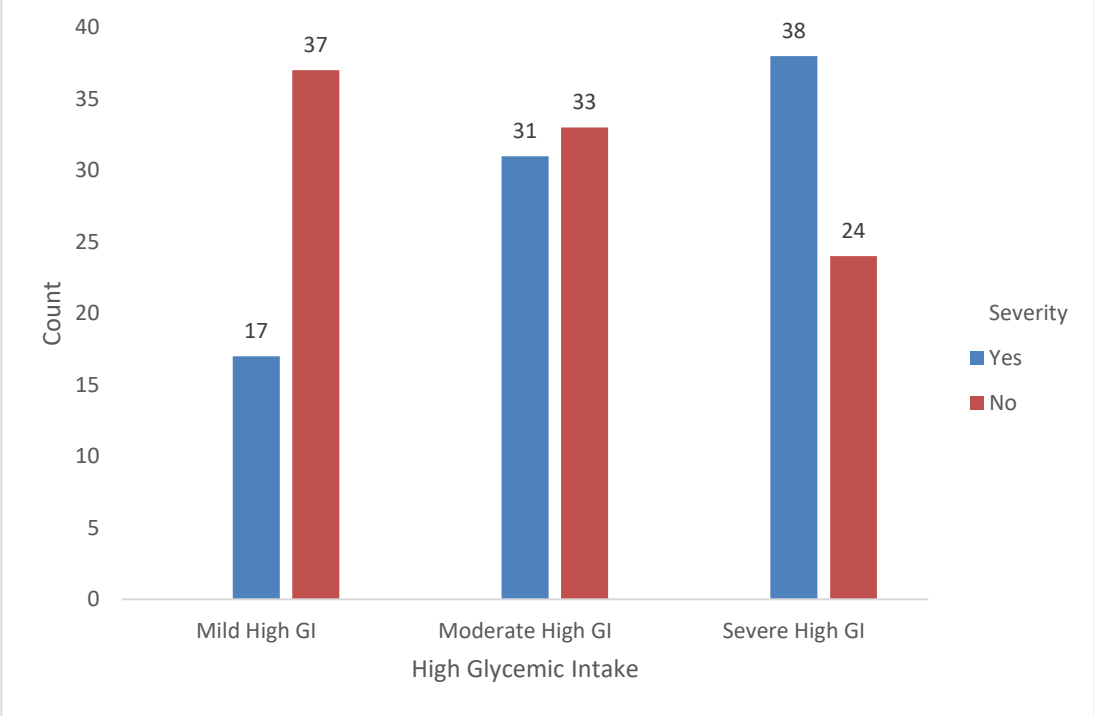


Figure No. 4.11: High Glycemic Intake vs Acne Severity

Acne Location by High Glycemic Intake:

The face presentation of acne occurred in 74.1% of subjects within the Mild High GI Intake group (n=54). Additionally, 25.9% of these participants developed acne on their body region. In patients with moderate high glycemic index intake, acne affected 87.5% of people in their faces while acne on the body occurred in 12.5% of people. Among the participants with severe High GI Intake (n=62), 91.9% showed acne on their face whereas 8.1% reported body acne. A total of 153 participants (85.0%) presented with face acne while 27 participants (15.0%) had body acne from among the 180 participants included in the study. The association between eating high amounts of glycemic foods and acne location stands as statistically significant based on the p-value value of 0.025. The relationship between high glycemic intake and acne clearly shows its prevalence on facial areas rather than body areas. The statistical results support that dietary factors might affect where acne appears since the difference went beyond random chance. 3. Every glycemic intake group shows facial acne occurs at a rate of 85.0% while body acne remains at 15.0%. The percentage of people who face acne increases as their glycemic intake level rises from Mild High GI to Severe High GI with proportions of 74.1%, 25.9% and then 91.9%, 8.1% respectively. Moderate High GI, 87.5% face, 12.5% body. Severe High GI: 91.9% face, 8.1% body. Results demonstrate that people who eat higher amounts of glucose are more likely to develop facial acne compared to body acne. The increased sensitivity of facial skin to hormonal as well as dietary changes could explain why acne appears more frequently on the face. Research shows that face acne directly links to higher glycemic intake when compared to general acne occurrences on the body.

Table No. 4.5: High Glycemic Intake vs Acne Location

High Glycaemic Intake	Acne Location		Total	P Value
	Face	Body		
Mild High GI	40	14	54	0.025
Moderate High GI	56	08	64	
Severe High GI	57	05	62	
Total	153	27	180	

Graphical Representation of Acne Location by High Glycemic Intake:

Acne that appears on the face exists more frequently than body acne throughout all glycemic intake categories. Higher amounts of glycemic intake lead to increased percentages of facial acne. A combination of forty patients had face acne during the check-up with fourteen having body acne within the Mild High GI group. The proportion of face acne cases reached 56 while body acne cases remained at 8 under moderate High GI. Acne affected the face with 57 cases combined with five body acne cases among severe High GI patients. Body acne cases become less frequent as total glycemic intake goes up thus demonstrating facial acne has a stronger association with high glycemic intake. Statistical Insight (P-Value: 0.025). Test results identify the p-value at 0.025 which demonstrates that glycemic intake generates statistically relevant changes in acne placement toward the facial region. Acne primarily resides on the facial region based on the findings illustrated through the bar graph data. The presented bar chart establishes facial acne as the most frequent form compared to body acne particularly among subjects with elevated glycemic consumption. The data indicates that glycemic food sources significantly affect acne location by causing more breakouts on the face.

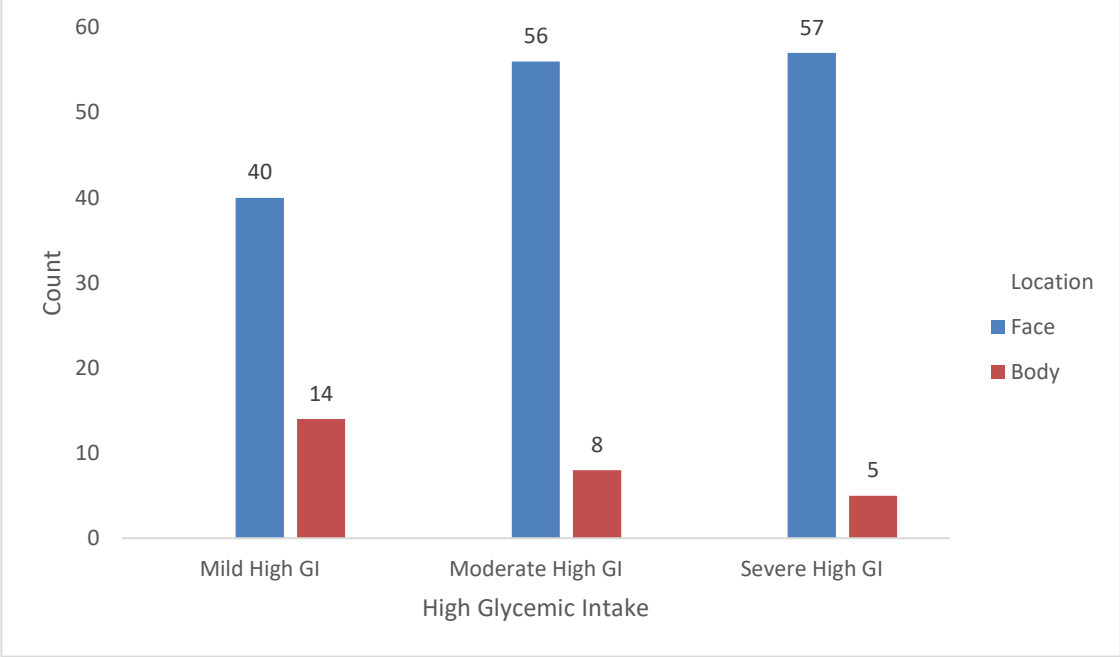


Figure No. 4.12: High Glycemic Intake vs Acne Location

Distribution of Acne Types by High Glycemic Intake:

Out of those with mild high GI intake (n=54) blackheads were present in 11 patients (20.4%) as well as 11 patients (20.4%) who had nodules.

10 (18.5%) had bumps. 22 (40.7%) had whiteheads. The blackhead counts among participants with moderate high GI intake (n=64) were 14 (21.9%) and the nodule total was 17 (26.6%) which was higher than the mild GI group. The bump count came to 11 (17.2%) and whitehead detection within this group was 22 (34.4%). Blackheads existed in 41.9% of studied participants who consumed Severe High GI Intake (n=62). 13 (21.0%) had nodules.13 (21.0%) had bumps. 10 (16.1%) had whiteheads.

Total (n=180) contained 51 subjects with blackheads followed by 41 subjects with nodules and 34 subjects with bumps and 54 subjects with whiteheads.. Research data demonstrates an association between food glycemic content and acne classification because the calculated p-value amounts to 0.032. The data shows that high GI intake leads to severe blackhead outbursts because the numbers of blackhead cases rise from 11 mild GI patients to 26 severe GI patients. Infectious acne seems influenced primarily by moderate high glycemic intake since 17 cases were recorded in that group. Most whiteheads occur within the mild and moderate high GI groups at rates of 22 cases per group while severe GI groups only have 10 whiteheads. The distribution of bumps remains uniform at every level of glycemic intake so other environmental factor may determine their development.

Table No. 4.6: High Glycemic Intake vs Acne Type

High Glycaemic Intake	Acne Type				Total	P Value
	Blackheads	Nodules	Bumps	Whiteheads		
Mild High GI	11	11	10	22	54	0.032
Moderate High GI	14	17	11	22	64	
Severe High GI	26	13	13	10	62	
Total	51	41	34	54	180	

Graphical Representation of Acne Types by High Glycemic Intake:

People who consumed high glycemic foods tend to develop blackheads as their prevalence reaches its highest point at 26 cases in the severe high GI category. Whiteheads show their peak frequency in the mild/moderate GI groups yet they appear less often in severe HI diets. The study shows that moderate glycemic index food intake results in the most nodules development (17 cases). The persistence of bumps stays consistent through every level of glycemic consumption. Statistical evidence through the p-value (0.032) demonstrates that glycemic intake affects the types of acne patients develop.

The graphical display demonstrates that blackheads together with nodules tend to occur in patients with higher GI levels yet whiteheads are primarily found in low GI groups.

The presented bar graph shows blackheads and nodules appear more frequently among patients consuming high glycemic intake.

High glycemic index diets cause whiteheads to decrease indicating diet acts as a factor that shapes acne type progression.

Researchers demonstrate the necessity of controlled dietary habits to manage different acne conditions. (Figure No. 4.12)

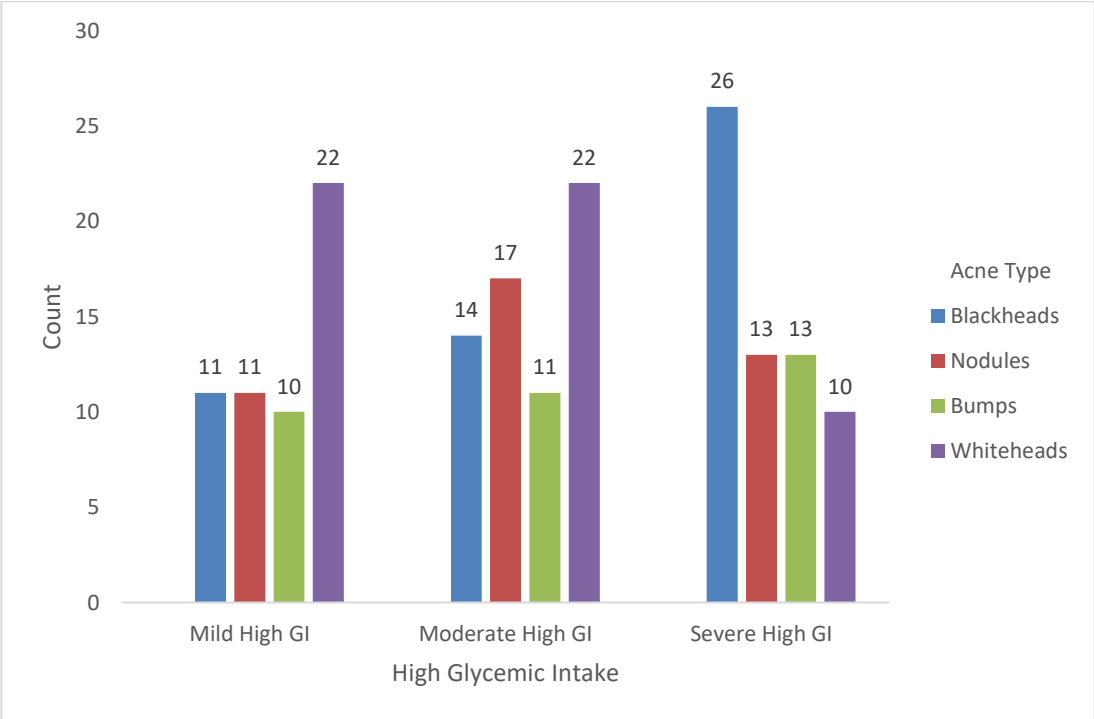


Figure No. 4.13: High Glycemic Intake vs Acne Type

Chapter 5

DISCUSSION

The present investigation analyzed the influence of high glycemic diet consumption on acne vulnerabilities alongside their distribution throughout different skin areas and their appearance types. Research data indicates that consuming diets with high glycemic values substantially contributes to acne formation together with its advancement. Acne formation shows a strong association to high glycemic intake according to results that utilize significant statistical value. High glycemic intake shows a proven statistical link ($p=0.003$) to acne development. People who maintained difficult high glycemic consumption patterns exhibited higher acne occurrences than consumers maintaining standard or low high glycemic intakes. Past studies support this discovery because high-glycemic foods cause insulin level spikes that trigger androgen production to create excessive sebum while clogging pores which worsens acne. The relationship between high glycemic intake and acne severity was determined to be statistically significant with a p-value of 0.006. The proportion of people with severe high glycemic intake had greater moderate to severe acne cases than those who ate less of these foods. Acne severity increases due to high insulin-like growth factor-1 (IGF-1) levels that occur when consuming high glycemic diets since this process leads to both hyper ketogenization and inflammatory processes. An acute reduction of glycemic load through diet adjustment presents itself as an alternative method to minimize acne severity levels ($p=0.025$). Acne appeared most frequently on the face (85%) while the rest of cases (15%) manifested on the body. High glycemic diet-induced hormonal changes affect sebaceous glands on the face to a greater extent because these glands display higher sensitivity.

The previous study confirms my results by showing how high glycemic diets cause acne development while a low glycemic-load diet improves acne symptoms and insulin sensitiveness which demonstrates nutrition as an important factor in acne development. More scientific studies need to investigate how weight reduction methods distinguish themselves from the effects of nutritional diet changes on their own. A 12-week food intervention took place in which forty-three male patients suffered from acne between the

ages of 15 to 25 years underwent an investigator-blinded dermatological assessment. The diet for the controlled trial had a glycemic sugar index that was low due to its 25% protein-based energy consumption together with 45% low-GI carbohydrate food. The control diet provided numerous carbohydrates but paid no attention to the glycemic index. Research staff assessed acne lesions along with measuring insulin sensitivity by homeostasis model during month-zero and at the end of the 12-week study period.

Test subjects with low-glycemic-load diet showed 23.5 ∓ 3.9 lesions reduction while control subjects maintained 12.0 ∓ 3.5 lesions during week 12 (P = 0.03). People on the experimental diet lost more weight (-2.9 ± 0.8 compared with 0.5 ± 0.3 kg; P< 0.001) and body mass index (in kg/m2; -0.92 ± 0.25 compared with 0.01 ± 0.11; P = 0.001) as well as experiencing better insulin sensitivity (-0.22 ± 0.12 compared with 0.47 ± 0.31; P = 0.026) than those on the control diet. (26).

Research used a cross-sectional study method while examining young people who were not obese in their experimental scope. Acne vulgaris appeared as a result of eating foods with high glycemic index or load according to the study results. The pathogenetic molecule adiponectin functions as a major factor that results in disease advancement. The research evaluated the dietary characteristics involving glycemic index and load and milk and dairy products as well as serum glucose levels alongside insulin and HOMA-IR and IGF-1 and IGFBP-3 and adiponectin in subjects with acne vulgaris.

Current research finds that increased Westernization of diets corresponds to higher acne rates. The pathogenesis of acne can be directly related to three main dietary components of Western diets which include high-glycemic carbs together with milk and dairy products and saturated fats. Research reveals information about nutritional signaling regarding acne vulgaris which links high glycemic load together with elevated insulin levels and IGF-1 signaling and leucine signaling from dairy proteins. (27)

6.1: CONCLUSIONS

The results of this study are in line with the potent relation between high glycemic diet and acne development, its severity, and type. The consumption of foods that are rich in glycemic foods, increases insulin levels that in turn encourage androgen production and the release of excess sebum and inflammation which are all major factors of the pathogenesis of acne. Our results indeed show that individuals who have really high hyperglycemia should have higher likelihood of acquiring acne than those with moderate or light hyperglycemia. Also, age and gender effects are demonstrated that the younger and the females are more at risk for developing acne. Furthermore, the presence of acne on the face strongly implicates a hormonal influence.

As there appear to be good evidence for relating high glycemic intake to acne, changing diet might be an effective, non-pharmacologic approach to acne management. Our results imply that diets that have low glycemic load and, in particular, those that are low in low are especially effective in the reduction of skin health. Clearly, there is need for further longitudinal and intervention-based research to determine which dietary guidelines are or are not useful for prevention and treatment of acne.

6.2: Recommendations

- Low Glycemic Diet: It is preferred to cut down on refined carbohydrates, processed foods, and sugary beverages in order to prevent and manage acne.
- The professionals in the health sector should increase awareness; educating individuals, especially adolescents and young adults, on how the diet can lead to acne formation.
- Individualized Acne Dietary Plans: Dermatologists and nutritionists need to put in place specific dietary guidelines for responsive to the acne sufferers.
- Then, further research should be conducted in the form of longitudinal and intervention studies to establish additional and stronger direct relations between the diet and severity of acne.

Limitations

- Recall Bias:` Dietary intake was self-reported, through which recall inaccuracies could be present.
- I did not control other acne triggers like stress, Skincare routines and my genetic predisposition.
- Longitudinal approach would give greater rigour to the evidence for causal relations with a study design being Cross-Sectional Study.

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APPENDICES

ENGLISH CONSEN TFORM

The study you are about to participate is a survey titled as; *"*Unveiling the Role of High Glycemic Diets on Acne Formation*"*

The study has no potential harm to participants. All data collected from you will be coded in order to protect your identity, and should not be disclosed to anyone. Following the study there will be no way to connect your name with your data. Your answers to the questions will not affect the quality of education given to you. Any additional information about the study results will be provided to you at its conclusion, upon your request.

You are free to withdraw from the study at any time. You agree to participate, indicating that you have read and understood the nature of the study, and that all your inquiries concerning the activities have been answered to your satisfaction.

NAME _____ **SIGNATURE**_____

DATE_____

URDU CONSENT FORM

میں_____ تصدیق کرتا/ کرتی ہوں کہ**محترمہ (Muhammad Bilal Aslam)**نے اپنی اس تحقیق

"Unveiling the Role of High Glycemic Diet on Acne Formation"

.زیرنگرانی **(Dr. Muhammad Adnan Hafeez)**کے متعلق بتا دیا ہے۔ مجھے اس تحقیق کی نوعیت، مقاصد، احداف، توقعات، فوائد اور خطرات کے متعلق ، ۔ساری معلومات فراہم کر دی گئی ہیں اس تحقیق کے دوران ساری معلومات صیغۃ راز میں رہیں گی اور مریض کا نام اور دیگر معلومات صرف تحقیق کے لیے استعمال ہوں گی۔مجھے یہ بھی بتا دیا گیا ہے کہ میں اس تحقیق سے متعلقہ ہر قسم کے سوال پوچھنے کا مجاز ہوں اور یہ تحقیق صرف ایک شخص ک مفاد میں نہیں ہے بلکہ بحسثیت مجموعی انسانیت کا مفاد اس سے وابسطہ ہے۔ تمام تفصیلات جاننے کے بعد یس تحقیق میں شامل ہونے یا نہ ہونے پر کسی کا قائل نہیں ہوں۔ اس تحقیق سے کسی بھی وقت علیحدہ ہونے پر مجھ پر کوئی پابندی نہیں ہو گی۔ میں بذاتِ خود بقائمی حوش و حواس

۔اور رضا مندی سے اس تحقیقاتی عمل میں شامل ہوتی/ ہوتا ہوں

---------- دستخط محقق

---------- دستخط شرکت کار

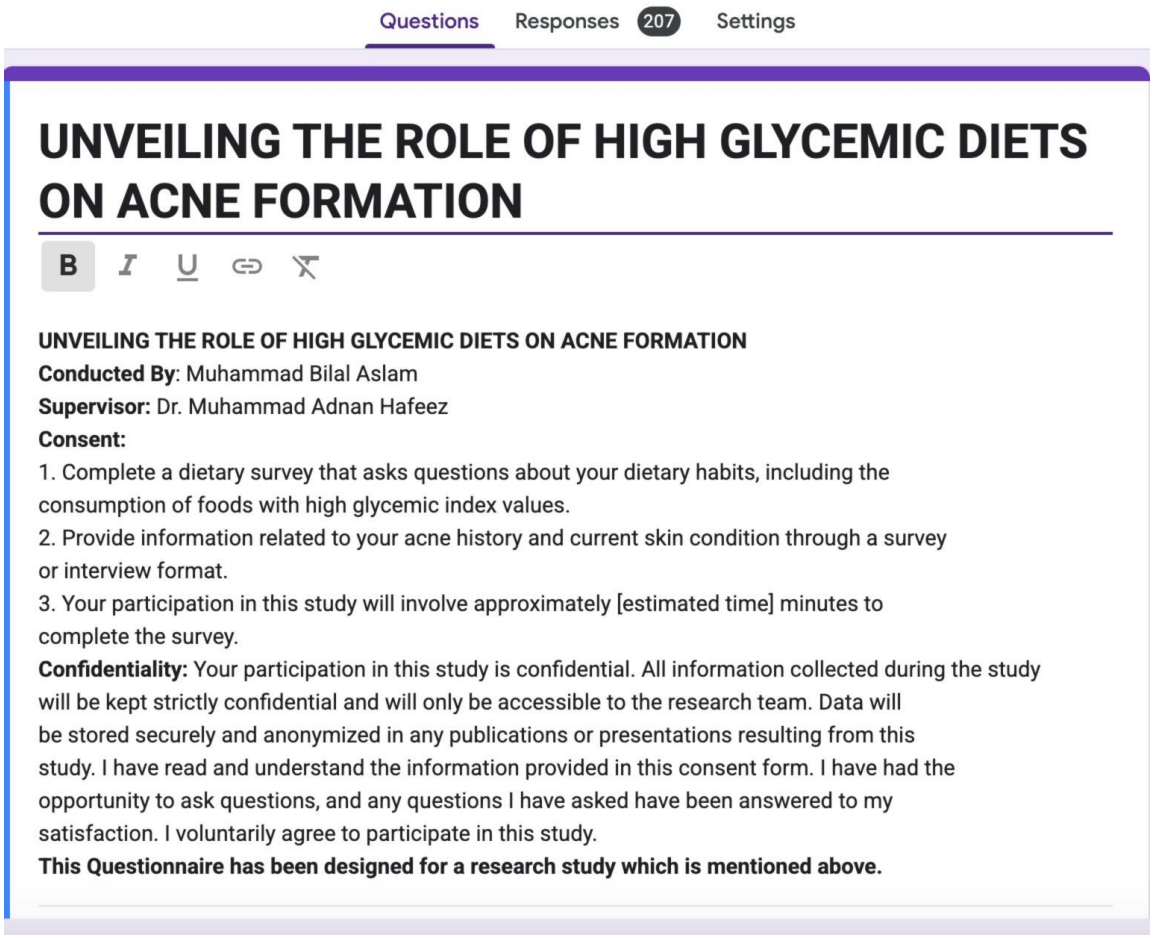
---------- تاریخ

QUESTIONNAIRE

Questionnaire to Unveil Role of High Glycemic Diet on Acne Formation	
Demographics	
1. Age	
a) 18-22	b) 23-26
2. Gender	
a) Male	b) Female
High Glycemic Intake	
a) Mild High GI	b) Moderate High GI
c) Severe High GI	
Acne	
1. Acne Formation	
a) Yes	b) No
2. Acne Severity	
a) Yes	b) No
3. Acne Location	
a) Body	b) Face
4. Acne Type	
a) Blackheads	b) Nodules
c) Bumps	d) Whiteheads

Food Frequency Questionnaire							
White bread	Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	Once a day	2-3 times per day
Soft drinks	Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	Once a day	2-3 times per day
Fruit juices	Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	Once a day	2-3 times per day
White rice	Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	Once a day	2-3 times per day
Ice cream	Never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	Once a day	2-3 times per day
Fast foods	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day
Refined Grains	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day
Bakery Products	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day
Honey	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day
Dates	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day
Chocolate	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day
Mashed Potatoes	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day
Milk & milk products	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day
Grapes	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day
Bananas	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day
Mangoes	Never	1-3 times per month	1-2 times per week	1-2 times per week	5-6 times per week	Once a day	2-3 times per day

PERMISSION LETTER



Questions Responses 207 Settings

UNVEILING THE ROLE OF HIGH GLYCEMIC DIETS ON ACNE FORMATION

B I U

UNVEILING THE ROLE OF HIGH GLYCEMIC DIETS ON ACNE FORMATION
Conducted By: Muhammad Bilal Aslam
Supervisor: Dr. Muhammad Adnan Hafeez
Consent:
1. Complete a dietary survey that asks questions about your dietary habits, including the consumption of foods with high glycemic index values.
2. Provide information related to your acne history and current skin condition through a survey or interview format.
3. Your participation in this study will involve approximately [estimated time] minutes to complete the survey.
Confidentiality: Your participation in this study is confidential. All information collected during the study will be kept strictly confidential and will only be accessible to the research team. Data will be stored securely and anonymized in any publications or presentations resulting from this study. I have read and understand the information provided in this consent form. I have had the opportunity to ask questions, and any questions I have asked have been answered to my satisfaction. I voluntarily agree to participate in this study.
This Questionnaire has been designed for a research study which is mentioned above.

ETHICS COMMITTEE LETTER

PLAGIARISM REPORT