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DESCRIPTIVE STUDY ON CLINICAL PRESENTATIONS AND LIFESTYLE CORRELATES AMONG PATIENTS DIAGNOSED WITH HYPOTHYROIDISM IN TERTIARY CARE HOSPITALS

Original Research

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ABSTRACT

Background: Hypothyroidism is a prevalent endocrine disorder characterized by reduced thyroid hormone production, leading to metabolic, cardiovascular, and neuropsychiatric disturbances. Its clinical manifestations often overlap with lifestyle-related factors, making early recognition and comprehensive management essential. Understanding these relationships provides insight into preventive and therapeutic strategies suited to local populations.

Objective: To describe the common clinical features and identify lifestyle-related correlates among patients diagnosed with hypothyroidism in tertiary care hospitals of South Punjab.

Methods: A descriptive study was conducted over eight months among 250 adults with confirmed hypothyroidism. Data were collected through structured interviews covering demographic details, clinical symptoms, and lifestyle variables such as physical activity, diet, sleep, and stress. Standardized tools, including the Global Physical Activity Questionnaire and self-reported sleep diaries, were used. Data were analyzed using SPSS version 26, with continuous variables expressed as mean ± SD and categorical data as frequencies and percentages. Pearson correlation, t-tests, and ANOVA were applied to explore relationships between clinical and lifestyle factors, considering $p < 0.05$ as statistically significant.

Results: The mean age of participants was 41.8 ± 10.7 years, with females comprising 72.8% of the sample. Fatigue (84.8%), weight gain (79.2%), and cold intolerance (66.8%) were the most frequent symptoms. Low physical activity (41.6%), inadequate sleep (35.2%), and high stress levels (44.8%) were prevalent. BMI showed a positive correlation with TSH ($r = 0.41$, $p < 0.001$), while sleep duration correlated inversely with fatigue ($r = –0.36$, $p < 0.001$).

Conclusion: The findings emphasize that hypothyroidism's clinical burden is significantly influenced by lifestyle behaviors. Incorporating physical activity, balanced diet, and stress management into clinical care may enhance treatment outcomes and patient quality of life.

Keywords: Body Mass Index, Fatigue, Hypothyroidism, Lifestyle, Physical Activity, Sleep, Thyroid Hormones.

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INTRODUCTION

Hypothyroidism is one of the most prevalent endocrine disorders worldwide, affecting individuals across all age groups and demographics. Characterized by an underactive thyroid gland and insufficient secretion of thyroid hormones, it leads to a generalized slowing of metabolic processes (1). The thyroid hormones—triiodothyronine (T3) and thyroxine (T4)—play crucial roles in regulating metabolism, thermogenesis, cardiovascular activity, and neurological functions. When their production decreases, multiple organ systems are affected, giving rise to diverse clinical manifestations. Despite its global recognition, hypothyroidism often remains underdiagnosed, particularly in developing countries where nonspecific symptoms are easily attributed to other causes or overlooked in routine medical practice. The clinical presentation of hypothyroidism varies widely, ranging from subtle fatigue and weight gain to overt signs such as myxedema, bradycardia, and depression. Many patients experience gradual symptom onset over months or even years, leading to diagnostic delays and chronic complications (2). The most common symptoms include cold intolerance, constipation, hair loss, menstrual irregularities in women, and generalized lethargy. These symptoms often overlap with lifestyle-related issues such as poor diet, lack of exercise, or chronic stress, making clinical differentiation challenging without biochemical confirmation. This overlap underscores the importance of studying lifestyle patterns that may influence both the onset and progression of hypothyroidism (3). Lifestyle factors such as sedentary behavior, high-calorie diets, inadequate sleep, and chronic stress have been increasingly implicated in the modulation of thyroid function. Emerging evidence suggests that environmental exposures, dietary iodine imbalance, and psychological stressors can contribute to thyroid dysfunction by disrupting the hypothalamic–pituitary–thyroid (HPT) axis. Urbanization and the shift toward processed food consumption have further increased the risk of endocrine disorders, including hypothyroidism. Moreover, lifestyle habits—especially among middle-aged women—often interact with hormonal and metabolic shifts, exacerbating the severity of symptoms and reducing treatment responsiveness. Understanding these associations may lead to improved patient counseling, early diagnosis, and preventive strategies (4).

In clinical practice, the diagnosis of hypothyroidism is primarily biochemical, relying on elevated thyroid-stimulating hormone (TSH) levels and reduced free T4 concentrations. However, the correlation between clinical presentation and laboratory values can vary substantially (5). Many patients remain undiagnosed until symptoms become pronounced, partly due to the vague nature of early manifestations. Therefore, exploring patterns of symptom clusters and their association with lifestyle behaviors can enhance the clinician's ability to identify at-risk individuals earlier in the disease course. Such descriptive insights are particularly valuable in tertiary care settings where patients often present with multiple comorbidities that may mask or mimic thyroid dysfunction (6). In South Asian populations, including Pakistan, hypothyroidism poses additional challenges due to nutritional transitions, limited screening programs, and low public awareness. Studies from regional healthcare centers indicate that a large proportion of thyroid cases are detected incidentally or during evaluation for unrelated health issues (7). Dietary habits rich in goitrogenic substances, inadequate iodine intake, and poor adherence to medication among diagnosed patients further complicate disease management. Moreover, cultural factors, such as reluctance to seek medical care for nonspecific fatigue or weight gain, contribute to the underreporting of symptoms. In this context, a descriptive evaluation of patients' clinical and lifestyle characteristics can offer meaningful insights into local disease patterns and guide community-level interventions. Another dimension often overlooked is the psychosocial burden of hypothyroidism. Chronic fatigue, cognitive dullness, and mood disturbances significantly impair quality of life. Lifestyle factors such as physical inactivity and irregular sleep cycles can worsen these symptoms, creating a self-perpetuating cycle of poor health outcomes. Understanding patient lifestyles not only aids in medical management but also provides a basis for behavioral interventions—such as structured exercise programs, stress management, and dietary counseling—that complement pharmacological therapy (8).

Despite extensive research in endocrinology, there remains a paucity of region-specific data that integrate clinical profiles with lifestyle determinants of hypothyroidism (9). Most existing literature focuses on hormonal measurements and pharmacological outcomes rather than on holistic patient characteristics (10). Consequently, clinicians lack contextual information on how daily habits, diet, and physical activity interact with disease expression in local populations. Filling this gap through descriptive research can contribute to more individualized, culturally sensitive, and effective management strategies (11). This study was therefore designed to describe the common clinical presentations and identify lifestyle-related correlates among patients diagnosed with hypothyroidism in tertiary care hospitals (12). The objective is to provide a comprehensive understanding of how demographic, behavioral, and environmental factors shape the

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manifestation and course of the disease. By establishing these patterns, the study aims to support more proactive screening, tailored patient education, and improved multidisciplinary management of hypothyroidism in clinical settings.

METHODS

This descriptive study was conducted over a period of eight months in tertiary care hospitals of South Punjab, focusing on patients diagnosed with hypothyroidism. The study was designed to describe the common clinical presentations of the condition and to identify lifestyle-related correlates among affected individuals. A purposive sampling technique was employed to recruit participants who fulfilled the diagnostic and eligibility criteria. Based on regional hospital records and the anticipated prevalence of hypothyroidism in adult populations, a minimum sample size of 220 participants was calculated using a 95% confidence level, 5% margin of error, and an estimated prevalence of 20%. To ensure statistical power and accommodate potential non-responses, the sample size was increased to 250 patients.

Participants included both male and female adults aged 18 years and above who had been clinically diagnosed with primary or subclinical hypothyroidism, confirmed through serum thyroid-stimulating hormone (TSH) and free thyroxine (FT4) levels. Patients on stable thyroid replacement therapy for at least three months prior to data collection were also included to capture lifestyle and symptomatic trends reflective of managed disease states. Exclusion criteria involved individuals with secondary hypothyroidism, concurrent pregnancy, major psychiatric disorders, or other chronic endocrine conditions such as diabetes mellitus or Cushing's syndrome, as these could confound symptom interpretation and lifestyle correlations.

Data collection was carried out using a structured, interviewer-administered questionnaire developed specifically for this study after a review of relevant clinical literature. The tool was pre-tested for clarity and consistency among a small subset of patients prior to formal data collection. The questionnaire comprised three sections: socio-demographic details, clinical symptom assessment, and lifestyle-related factors. Demographic data included age, gender, marital status, educational background, and occupational activity. The clinical section documented symptom patterns such as fatigue, weight changes, cold intolerance, mood alterations, constipation, and menstrual irregularities. Lifestyle correlates encompassed dietary habits, physical activity levels, sleep duration, and stress perception.

Lifestyle assessment was further supported by validated tools to ensure objective measurement. Physical activity was quantified using the Global Physical Activity Questionnaire (GPAQ), which classifies activity into low, moderate, and high levels based on weekly metabolic equivalents (METs). Dietary patterns were evaluated using a simplified food frequency module focusing on iodine-rich and goitrogenic food consumption. Sleep duration and quality were recorded using standard self-reported sleep diaries, while perceived stress levels were rated on a 5-point Likert scale. Anthropometric parameters, including body mass index (BMI), were recorded using standardized methods to establish metabolic associations with hypothyroid presentations.

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 26. Continuous variables such as age, BMI, and sleep duration were summarized as means and standard deviations, while categorical variables, including gender, physical activity, and dietary habits, were expressed as frequencies and percentages. The Shapiro–Wilk test confirmed normal distribution of continuous variables. Comparative analyses were conducted using independent sample t-tests and one-way analysis of variance (ANOVA) to explore mean differences in clinical and lifestyle variables across subgroups. Pearson correlation coefficients were used to examine associations between continuous variables, such as TSH levels, BMI, sleep duration, and physical activity scores. A p-value of less than 0.05 was considered statistically significant for all inferential analyses.

This systematic and transparent methodology allowed for the comprehensive assessment of clinical manifestations and lifestyle characteristics among patients with hypothyroidism. The use of validated tools and appropriate statistical techniques ensured reliability and reproducibility, enabling meaningful interpretation of relationships between lifestyle patterns and the clinical expression of thyroid dysfunction in the study population.

RESULTS

A total of 250 patients diagnosed with hypothyroidism were included in the analysis. The mean age of participants was 41.8 ± 10.7 years, with a predominance of females (72.8%). The mean body mass index (BMI) was 27.6 ± 4.8 kg/m², indicating an overall trend toward overweight. A majority of the respondents were from urban settings (62.4%), while 47.2% had completed graduate or higher

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education. More than half of the participants (52.8%) reported sedentary occupational routines, suggesting reduced daily physical activity (Table 1).

Clinical symptom distribution revealed fatigue as the most frequent complaint, reported by 84.8% of patients. Weight gain (79.2%), cold intolerance (66.8%), and constipation (57.6%) were also highly prevalent. Dermatological complaints such as hair loss (48.4%) and dry skin (55.2%) were common, while 53.3% of women reported menstrual irregularities. Mood disturbances, including irritability and depressive tendencies, were observed in nearly half of the sample (47.6%) (Table 2, Figure 1).

Lifestyle analysis showed that 41.6% of participants reported low physical activity levels, while 38.8% engaged in moderate activity and only 19.6% maintained a high activity profile. Inadequate sleep, defined as less than six hours per night, was noted in 35.2% of cases. High stress scores (Likert 4–5) were observed among 44.8% of patients. Approximately 42.8% reported following a balanced diet, while more than half (51.6%) admitted to frequent consumption of goitrogenic foods such as cabbage, cauliflower, and soy-based products. Sleep adequacy was comparatively better among urban respondents, though stress scores remained higher in the same group (Table 3, Figure 2).

Correlational analysis demonstrated a moderate positive correlation between BMI and TSH levels ($r = 0.41$, $p < 0.001$), indicating that higher BMI values were associated with greater thyroid dysfunction. Sleep duration showed a negative correlation with fatigue severity ($r = –0.36$, $p < 0.001$), suggesting that insufficient rest contributed to symptom persistence. Physical activity scores were inversely correlated with weight gain ($r = –0.29$, $p = 0.002$), emphasizing the role of sedentary behavior in metabolic impairment. Stress levels exhibited a strong positive correlation with mood change frequency ($r = 0.44$, $p < 0.001$) (Table 4).

Overall, the findings highlighted that most patients with hypothyroidism exhibited characteristic clinical features alongside modifiable lifestyle patterns that may influence disease expression and quality of life. The integration of physical activity, dietary balance, and stress reduction into management strategies may therefore hold clinical relevance for improving patient outcomes

Table 1: Demographic Characteristics of Study Participants

Variable	n (%) or Mean ± SD
Age (years)	41.8 ± 10.7
Gender (Male/Female)	68 (27.2%) / 182 (72.8%)
BMI (kg/m²)	27.6 ± 4.8
Residence (Urban/Rural)	156 (62.4%) / 94 (37.6%)
Education (Graduate or above)	118 (47.2%)
Occupation (Sedentary work)	132 (52.8%)

Table 2: Frequency of Clinical Features among Patients with Hypothyroidism

Clinical Feature	Frequency (n)	Percentage (%)
Fatigue	212	84.8
Weight gain	198	79.2
Cold intolerance	167	66.8
Constipation	144	57.6
Hair loss	121	48.4
Dry skin	138	55.2
Menstrual irregularity (females)	97	53.3
Mood changes	119	47.6

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Table 3: Lifestyle Characteristics of Patients with Hypothyroidism

Lifestyle Variable	n (%)
Low physical activity	104 (41.6%)
Moderate activity	97 (38.8%)
High activity	49 (19.6%)
Inadequate sleep (<6h)	88 (35.2%)
Adequate sleep (≥6h)	162 (64.8%)
High stress (Likert 4–5)	112 (44.8%)
Balanced diet	107 (42.8%)
Goitrogenic food intake	129 (51.6%)

Table 4: Correlation between Clinical and Lifestyle Variables

Variable Pair	Correlation coefficient (r)	p-value
BMI vs TSH	0.41	<0.001
Sleep duration vs Fatigue score	-0.36	<0.001
Physical activity vs Weight gain	-0.29	0.002
Stress score vs Mood change frequency	0.44	<0.001

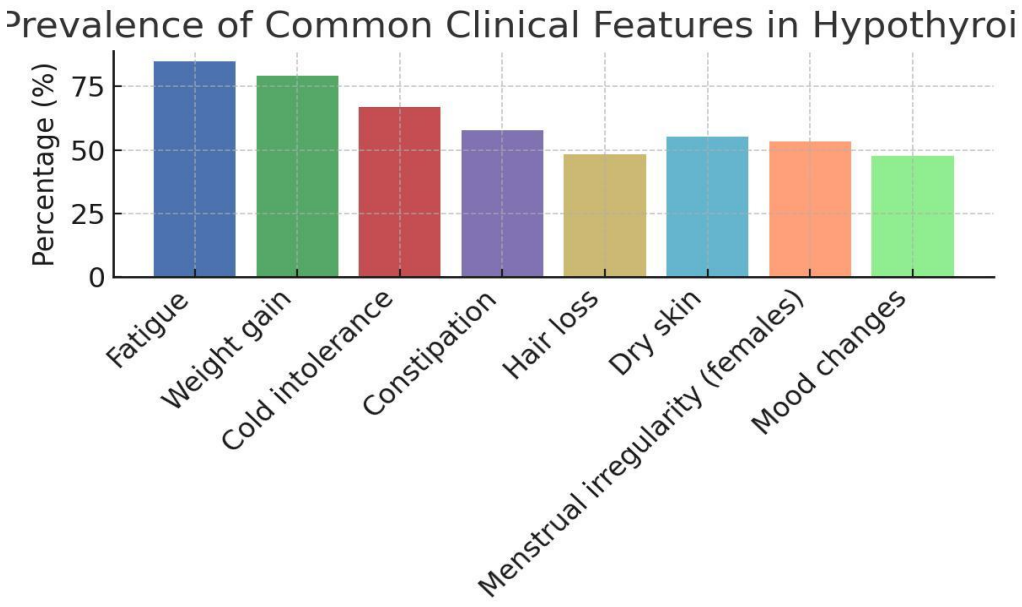

Figure 1 Prevalence of Common Clinical Features in Hypothyroid

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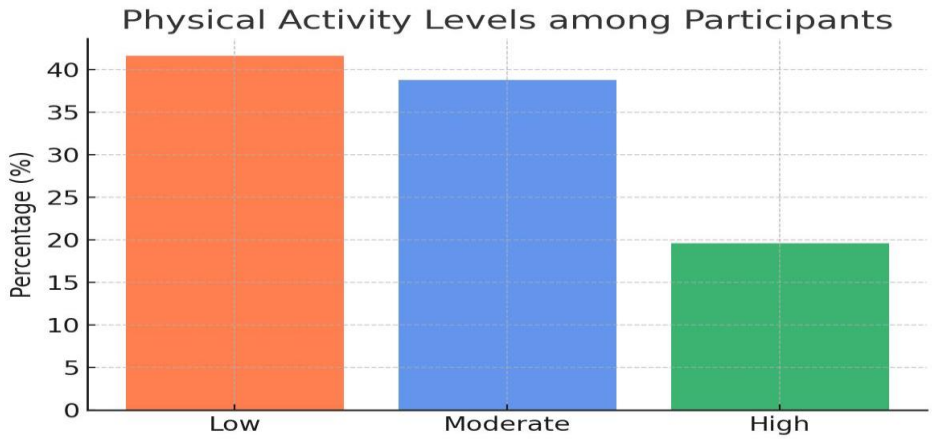

Figure 2 Physical Activity Levels Among Participants

DISCUSSION

The present study provided an in-depth understanding of the clinical and lifestyle characteristics of patients diagnosed with hypothyroidism in tertiary care hospitals of South Punjab (13). The results underscored a strong predominance of classic symptoms such as fatigue, weight gain, cold intolerance, and constipation, accompanied by notable variations in lifestyle habits including low physical activity, high stress, and poor dietary balance (14). The findings reflected the complex interplay between physiological dysfunction and modifiable behavioral factors, highlighting the importance of a holistic approach to managing hypothyroidism beyond pharmacological treatment alone. The predominance of fatigue and weight gain among the majority of participants aligned with the expected metabolic consequences of thyroid hormone deficiency, which slows basal metabolic rate and alters energy utilization (15). Cold intolerance and constipation, both consequences of reduced thermogenesis and gastrointestinal motility, further reinforced the metabolic sluggishness characteristic of the disorder. The relatively high occurrence of dermatological complaints such as dry skin and hair loss suggested chronicity in many cases, as these manifestations often appear after prolonged hormonal imbalance. Menstrual irregularities and mood changes among female participants reflected the significant influence of thyroid hormones on reproductive and neuropsychiatric functioning, emphasizing the systemic nature of the disease. The study identified that lifestyle factors were strongly associated with the severity and pattern of symptoms. More than 40% of patients exhibited low physical activity, while a similar proportion reported high stress levels. These patterns indicated that behavioral contributors may exacerbate or mimic hypothyroid symptoms, creating diagnostic and management challenges in routine practice. The negative correlation between physical activity and weight gain supported the physiological rationale that sedentary behavior amplifies metabolic disturbances in hypothyroid individuals. Likewise, the positive correlation between stress and mood changes highlighted the bidirectional relationship between endocrine and psychological health. Chronic stress is known to influence hypothalamic–pituitary regulation, which may further disrupt thyroid hormone secretion and worsen symptom perception (16).

The relationship between sleep duration and fatigue was particularly noteworthy. Sleep insufficiency was common, with over one-third of patients reporting less than six hours of rest per night. The observed negative correlation between sleep duration and fatigue severity suggested that inadequate rest aggravated perceived tiredness and cognitive dullness, independent of hormonal levels (17). These findings underscored the relevance of sleep hygiene in thyroid health and the potential for non-pharmacological interventions such as relaxation therapy, mindfulness, and structured sleep schedules to alleviate symptom burden. Dietary habits emerged as another important correlate. Over half of the participants admitted frequent intake of goitrogenic foods such as cruciferous vegetables and soy-based products, which can interfere with thyroid hormone synthesis, especially in regions with marginal iodine intake (18). The coexistence of unbalanced dietary habits and low awareness of nutritional triggers illustrated the need for structured dietary counseling in hypothyroid management. Conversely, a subset of participants following balanced dietary patterns demonstrated relatively milder symptom clusters, suggesting that nutritional behavior could modulate disease expression even in medically treated cases (19). The study's results aligned with the understanding that hypothyroidism represents both a metabolic and lifestyle-related disorder. The positive correlation between BMI and TSH levels highlighted that weight management is not merely a cosmetic concern but a significant physiological indicator of disease control. These results reinforced the importance of multidisciplinary care involving endocrinologists,

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dietitians, and behavioral specialists to address the multifactorial dimensions of the condition. The holistic assessment of lifestyle correlates, rather than focusing solely on biochemical correction, can significantly enhance patient outcomes and quality of life (20).

The findings carried several practical implications. They supported the integration of lifestyle modification programs into endocrine clinics, emphasizing physical activity promotion, dietary optimization, and stress management as adjuncts to levothyroxine therapy (21). The use of validated tools such as the Global Physical Activity Questionnaire and sleep diaries demonstrated that standardized assessment can effectively identify behavioral risk factors requiring intervention. Additionally, the inclusion of psychosocial measures broadened the understanding of patient well-being, a component often overlooked in conventional thyroid management. Despite its strengths, including the use of standardized instruments and a well-defined sample, the study had certain limitations. The cross-sectional nature limited causal inferences, as associations between lifestyle factors and symptom patterns could not establish directionality (22). The reliance on self-reported data for physical activity, dietary habits, and stress levels may have introduced reporting bias or recall inaccuracies. Moreover, biochemical parameters such as TSH and free T4 were not stratified by medication adherence or duration of illness, which could influence the observed relationships. The study was also confined to tertiary care hospitals, potentially representing a more symptomatic subset of patients compared to those managed in community settings. Nevertheless, the study offered valuable insights into the lived experience of hypothyroid patients within a regional context, adding depth to the understanding of lifestyle interplay in disease manifestation (23). Its strength lay in bridging clinical observation with behavioral assessment, thereby establishing a framework for patient-centered care. Future research could benefit from longitudinal designs that track lifestyle interventions and their impact on hormonal control, fatigue reduction, and metabolic recovery. Further exploration of dietary micronutrients, including selenium and zinc intake, could also refine nutritional recommendations. In conclusion, the findings emphasized that hypothyroidism in South Punjab represents not only a hormonal disorder but a condition deeply intertwined with lifestyle behavior. The observed correlations between clinical symptoms and modifiable habits highlighted opportunities for preventive and rehabilitative strategies that extend beyond conventional drug therapy. Encouraging active lifestyles, balanced diets, and stress resilience could serve as vital components of comprehensive thyroid health programs aimed at improving patient outcomes and long-term disease control (24).

CONCLUSION

The study concluded that hypothyroidism commonly presents with fatigue, weight gain, and cold intolerance, strongly influenced by lifestyle factors such as low physical activity, inadequate sleep, high stress, and poor dietary habits. These findings highlight the critical need for integrating lifestyle modification into clinical management to complement pharmacological treatment. Promoting regular exercise, balanced nutrition, and stress reduction can improve symptom control and overall quality of life, underscoring that effective hypothyroidism care requires both metabolic regulation and behavioral intervention for long-term health outcomes.

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Tooba Khanum	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
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Ayesha Foad Saeed	Contributed to study concept and Data collection Has given Final Approval of the version to be published

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