

# Evaluation of Knowledge, Attitudes, and Practices of Thyroid Disorders and Risk Factors Among Women of Zawia City of the Western Region of Libya

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## Abstract

The occurrence of thyroid disorders is a highly frequent health issue. Thyroid disorders represent one of the most prevalent medical conditions globally. In the North Africa and Middle East (NAME) region, a health systems evaluation has highlighted a higher prevalence of risk factors for thyroid disease, particularly those related to iodine deficiency. Thyroid issues are quite prevalent in women of reproductive age. Pregnancy has a notable effect on thyroid function, resulting in an almost 50% rise in the synthesis of thyroid hormones, thyroxine (T4) and triiodothyronine (T3), and a 50% rise in daily iodine needs. This study aimed to investigate the level of awareness and knowledge of thyroid disorders among the Libyan female population in Zawia Diabetic Center and the factors leading to increased rates of thyroid disorders in Zawia, Libya. This is a cross-sectional study conducted among females aged 18 years and older who currently reside in Zawia in the Western region of Libya. A total of 103 female participant, majority of the respondents were aged 41–55 years (39.8%), married (72.8%), and had a high educational level (62.1%). Most of them, 79 (76.7%), had thyroid disease before. Overall, 64 (62.1%) participants had poor knowledge, whereas 39 (37.9%) demonstrated good knowledge regarding thyroid disorders. Age was significantly associated with knowledge level ( $p = 0.011$ ). We recommended doing activities that focus on increasing the knowledge and awareness of the public regarding thyroid disorders.

**Keywords.** Knowledge, Attitude, Thyroid Disorders, Zawia, Libya.

## Introduction

The thyroid gland is an endocrine organ located in the front part of the neck, situated in front of the trachea. The main role of this gland is to produce a sufficient number of thyroid hormones, which mainly regulate the metabolic rate and protein synthesis. Additionally, thyroid hormones have further impacts, such as influencing the growth of different tissues and organs. The production of thyroid hormones is carefully controlled by the hypothalamic-pituitary axis through the release of thyroid-stimulating hormone from the anterior pituitary and thyrotropin-releasing hormone from the hypothalamus. The occurrence of thyroid disorders is a highly frequent health issue [1]. Indicators of thyroid issues vary based on the status of thyroid gland activity [1]. The thyroid's function can be mainly influenced by the gland itself (the most frequent cause) or secondarily impacted by signals from higher brain centers (hypothalamic-pituitary axis). This impact on gland activity will lead to either of two disorders: hypothyroidism or hyperthyroidism.

Hypothyroidism is the most common form, impacting 4-5% in developed nations. It is more prevalent in regions with iodine deficiency [2]. Hypothyroidism arises when the thyroid gland does not produce adequate hormones, potentially resulting in symptoms like fatigue, weight gain, and depression [3]. On the other hand, hyperthyroidism occurs due to overproduction of hormones, presenting as weight loss, anxiety, and rapid heartbeat [4]. Thyroid disorders represent one of the most prevalent medical conditions globally [5]. In the North Africa and Middle East (NAME) region, a health systems evaluation has highlighted a higher prevalence of risk factors for thyroid disease, particularly those related to iodine deficiency [6]. In Saudi Arabia, the highest prevalence recorded was 49.76%, with subclinical hypothyroidism being the most common type (39.25%), followed by primary hypothyroidism (5.3%) [7]. In Jordan, the prevalence was identified as 11.9%, while the rate of undiagnosed thyroid dysfunction rose to 9% [8]. Likewise, a different study conducted in Jordan indicated that around 10% of the participants experienced an athyroid condition that remained unrecognized [9].

Both studies generated comparable results regarding undetected thyroid dysfunction, which exceeds the 4.78% estimate of undiagnosed thyroid dysfunction in the United States, according to the American Association of Clinical Endocrinologists [10]. Thyroid disorders in Africa represent major public health issues that frequently go underdiagnosed and underreported due to multiple factors, such as insufficient healthcare resources and sociocultural obstacles [11]. Thyroid issues are quite prevalent in women of reproductive age. Pregnancy has a notable effect on thyroid function, resulting in an almost 50% rise in the synthesis of thyroid hormones, thyroxine (T4) and triiodothyronine (T3), and a 50% rise in daily iodine needs. The impact of thyroid conditions on women is significant, regardless of whether it is before, during, or after pregnancy. The prevalence of thyroid dysfunction in pregnancy ranges from 0.5% to 3.5% for hypothyroidism and around 1% for hyperthyroidism in early trimesters [12]. Thyroid issues, especially those connected to a lack of iodine, have historically been an issue in North African nations, such as Libya.

On the other hand, the rate of these disorders is still inadequately recorded, as there have been limited research efforts on the epidemiology of thyroid diseases in Libya [13]. There is a notable deficiency in the existing epidemiological data and engagement from local health agencies, resulting in a lack of relevant statistics and reports from reliable sources like the World Health Organization (WHO) and the Libyan Ministry of Health [14,15]. This study aimed to investigate the level of

awareness and knowledge of thyroid disorders among the Libyan female population in Zawia Diabetic Center and will examine the factors leading to increased rates of thyroid disorders in Zawia, Libya, and their effects on well-being, and the significance of significance of tackling this public health concern. Focused awareness campaigns, research initiatives, and collaborative healthcare efforts can enhance the diagnosis and management of thyroid disorders in the city, ultimately improving the health and quality of life for those impacted.

## Methods

### *Research design and Study setting*

This is a cross-sectional study conducted among females aged 18 years and older who are visiting Zawia Endocrine and Diabetic Center and currently reside in Zawia at Western region of Libya. The respondents to this study were fully informed about the nature of the study, and a pretested, pre-validated structured questionnaire was administered to a sample of 103 after obtaining verbal informed consent to participate in the study. The sample was randomly collected during the period from 18 November to 20 June.

### *Study questionnaire*

The survey was created to evaluate knowledge, attitudes, and practices (KAP) related to thyroid disorders and associated factors. It was designed using a standardized approach, which included a review of previously published surveys and related literature, along with the latest clinical guidelines such as the 2017 American Thyroid Association guidelines and the 2016 guidelines from the American Association of Clinical Endocrinologists/American College of Endocrinology/Association Medici Endocrinologic concerning thyroid nodules [16]. The initial draft of the survey was produced in English following discussions among the team of specialists in community medicine, endocrinology, and clinical radiology. It was subsequently translated into Arabic using the Google questionnaire platform, and then the questionnaire was revised by a clinical radiologist and another endocrine expert consultant to check its clarity and content validity. Experts from their field reviewed this draft, and their recommendations were included.

A pilot study was conducted to evaluate clarity and reliability, and a test was applied on a representative sample (around 19.4% of the target sample) (n= 20) to address any ambiguity in the questions and to determine whether the data would provide reliable information (change some terms for more clarification). Data collected during this pilot part of the study were excluded from the final data analysis. Ultimately, the finished survey comprised four sections: sociodemographic information and medical history, knowledge, attitudes, and practices related to thyroid disorders. The knowledge components were scored based on the type of questions, giving one point for correct responses and zero for incorrect or 'I do not know' answers; checklist items were proportionately scored to maintain balanced weighting across questions. Attitudes were evaluated using Likert-scale items, with scoring thresholds applied to categorize participants' levels of knowledge and attitudes. Participation was voluntary, with informed consent obtained from all individuals, while ensuring the confidentiality of personal data was upheld.

### *Ethical Approval and Informed Consent*

The study was approved by the Libyan Medical Research Center Bioethics Committee before data collection, and it was permitted by the ethical committee of Zawia Diabetic Center. Personal informed consent was obtained from all participants before their enrollment.

### *Statistical analysis*

Statistical analyses were performed using IBM SPSS Statistics version 27.0. Categorical variables were summarized as frequencies and percentages, while the thyroid disorder knowledge score was described using mean and standard deviation. Associations between participants' sociodemographic and clinical characteristics and knowledge level were assessed using the Pearson chi-square test or Fisher's exact test when appropriate. Variables showing a p-value of <0.10 in the univariable analysis were considered eligible for inclusion in the multivariable logistic regression model to identify independent factors associated with good thyroid disorder knowledge.

## Results

### *Socio-Demographic Characteristics of Respondents*

A total of 103 female participants visited the Zawia Endocrine and Diabetic Center for diagnosis and follow up, who were participated in this study. As shown in (Table 1), the majority of the respondents were aged 41–55 years (39.8%), married (72.8%), and had a high educational level (62.1%). Most of them, 79 (76.7%), had thyroid disease before. Among those who had been diagnosed, the most common type was hypothyroidism (31;30.1 %), followed by thyroid nodules (25;24.3%) and hyperthyroidism (23;22.3%). Our results showed that 56 (54.4%) of respondents had a family member with a history of thyroid disease. The overall mean knowledge score was  $8.03 \pm 3.29$  out of a maximum possible score of 14. Overall, 64 (62.1%) participants had poor knowledge, whereas 39 (37.9%) demonstrated good knowledge regarding thyroid disorders. Age was significantly associated with knowledge level ( $p = 0.011$ ).

The proportion of good knowledge increased progressively with age. Women with advanced education demonstrated a notably larger percentage of sound knowledge in comparison to those with less education (45.3% versus 25.6%). This underscores the significance of education as a key factor in health literacy and the capability to obtain and understand

information related to diseases. Females earning above 3,000 LYD demonstrated the greatest level of good knowledge (90.0%), while those with no income or lower earnings exhibited significantly lower levels of knowledge. This observation suggests that socioeconomic status might affect the availability of reliable health information and preventive healthcare services. The type of thyroid disorder was significantly associated with knowledge level ( $p = 0.001$ ). Participants diagnosed with hypothyroidism had the lowest proportion of good knowledge (19.4%), whereas those with hyperthyroidism showed comparatively better knowledge (39.1%). These differences may reflect variation in disease awareness, symptom recognition, and previous exposure to educational information.

**Table 1. Sociodemographic and clinical characteristics of the study participants (N =103)**

| Variable                               | Category              | n (%)     | Knowledge  |            | p-value |
|----------------------------------------|-----------------------|-----------|------------|------------|---------|
|                                        |                       |           | Poor n (%) | Good n (%) |         |
| Age (years)                            | 18–25                 | 14 (13.6) | 14 (100.0) | 0 (0.0)    | 0.011   |
|                                        | 26–40                 | 27 (26.2) | 17 (63.0)  | 10 (37.0)  |         |
|                                        | 41–55                 | 41 (39.8) | 23 (56.1)  | 18 (43.9)  |         |
|                                        | >55                   | 21 (20.4) | 10 (47.6)  | 11 (52.4)  |         |
| Marital status                         | Single                | 14 (13.6) | 9 (64.3)   | 5 (35.7)   | 0.912   |
|                                        | Married               | 75 (72.8) | 47 (62.7)  | 28 (37.3)  |         |
|                                        | Divorced/Widowed      | 14 (13.6) | 8 (57.1)   | 6 (42.9)   |         |
| Educational level:                     | Primary and secondary | 39 (37.9) | 29 (74.4)  | 10 (25.6)  | <0.001  |
|                                        |                       | 64 (62.1) | 35 (54.7)  | 29 (45.3)  |         |
| Employment status                      | Employed              | 65 (63.1) | 34 (52.3)  | 31 (47.7)  | 0.007   |
|                                        | Unemployed            | 38 (36.9) | 30 (78.9)  | 8 (21.1)   |         |
| Monthly income (LYD)                   | No income             | 38 (36.9) | 30 (78.9)  | 8 (21.1)   | <0.001  |
|                                        | <1,000                | 15 (14.6) | 13 (86.7)  | 2 (13.3)   |         |
|                                        | 1,000–3,000           | 40 (38.8) | 20 (50.0)  | 20 (50.0)  |         |
|                                        | >3,000                | 10 (9.7)  | 1 (10.0)   | 9 (90.0)   |         |
| Distance from healthcare center        | Near                  | 41 (39.8) | 25 (61.0)  | 16 (39.0)  | 0.468   |
|                                        | Far                   | 52 (50.5) | 31 (59.6)  | 21 (40.4)  |         |
|                                        | Very far              | 10 (9.7)  | 8 (80.0)   | 2 (20.0)   |         |
| Previous diagnosis of thyroid disorder | Yes                   | 79 (76.7) | 57 (72.2)  | 22 (27.8)  | <0.001  |
|                                        | No                    | 24 (23.3) | 7 (29.2)   | 17 (70.8)  |         |
| Type of thyroid disorder               | Hypothyroidism        | 31 (30.1) | 25 (80.6)  | 6 (19.4)   | 0.001   |
|                                        | Hyperthyroidism       | 23 (22.3) | 14 (60.9)  | 9 (39.1)   |         |
|                                        | Thyroid nodules       | 25 (24.3) | 18 (72.0)  | 7 (28.0)   |         |
| Family history of thyroid disorder     | Yes                   | 56 (54.4) | 32 (57.1)  | 24 (42.9)  | 0.254   |
|                                        | No                    | 47 (45.6) | 32 (68.1)  | 15 (31.9)  |         |

Percentages for thyroid disorder type were calculated among participants reporting a previous thyroid diagnosis.

Knowledge of thyroid disorders, risk factors and clinical manifestations among participants.

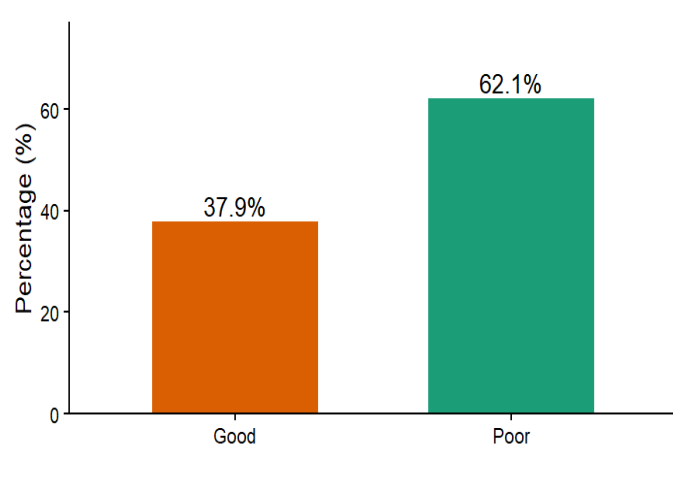
(Table 2, Figures 1 and 2) Illustrate the distribution of responses regarding knowledge related to thyroid issues. Among the evaluated thyroid-related knowledge aspects, the greatest awareness was noted concerning the significance of early thyroid function testing in avoiding complications (74.8%) and the importance of maintaining a balanced diet (73.8%). Fatigue as a sign of thyroid disorders was acknowledged by 68.0% of participants. In contrast, significant knowledge deficits were found concerning pregnancy and postpartum intervals as risk factors (28.2%), gastrointestinal symptoms (34.0%), and iodine imbalance as a risk factor (40.8%). The percentage of uncertain answers was typically low; nonetheless, it was noticeably higher for iodine-related risk factors (14.6%), gastrointestinal symptoms (15.5%), and pregnancy-related risk factors (13.6%), highlighting particular areas where focused educational efforts might be advantageous.

The majority of participants demonstrated poor knowledge (62.1%), whereas only 37.9% achieved a good knowledge level (Figure 1); these findings indicate considerable gaps in thyroid-related knowledge among participants. Whereas, figure 2 illustrates participants' knowledge regarding thyroid disorders, ranked by the percentage of correct responses; the highest awareness was observed for preventive measures, including early thyroid function testing (74.8%) and a balanced diet (73.8%). Moderate knowledge was observed for common symptoms and risk factors, such as fatigue (68.0%), female susceptibility (65.0%), and hypothyroid symptoms (62.1%). The greatest knowledge gaps were identified regarding pregnancy/postpartum risk (28.2%) and gastrointestinal symptoms (34.0%), highlighting the need for targeted educational interventions addressing less recognized aspects of thyroid disorders. In general, the data suggest that while the female

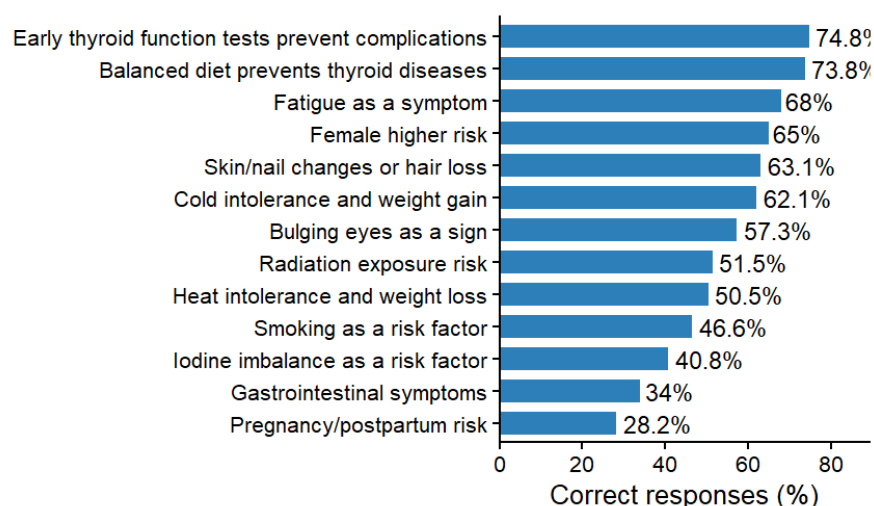
has a good understanding of the importance of testing and basic wellness for thyroid health, there is significantly less awareness regarding specific, understated risk factors and less overt clinical symptoms.

**Table 2. Knowledge regarding thyroid disorders among participants (N=103)**

| Knowledge item                                                                | Yes<br>n (%) | No<br>n (%) | Don't know<br>n (%) |
|-------------------------------------------------------------------------------|--------------|-------------|---------------------|
| Smoking (passive smoking) is a risk factor for thyroid diseases               | 48 (46.6)    | 41 (39.8)   | 14 (13.6)           |
| Radiation exposure is a risk factor for thyroid diseases                      | 53 (51.5)    | 40 (38.8)   | 10 (9.7)            |
| Insufficient or excessive iodine intake is a risk factor for thyroid diseases | 42 (40.8)    | 46 (44.7)   | 15 (14.6)           |
| Females are more at risk of having thyroid diseases                           | 67 (65.0)    | 33 (32.0)   | 3 (2.9)             |
| Pregnancy and the postpartum period are risk factors for thyroid diseases     | 29 (28.2)    | 60 (58.3)   | 14 (13.6)           |
| Cold intolerance and weight gain are common symptoms of hypothyroidism        | 64 (62.1)    | 32 (31.1)   | 7 (6.8)             |
| Heat intolerance and weight loss are common symptoms of hyperthyroidism       | 52 (50.5)    | 42 (40.8)   | 9 (8.7)             |
| Fatigue can be a symptom of thyroid diseases                                  | 70 (68.0)    | 29 (28.2)   | 4 (3.9)             |
| Diarrhea, constipation, or stomachache can be symptoms of thyroid diseases    | 35 (34.0)    | 52 (50.5)   | 16 (15.5)           |
| Skin and nail changes or hair loss can be signs of thyroid diseases           | 65 (63.1)    | 24 (23.3)   | 14 (13.6)           |
| Bulging eyes can be a sign of thyroid diseases                                | 59 (57.3)    | 35 (34.0)   | 9 (8.7)             |
| Early thyroid function tests can prevent complications of thyroid diseases    | 77 (74.8)    | 24 (23.3)   | 2 (1.9)             |
| A well-balanced diet is essential to prevent thyroid diseases                 | 76 (73.8)    | 21 (20.4)   | 6 (5.8)             |



**Figure 1. Distribution of participants according to thyroid disorder knowledge level**



**Figure 2. Knowledge gaps across thyroid disorder items**

**Attitudes and practices of female participants toward thyroid disorders**

(Table 3) presented participants' attitudes toward thyroid disorders. The majority of participants (88.3%) agreed that individuals should be motivated to get screening for thyroid nodules and thyroid cancer. Moreover, 70.9% stated that they would be concerned after being diagnosed with a thyroid disorder, while 54.4% thought that benign thyroid nodules are currently overtreated. Over half of the participants (52.4%) believed that thyroid disorders are preventable. In contrast, considerable uncertainty was observed regarding multiple statements, including whether benign thyroid nodules should be excised to prevent future malignancy (43.7% "I don't know"), the need for long-term medication after thyroidectomy (45.6%), the risk of death despite the generally favorable prognosis of thyroid cancer (59.2%), and the need for immediate surgery after diagnosis (41.7%). These results reveal significant gaps and uncertainty in attitudes toward the management and prognosis of thyroid disorders.

**Table 3. Participants' attitudes toward thyroid disorders and thyroid nodules (N = 103)**

| Attitude statement                                                                                                                   | Yes<br>n (%) | No n (%)  | I don't know<br>n (%) |
|--------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|-----------------------|
| You are worried after your diagnosis of thyroid disease.                                                                             | 73 (70.9)    | 22 (21.4) | 8 (7.8)               |
| Thyroid nodules are very common, not a major problem, and do not need to be dealt with.                                              | 28 (27.2)    | 37 (35.9) | 38 (36.9)             |
| Even if the thyroid nodule is benign at present, it should be excised as soon as possible to prevent malignant change in the future. | 33 (32.0)    | 25 (24.3) | 45 (43.7)             |
| Do you think steps can be taken to avoid getting thyroid disorders?                                                                  | 54 (52.4)    | 10 (9.7)  | 39 (37.9)             |
| There is overtreatment for benign thyroid nodules at present.                                                                        | 56 (54.4)    | 9 (8.7)   | 38 (36.9)             |
| The public should be encouraged to take the initiative in screening for thyroid nodules and thyroid cancer.                          | 91 (88.3)    | 4 (3.9)   | 8 (7.8)               |
| After thyroidectomy, there was no need to take medicine for a long time anymore.                                                     | 27 (26.2)    | 29 (28.2) | 47 (45.6)             |
| The prognosis of thyroid cancer is good, so a regular postoperative follow-up is not needed.                                         | 23 (22.3)    | 41 (39.8) | 39 (37.9)             |
| Although the prognosis of thyroid cancer is good, there is also a risk of death.                                                     | 28 (27.2)    | 14 (13.6) | 61 (59.2)             |
| Although the prognosis of thyroid cancer is good, surgery should be carried out as soon as possible after diagnosis.                 | 46 (44.7)    | 14 (13.6) | 43 (41.7)             |

Responders reported generally positive practices regarding thyroid disorder management and follow-up (Table 4). Most participants (91.3%) stated they follow up regularly as advised by healthcare providers, and 95.1% indicated that they would comply with prescribed medication schedules regarding timing and dosage. Physicians were the most frequently reported source of thyroid-related information (71.8%), followed by family and friends (18.4%) and social media platforms (9.7%). The majority of participants indicated maintaining a positive emotional state after diagnosis of thyroid nodules or thyroid cancer (77.7%) and showed a desire to learn about disease management (78.6%) actively. However, the percentage of uncertain replies was significantly notable for certain items, especially emotional coping (18.4%) and seeking additional disease-related information (17.5%).

**Table 4. Participants' reported practices and health-seeking behaviors related to thyroid disorder (N = 103)**

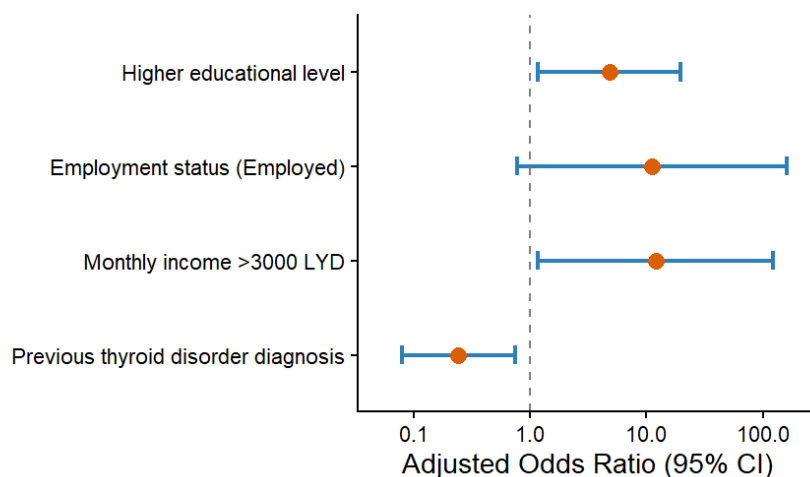
| Practice statement                                                                                                      | Response               | n (%)     |
|-------------------------------------------------------------------------------------------------------------------------|------------------------|-----------|
| You follow up regularly as the doctor advised.                                                                          | Yes                    | 94 (91.3) |
|                                                                                                                         | No                     | 3 (2.9)   |
|                                                                                                                         | I don't know           | 6 (5.8)   |
| What sources of information do you use to obtain information about thyroid disorders?                                   | Consulting a physician | 74 (71.8) |
|                                                                                                                         | Family/friends         | 19 (18.4) |
|                                                                                                                         | Social media           | 10 (9.7)  |
|                                                                                                                         | (Facebook, WhatsApp)   |           |
| If medication is required for management, you will take medicine on time and in the dosage recommended by your doctor.  | Yes                    | 98 (95.1) |
|                                                                                                                         | No                     | 1 (1.0)   |
|                                                                                                                         | I don't know           | 4 (3.9)   |
| After the diagnosis of thyroid nodules or thyroid cancer, you will pay attention to maintaining a good emotional state. | Yes                    | 80 (77.7) |
|                                                                                                                         | No                     | 4 (3.9)   |
|                                                                                                                         | I don't know           | 19 (18.4) |
| You will actively learn about the management of thyroid nodules or thyroid cancer.                                      | Yes                    | 81 (78.6) |
|                                                                                                                         | No                     | 4 (3.9)   |
|                                                                                                                         | I don't know           | 18 (17.5) |

In the multivariable logistic regression analysis, individuals with higher education had about five times greater odds of exhibiting good knowledge compared to those with lower education (AOR=4.80, 95% CI: 1.16–19.77). This discovery strengthens the recognized role of education in improving health literacy, helping access to reliable health information, and improving comprehension skills to understand disease-related concepts. Similarly, participants with the highest income category (>3000 LYD) had significantly higher odds of good knowledge (AOR=11.98, 95% CI: 1.16–123.35), signifying that socioeconomic factors might affect access to health information and participate with healthcare services. However, the wide confidence interval indicates reduced precision, likely related to the small number of participants in this income category, and this result should therefore be interpreted with caution. Notably, earlier thyroid diagnosis showed an inverse relationship with good knowledge after adjustment (AOR=0.24, 95% CI: 0.08–0.75). Even though people with thyroid issues are likely to have increased disease exposure, just being diagnosed may not ensure sufficient comprehension of the condition. This discovery underscores a possible deficiency in patient education and implies that regular clinical visits should include organized thyroid disease guidance to enhance patients' understanding and self-management skills.

**Table 5. Factors associated with good thyroid disorder knowledge: crude and adjusted logistic regression analysis**

| Variable                   | Category             | COR (95% CI)        | p-value | AOR (95% CI)        | p-value |
|----------------------------|----------------------|---------------------|---------|---------------------|---------|
| Education level            | Low education (Ref.) | 1.00                | —       | 1.00                | —       |
|                            | High education       | 9.94 (2.77–35.64)   | <0.001  | 4.80 (1.16–19.77)   | 0.030   |
| Employment status          | Unemployed (Ref.)    | 1.00                | —       | 1.00                | —       |
|                            | Employed             | 3.42 (1.36–8.57)    | 0.009   | 11.12 (0.77–160.44) | 0.077   |
| Monthly income (LYD)       | No income (Ref.)     | 1.00                | —       | 1.00                | —       |
|                            | <1000 LYD            | 0.58 (0.11–3.10)    | 0.521   | 0.47 (0.08–2.84)    | 0.413   |
|                            | 1000–3000 LYD        | 3.75 (1.39–10.16)   | 0.009   | 2.11 (0.67–6.70)    | 0.205   |
|                            | >3000 LYD            | 33.75 (3.71–307.13) | 0.002   | 11.98 (1.16–123.35) | 0.037   |
| Previous thyroid diagnosis | No (Ref.)            | 1.00                | —       | 1.00                | —       |
|                            | Yes                  | 0.16 (0.06–0.44)    | <0.001  | 0.24 (0.08–0.75)    | 0.015   |

Note: Reference categories are indicated by (Ref.). FOR: COR: crude odds ratio; AOR: adjusted odds ratio; CI: confidence interval.



**Figure 3. Forest plot of adjusted predictors associated with good thyroid disorder knowledge among participants**

Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) were obtained from multivariable logistic regression analysis. The dotted vertical line indicates the null effect (AOR = 1).

## Discussion

Evaluating the level of knowledge and awareness regarding thyroid disorders is critical since increased levels of understanding and awareness were linked to decreased prevalence and improved management and condition. Strategies for prevention [17]. Thyroid disorders are widely known as a prevalent health issue worldwide, but many remain undetected. Partly because of insufficient knowledge about the risk factors, symptoms, and effects of the disease among the general public [18], and the variations in KAP survey results across different communities worldwide [7,17,18]. The study's results showed that participants possessed a reasonable level of knowledge, indicated by an average knowledge score of  $8.03 \pm 3.29$  from a total of 14.00.

Comparable knowledge scores were noted in the literature [7,17,18]. Straightforward comparisons between studies cannot be conducted because of inconsistencies in the evaluation tools employed. Our study results show 64 (62.1%) participants had poor knowledge, whereas 39 (37.9%) demonstrated good knowledge regarding thyroid disorders. The proportion of good knowledge increased progressively with age, ranging from 0.0% among participants aged 18–25 years to 52.4% among those aged >55 years. Corresponding with Anas and colleagues' survey, where demonstrate the Jordanian age group (41–

55 years of age) has good knowledge regarding thyroid disorders. This finding suggests that older participants may have greater exposure to thyroid-related information, possibly due to increased healthcare contact and disease experience. Hypothyroidism was identified as the most prevalent thyroid condition among respondents, as noted by (n=31, 30.1%) of our survey participants, and this figure was determined to be less than noted in similar research carried out by Kollerits et al., where 93.1% of participants had hypothyroidism among 885 female patients in Hungary [19].

Awareness about the risk factors associated with thyroid disorders could assist in preventing those risks or might lead to earlier detection. In this research, a family background of thyroid conditions was the most acknowledged risk factor. A positive family history demonstrated a slightly higher proportion of good knowledge (42.9%) compared with those without a family history (31.9%); this difference did not reach statistical significance. In contrast, Anas and colleagues [18], family history of thyroid disorders was the most recognized risk factor among participants (68.7%). Additionally, the study revealed that 48 (46.6%) of participants correctly recognized the association between smoking (as passive smoking) and thyroid disorders, similar to [11] and the findings presented by Anas et al [18], who said that only 27.1% of participants correctly recognized the association between smoking and thyroid disorders. Moreover, 46 (44.7%) females in the study did not have any knowledge that insufficient or excessive iodine intake is a risk factor for thyroid diseases, which contradicts the findings from the study by Anas [18] and Alshahrani [20], where the degree of Understanding of iodine's significance in preventing thyroid issues was high and the same as the result by Kayes [21]. In this study, the level of knowledge about the importance of iodine in the prevention of thyroid disorders was poor. The majority (n=67, 65.0%) of the participants believed that females are more at risk of having thyroid disease, and comparable findings were stated in a similar study [7, 13 & 14]. Notably, only 29 (28.2%) of participants were aware of the association between Pregnancy and postpartum period are risk factors for thyroid diseases, in addition, it was observed that 60 (58.3%) of participants had answer where no association between pregnancy and thyroid disorders and only (n= 14 (13.6%) which was similar to a study conducted in India where 63.6% of participants had this understanding [22].

Concerning knowledge of the clinical presentation of thyroid disorders, over half (n=64, 62.1%) of the participants were aware that cold intolerance and weight gain are common symptoms of hypothyroidism; almost half (n=52, 50.5%) of the participants were aware that heat intolerance and weight loss are typical indications of experiencing hyperthyroidism. Almost half n=52, (50.5%) of the participants stated that diarrhea, constipation, or abdominal pain are not symptoms of thyroid issues. A third (n=59 (57.3%) of the participants indicated that they were aware that eye bulging can indicate thyroid disease, and comparable results were observed in concurrent studies [20,22]. 70 (68.0%) of female represented that Fatigue can be a symptom of thyroid diseases, and 65 (63.1%), knew that Skin and nail changes or hair loss can be signs of thyroid diseases, comparable with the literature [17]. Participants displayed good health-seeking behavior since they primarily relied on healthcare professionals or their family and friends as their main sources of information about thyroid disorders. 74 (71.8%) participants acquired concerning the thyroid disorders from doctors, followed by family and friends (18.4%) and social media platforms (9.7%). 80 (77.7%) answered that, after the diagnosis of thyroid nodules or thyroid cancer, they will pay attention to maintaining a good emotional state. Most participants reported maintaining a positive emotional state after diagnosis of thyroid nodules or thyroid cancer (77.7%) and expressed willingness to learn about disease management (78.6%) actively. However, the proportion of uncertain responses remained notable for some items, particularly emotional coping (18.4%) and seeking additional disease-related information (17.5%), suggesting potential opportunities for improving patient support and education. Those factors reported in our study have the same findings in several studies in India [22], Saudi Arabia [7], and Jordan [18]. Women who recognize thyroid conditions and their signs are significantly more likely to avoid risk factors, to seek medical attention when uncertain, and to take appropriate actions regarding care. This cross-sectional descriptive study sought to evaluate the knowledge, attitudes, and practices regarding thyroid disorders in Zawia, Libya, as information on this topic is insufficient.

## Conclusion

The participants (37.9%) who demonstrated good knowledge and awareness of thyroid disorders were noted. Some knowledge gaps were noted concerning symptoms of thyroid disease and risk factors that could lead to thyroid issues. Level of education and family background of thyroid Disorders were associated with heightened awareness and understanding of thyroid disorders. Activities should focus on increasing the knowledge and awareness of the public regarding thyroid disorders. This can be achieved through different methods, including community outreach and social media. Media today play a crucial role in disseminating information and knowledge, and this might serve as an effective resource to enhance awareness through media initiatives.

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