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A study on impact of intervention programme on women suffering from hypothyroidism in Dharwad city, Karnataka

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Abstract
The present study was conducted to know the incidence and prevalence of hypothyroidism among women in Dharwad city. Thirty hypothyroid women patients were selected randomly from the workshop conducted at Dharwad city. The questionnaires (pre and post) were administered as a tool to collect the baseline and post intervention information. Majority (43%) of the respondents were having normal body mass index (BMI). Majority of the patients were aged between 40 and 50 years and developed hypothyroidism between the age of 30 and 40 years. Respondents suffered from symptoms like general fatigue (86%), swelling in the neck (64%), thickening of the tongue(60%), and constipation (23%). The baseline data revealed that, the women were lacking knowledge regarding foods to be avoided and included during the treatment of hypothyroidism. After intervention their knowledge regarding consumption of chicken and mutton (BI- 60% daily, and AI- 100% weekly),wheat and wheat products (BI- 83% daily, AI-100% do not consume), green leafy vegetables (BI- <34% daily, AI – 100% daily). Consumption pattern in raw or cooked form of goitrogenous foods like cabbage, cauliflower (BI -40% raw, AI - 100% cooked), iodised salt (BI-86%, AI – 100%) and millets (BI; 43- 60% daily, AI - 100% daily) was recorded. The study concluded that life style disease may occur due to several reasons and it can be managed through dietary modifications such as food to be consumed or avoided and shifting from preserved foods to fresh foods that can provide nutrients to lead a healthy life. Intervention programme was very effective as revealed by significant results and there was a significant improvement in respondents knowledge regarding their dietary aspects post intervention.

Keywords: hypothyroidism, nutritional education, bi-before intervention, ai- after intervention

Introduction

The word Hypothyroidism is from Greek hypo meaning "reduced" thyreos for "shield" and eidos for "form". The prevalence of Hypothyroidism in India is 11% compared with only 2% in the UK and 4.6% in the USA. Hypothyroidism is a deficiency of T4. It is present in approximately 2% of women and 0.1 - 0.2% of men (Tunbridge *et al.,* 1977; Vanderpump *et al.,* 1995) [22, 23]. The eastern part of our country had the highest occurrence of thyroid disorders (27%) followed by North India (26%). Ambika Unnikrishnan *et al.* (2013) [1] explains that hypothyroidism is highly prevalent in India with one out of 10 people in the country diagnosed with the thyroid condition. Chaisera, (2013) [3] explains that thyroid disease is usually seen in three forms; under activity (primary and secondary hypothyroidism); over activity (hyper thyroidism); and swelling of the thyroid. The most common thyroid condition is hypothyroidism or (under activity), under active thyroid resulting from deficiency of thyroid hormones autoimmune diseases, surgical removal of thyroid and radiation treatment or more rarely from their impaired activity at tissue level. Primary Hypothyroidism is where the thyroid gland produces insufficient amounts of thyroid hormone (eg-autoimmune) thyroiditis, previous radio iodine or surgical treatment of hypothyroidism. Secondary hypothyroidism is lack of thyroid hormone secretion due to inadequate secretion of either thyrotrophin i.e. thyroid stimulating hormone (TSH) from the pituitary gland or thyrotropin releasing hormone TRH. The thyroid gland secretes two main hormones, thyroxin *(T_4)* and triodothyronine (T_3). Thyroxin is produced in greater quantity than T3 (at a ratio of 10:1) but T3 is the major biologically active thyroid hormone. The normal range for T3 is 100 to 200 nanograms per deciliter, and the normal range for T4 is 4.5 to 11.2 micrograms per deciliter and the normal range for TSH is 0.4 to 4.2 microunits per milimiter in adults. The purpose of this study was to know the incidence, causes, treatment, management and prevention of hypothyroidism by dietary modification. This educational programme assist the hypothyroid patients in broadening their knowledge as possible and further in understanding the importance of nutritious food intake to maintain the levels under control. There were limited studies found on the dietary aspects and hypothyroidism. Thus, a study was undertaken with objectives, to study the dietary pattern of hypothyroid patients, to conduct intervention programme by giving nutrition education and to evaluate study the impact of intervention programme.

Material and Methods

The study was conducted in Dharwad City. Thirty hypothyroid patients (women) were selected randomly from Dharwad city, where 15 samples were selected by the camp conducted by the Akkanabalaga an NGO women organisation Dharwad and rest of 15 samples were selected by workshop conducted at Shri Satya Sai Institute for women college, Dharwad.

1. A self structured questionnaires (Pre and post) were developed to collect the necessary data.
    a. Pre questionnaire consisted of personal information, clinical history and dietary considerations in the

management of hypothyroidism.
b. Post questionnaire consisted of dietary intake of hypothyroidism.

2. **Nutrition education:** Intervention programme was carried out by three phases:
   Phase I: The pre questionnaire was administered to women who attended the workshop.
   Phase II: Nutrition education was imparted through lecture, slideshow presentation and folders.
   Phase III: The post questionnaire was administered to women to collect the impact of nutrition education.

Statistical analysis
Frequencies and percentage were calculated for the data gathered from the self structured questionnaire. Data obtained was interpreted for results followed by statistical analysis (descriptive statistics were calculated). T test of significance was done, the level of statistical significance was set up at $P < 0.05$).

Results & Discussion
The data generated from the study conducted was compiled and tabulated. The results of the study are represented in tabular form and discussed below

Demographic data of the patients suffering from hypothyroidism (30)

Table 1

Age		Education		Bodymass index		Family life history	
Years	**%**	**Educational status**	**%**	**BMI**	**%**	**years**	**%**
30-40	33.33	10^{th}	10	Underweight	7	<10	13
40-50	40	PUC	20	Normal	43	>10	37
50-60	16.67	Degree	54	Overweight	40	>15	50
60-70	10	PG	16	Obese	10	-	-

The above table depicts the age of the respondents i.e., 33.33 per cent of the subjects were 30 – 40 years, whereas 40 and 16.67 per cent of the subjects age were 40 – 50 years and 50 – 60 years, respectively, while rest 10 per cent of the subjects age were 60 – 70 years. Hence, the majority of the women who attended the workshop was between the age of 40 - 50 years. Regarding Education status of the women 10 per cent of the women were SSLC, 20 percent of them were PUC, 54 percent of the subjects were degree holders and 16 per cent of the subjects were belonged to the category of post-graduation, hence majority of the women were graduates. 13 per cent of the women were married for less than 10 years, whereas 37 percent of the subjects were more than 10 years while majority of them were more than 15 years of married life. When the BMI of subjects was categorized it was found that 7percent of the subjects were underweight, while 43 per cent of the subjects were normal, 40 percent of the subjects were overweight and rest about 10 percent of the subjects were found to be obese, hence less than 50 percent of the women were normal.

Clinical History

Table 1: Incidence of hypothyroidism in respondents (30)

Age	Percentage
30 – 40 years	54
40 – 50 years	24
50 -60 years	16
60 – 70 years	6

The above table exhibits that majority of the respondents (54%) suffered hypothyroidism at the age between 30 – 40 years, while 24 percent of the subjects suffered hypothyroidism at the age between 40 – 50 years and rest 16 and 6 per cent of the subjects got the hypothyroidism at the age between 50 – 60 years and 60 – 70 years, respectively. It was noted from the data that the majority of the respondents developed hypothyroidism at the age of 30 – 40 years. Where Ambika Unikrishnan *et al*. (2013) [1] explains that there is high prevalence of thyroid condition in India with one out of 10 people prevalence of hypothyroidism is more in women than in men.

Table 2: Symptoms of the respondents (30)

Symptoms	Percentage
Swelling in the neck	64
Thickening of the tongue	60
Fatigue	86
Constipation	23

Majority of the respondents (86%) suffered from fatigue condition, followed by 64 percent of the subjects suffered from swelling in the neck, while 60 percent of the subjects suffered from thickening of the tongue and only 23 percent of the subjects suffered from constipation.

Dietary History

Table 3: Non-veg food consumption pattern by the respondents (30)

Non-veg foods	Daily		Weekly		Occasionally	
	B.I. (%)	**A.I. (%)**	**B.I. (%)**	**A.I. (%)**	**B.I. (%)**	**A.I. (%)**
Fish	40	-	60	100	-	-
Chicken	60	-	40	100	-	-
Mutton	60	-	20	100	20	-
't' calculated	11.30		7.34		1.73	
T – table value	4.30		4.30		4.30	

Significant at 0.05 per cent level of probability

The above table depicts that before the intervention, majority of the subjects (60%) consumed fish weekly, whereas 40 percent of the subjects consumed fish daily. About 60 percent of the subjects consumed both chicken and mutton daily. While rest 40 and 20 percent of the subjects consumed chicken and mutton weekly and rest 20 percent of the subjects consumed the mutton occasionally. After the intervention all the respondents (100%) expressed that they will consume the non-veg weekly. So, the intervention programme did bring positive significant result (which is indicated by the tabulated and T-table value) among the women.

Table 4: Wheat and wheat products consumption by the subjects (30)

Wheat and wheat products	Daily		Weekly		Occasionally		Do not take	
	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)
Wheat flour	83	-	17	-	-	-	-	100
Maida	-	-	43	-	44	-	13	100
Semolina	30	-	43	-	27	-		100
Vermicelli	-	-	40	-	47	-	13	100
Bakery products	10	-	17	-	43	-	30	100
't' calculated	2.16		10.19		7.34		32.03	
T – table value	2.77		2.77		2.77		2.77	

Significant at 0.05 per cent level of probability

The above table reveals that before intervention, majority of the respondents (83%) consumed wheat flour daily and rest 17 percent of the respondents consumed the wheat flour weekly. About 43 and 44 per cent of the respondents consumed maida weekly and occasionally respectively. Whereas 13 per cent of the respondents does not consume maida at all. About 30, 43 and 23 percent of the respondents consumed semolina daily, weekly and occasionally, respectively before the intervention. About 40 and 47 percent of the respondents consumed vermicelli weekly and occasionally respectively, while rest 13 percent of the respondents do not consume vermicelli at all. About 10, 17 and 43 percent of the respondents consume bakery products daily, weekly, occasionally, while rest 30 percent of the respondents do not consume bakery products. After the intervention all the respondents (100%) stated they will not consume the wheat and wheat products. This shows that intervention programme had positive impact on the hypothyroid patients with respect to wheat and wheat products consumption as the result is significant (which is indicated by the t-calculated and T-table value).Because patients with hypothyroidism have gluten sensitivities and majority of the individuals find that thyroid function improves upon elimination of gluten from their diets.

Table 5: Green leafy vegetables consumption by the subjects (30)

Green leafy vegetables	Daily		Weekly		Occasionally		Do not take	
	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)
Spinach	26	100	54	-	20	-	-	-
Lettuce	20	100	40	-	40	-	-	-
Menthi (fenugreek leaves)	34	100	56	-	10	-	-	-
Shepu	23	100	50	-	27	-	-	-
Amaranthus	10	100	34	-	43	-	13	-
't' calculated	19.72		21.48		9.05		2.01	
T table value	2.776		2.776		2.776		2.776	

Significant at 0.05 per cent level of probability

The above table depicts that after the intervention all the subjects (100%) expressed that they will consume green leafy vegetables daily but before intervention about 26, 54 and 20 percent of the respondents consumed spinach daily, weekly and occasionally, respectively. About 20, 40 and 40 percent of the subjects consumed lettuce daily, weekly and occasionally, respectively. Majority of the samples (56%) consumed fenugreek leaves weekly, whereas 34 and 10 percent of the samples consumed fenugreek leaves weekly, whereas 34 and 10 percent of the samples consumed fenugreek leaves daily and occasionally, respectively. Majority of the subjects (50%) consumed shepu weekly while rest 23 and 27 percent of the women consumed shepu daily and occasionally, respectively. About 10, 34 and 43 percent of the women consumed amaranthus daily, weekly and occasionally whereas 13 percent of the samples does not consume amaranthus at all. It revealed that the intervention programme was very effective on the respondents with respect to green leafy vegetables consumption as indicated by significant result the 't' calculated and T-table value.

Table 6: Food consumption pattern by the subjects (30)

Foods	Daily		Weekly		Occasionally		Do not take	
	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)
Groundnut	60	83	26	17	14	-	-	-
Cashews	33	67	35	33	26	-	6	-
Almond	26	70	54	30	20	-	-	-
Garden cress	-	-	17	-	30	20	53	80
Soybean	16	-	35	-	33	10	16	90
Soyachunk	17	-	17	-	43	7	23	93
Soya milk	7	-	13	-	30	-	50	100
Soya tofu	-	-	13	-	30	-	57	100
Cabbage	-	-	57	-	30	34	13	66
Cauliflower	-	-	44	-	40	34	16	66
Sweet potato	-	-	20	-	66	17	14	83
Pumpkin seeds	-	17	7	50	40	33	54	-
Coconut	-	13	37	50	40	17	23	-
't' calculated	10.74		15.55		18.60		16	
T – table value	2.179		2.179		2.179		2.179	

Significant at 0.05 per cent level of probability

The above table revealed that before intervention, about 60 per cent of the women consumed groundnut daily while 26 and 14per cent of the women consumed the groundnut weekly and occasionally, respectively. After intervention majority of the respondents (83%) stated that they are consuming the groundnut daily, while 17 per cent of the respondents consume weekly. Before intervention about 33 per cent of the respondents consumed the cashews daily while 35, 26 per cent of the respondents consumed the cashews weekly and occasionally and rest of the 6 per cent of the respondents do not consume cashews. After intervention majority of the respondents (67%) stated that they consume the cashew nuts daily and rest 33 per cent of the respondents consumed cashew weekly. Before imparting nutrition education about 26 per cent of the respondents consumed almond daily, while 54 and 20 per cent of the respondents consumed the almond weekly and occasionally respectively. After imparting nutrition education majority of the respondents (70%) revealed that they consume almond daily and rest (30%) of the respondents consume weekly. Before intervention programme about 17 percent of the subjects consumed garden cress seeds weekly while 30 per cent of the subjects consumed the garden cress occasionally and rest 53 per cent of the respondents do not consume the garden cress at all. After intervention programme majority of the respondents (80%) revealed that they consume garden cress seeds while rest 20 per cent of the respondents consume garden cress seeds occasionally. Before intervention about 16 per cent of the respondents consumed soybean daily whereas 35 and 33 per cent of the respondents consumed weekly and occasionally respectively and rest 16 per cent of the respondents do not consume the soybean only, but after intervention majority of the respondents (90%) informed that they will not consume soybean and rest 10 per cent of the respondents consume occasionally. Before imparting nutrition education about 17 per cent of the respondents consumed the soyachunk daily while 17 and 4.30 per cent of the respondents consumed the soyachunk weekly and occasionally and rest 23 per cent of the respondents do not consume soyachunk. After imparting the nutrition education, majority of them(93%) expressed that they will not consume soyachunk and rest 7 per cent of them consume the soyachunk occasionally. Before intervention about 7per cent of the subjects consumed the soyamilk daily whereas 13 and 30 per cent of them do not consume soya milk. After the intervention programme, all the subjects (100%) stated that they will not consume soyachunk. After providing nutrition education all the respondents (100%) revealed that they will not consume soya tofu. Before intervention about 57 per cent of the respondents revealed that they will not consume soyatofu while 13 and 30 per cent of the respondents consumed soyatofu weekly and occasionally, respectively. After the intervention, majority of them (66%) conveyed that they will not consume cabbage. Before the intervention about 57 and 30 per cent of them consumed cabbage weekly and occasionally whereas 13 per cent of the samples cabbage only. Before intervention about 44 and 40 per cent of the respondents consumed cauliflower weekly and occasionally, while rest 16 per cent of the subjects do not consume cauliflower. After intervention majority of the subjects (66%) stated that they will not consume cauliflower. After imparting the nutrition education majority of the patients (83%) expressed that they will not consume sweet potato while 17 per cent of the patients consume the sweet potato occasionally, but before imparting nutrition education about 20 and 66 per cent of the hypothyroid patients consumed the sweet potato weekly and occasionally respectively, whereas rest 4 per cent of the subjects does not consume sweet potato. Before intervention about 7 and 40 per cent of the respondents consumed the pumpkin seeds weekly and occasionally whereas 54 per cent of the respondents does not consume any pumpkins seeds but after intervention, majority of the respondents (50%) stated that they consume the pumpkin seeds weekly whereas 17 and 33 per cent of the respondents consume the pumpkin seeds daily and occasionally, respectively. Before intervention about 37 and 40 per cent of them consumed coconut weekly and occasionally whereas 23 per cent of the them do not consume coconut at all. After intervention majority of them (50%) conveyed that they consume coconut weekly, while rest 33 and 17per cent of the samples consume coconut daily and occasionally, respectively. Hence,the intervention programme was very effective with respect to food consumption pattern as revealed by significant result (which is indicated by the 't' calculated and T-table value).

Table 7: Goitrogenous food consumption pattern by the subjects (30)

Goitrogenous foods	Raw		Cooked	
	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)
Cabbage	60	-	40	100
Cauliflower	13	-	86	100
Sweet potato	-	-	100	100
't' calculated	2.27		2.27	
T – table value	4.30		4.30	

Significant at 0.05 per cent level of probability

From the above table it reveals that the before intervention, majority of the subjects (60%) consumed cabbage in raw form and rest (40%) consumed cabbage in cooked form. About 13 per cent of the subjects consumed cauliflower in raw form while 86 per cent consumed in cooked form before the intervention. All the subjects (100%) consumed the sweet potato in cooked form before the intervention. After intervention the knowledge level of all subjects increased and stated that they will not consume goitrogenous foods. But inspite of intervention there was not much significant difference (which is indicated by the 't' calculated and T table value)

Salt consumption pattern by the subjects

The salt consumption pattern revealed that before intervention about 14 per cent of the patients consumed crystal salt whereas 86 per cent of the patients consumed iodized salt. But after intervention knowledge level of the respondents increased upto (100%) and expressed that they will daily consume iodized salt.

Table 8: Millets consumption pattern by the subjects (30)

Millets	Daily		Weekly		Occasionally		Do not take	
	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)	B.I. (%)	A.I. (%)
Ragi	43	100	30	-	14	-	13	-
Bajra	-	100	10	-	44	-	46	-
Foxtail	-	100	12	-	44	-	44	-
Samai	-	100	10	-	30	-	60	-
Kodomillet	-	100	3	-	86	-	11	-
Barnyard millet	-	100	7	-	6	-	87	-
Jowar	60	100	33.33	-	7	-	-	-
't' calculated	3.26		8.47		10.47		9.33	
T – table value	2.447		2.447		2.447		2.447	

Significant at 0.05 per cent level of probability

The above table explains that before intervention majority of the respondents consume ragi (43%) daily, whereas weekly and occasionally they consume foxtail millet followed by bajra, samai and barnyard millet. But after intervention all the subjects (100%) expressed that they will consume all millets daily. Hence, the intervention programme has a very good impact on the subjects as revealed by a significant result (which is indicated by the 't' calculated and T table value)

Conclusion

The study made it worth concluding that life style disease may occur from many of the reasons yet we can manage it through dietary modifications such as food should be consumed or avoided, shifting from preserved foods to fresh foods that can provide nutrients to lead a healthy life. Yoga practices and asanas are considered to be good for hypothyroid patients such as meditation, prayer, pranayama, mudras and suryanamaskar and asanas like sarvangasana (shoulder stand), matsyasana (fish pose), marjarsana (cat pose), halasana (plough pose), bhujangasana (cobra pose). Here all these yoga asanas stimulate the endocrine system and engage the body in carrying out its normal functions and the intervention programme which was given on nutritional aspects helped all the hypothyroid patients and there was a significant improvement in their knowledge regarding their dietary aspect to cope up with the stress and lifestyle.

Limitations

- Number of intervention programme could be increased periodically so that better practice is accomplished by the subjects.
- The sample size of the present study was 30. Further, study could be conducted on more number of subjects for better reliable results.

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