

Impact of a Designed Educational Program on Thyroidectomy Patients' Discharge Compliance Instructions

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Abstract: Complications following surgical removal of the thyroid gland can often be life-threatening. The risk for these complications illustrates the importance of long-term follow-up of patients treated for thyroid disorders. Health education emphasizes the importance of following medical advice in order to improve adherence to treatment. Thus the aim of this study was to design an educational program to fit with thyroidectomy patients, and to evaluate the effect of a designed educational program on discharge compliance. The PRECEDE/PROCEED model was used as theoretical framework. Quasi-experimental design was used. Sample recruited in the study was 60 adult male and female patients admitted to general surgical wards at El Manial University Hospital affiliated to Cairo University. Data were collected utilizing four tools; 1) Socio-demographic and Medical Data Sheet; 2) Lifestyle Assessment Questionnaire, 3) Discharge Knowledge Questionnaire, and 4) Compliance Discharge Instructions. The study finding revealed that, there is a statistical significant improvement in discharge knowledge and compliance. Discharge compliance instructions including (Lifestyle and medication compliance) were gradually improved by time throughout the study period (3months) among the studied subjects (N=60). **Conclusion:** implementation of the designed educational program for thyroidectomy patients' improved patient acquisition of knowledge and discharge compliance instructions. Application of such a designed program is highly recommended for thyroidectomy patients at general surgical wards to improve patients' compliance and knowledge. Thus, this educational program could help in preventing complication, and re-hospitalization. Therefore, thyroidectomy patients' outcome will be improved.

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1. Introduction

About 200 to 800 million people in the world have some form of thyroid disease. Thyroid disorders are very common in the United States with over 20 million people under treatment. Multinodular goiter is one of the most common endocrine diseases worldwide, affecting 500-600 million people. Multinodular goiter is more prevalent in areas where iodine is lacking in the diet (Bailey 2001; Columbia University Medical Center, 2007).

In Egypt by reviewing the medical records and statistical data of the general surgical departments, revealed that there is a continuous increase in percentage of patients who were admitted for thyroidectomy in relation to general surgical patients. It was (19.8%, 25.5%, 31.5%, 38.8%, 44.4%) respectively, in the period between "2004 to 2008" respectively (Statistical Administration and Medical Records. at Manial University Hospital, 2010). Also, the traditional course of treatment for thyroidectomy patients throughout all stages of the surgical experience are lacking in provision of patient teaching in spite of, thyroid patients require life-long monitoring of potential complication, adherence to drug therapy and need for follow-up.

Following partial or complete removal of the thyroid, complications may occur due to the surgical procedure itself, or the secondary metabolic disturbances. Frequently seen complications include postoperative bleeding, infection, and parathyroid deficit. Complications that occur less frequently are thyroid storm, and recurrent laryngeal nerve injury (Sharma. Barr and Rubin (2007). The risk of hypothyroidism with subtotal thyroidectomy is, however, quite high, and some experts say that more than 70 percent of patients undergoing a subtotal thyroidectomy will become hypothyroid. Hypocalcaemia, or low blood levels of calcium, may occur after near total thyroidectomy(Shomon, 2007). Complications following surgical removal of the thyroid gland can often be life-threatening. The risk for these complications illustrates the importance of long-term follow-up of patients treated for thyroid disorders. (Bare, & Smelter, 2008).The gap between best care and usual care is large for many diseases. In particular, poor compliance remains a significant, cause of the care gap. Poor compliance is a remedial problem in health care quality and its improvement and accountability offer shared opportunities for providers and patients (Wahl *et al* 2004).

Therefore, health education should emphasize the importance of following medical advice. Healthcare providers as well as patients need education in order to improve adherence to treatment. (Hirsch; *et al*, 2008). Accordingly, Compliance is often seen as the most important outcome of patient education. Aims of the education are to motivate the patient to comply with the prescribed treatment and adapt to health-promoting behaviors and to provide the patient with the skills and knowledge needed in order to perform self-care without professional supervision (Couffinhal, *et al*. 2005).

Discharge teaching for the patient following a thyroidectomy should include information regarding the signs and symptoms of potential complications. It is also important to include information about how and when to contact the physician, plus written and verbal information regarding medications, lifestyle pattern, wound care, and follow-up visits with the physician. The nurse must be sure that the patient demonstrates an understanding of all aspects of home care. (Naldi&Sassi, 2009).

Therefore, implementation of nursing educational program for thyroidectomy patients might improve patients care outcome by encouraging compliance with medical treatment regimens and promoting healthy lifestyles, also it helps in cost reduction when it is directed towards prevention of re-hospitalization.

2. Methodology:

Conceptual Framework:

PROCEED - PROCEED model was utilize as a frame of work for the study.

Aim of the study:

The aim of this study was to evaluate the impact of a designed educational program on thyroidectomy patients' discharge compliance instructions.

Hypotheses:

The main hypothesis of the study is; the patients whose receive the educational program will have better patients' discharge compliance. To fulfill the main aim of this study the following sub-research hypotheses were formulated:

H₁- Thyroidectomy patients who will participate in a designed educational program will have higher post total discharge knowledge mean score than pre total discharge knowledge mean score.

H₂- Thyroidectomy patients who will participate in a designed educational program will have higher discharge compliance instructions mean score in the third month than second and first month mean scores respectively.

Research Design:

Quasi-experimental design utilized in this study. The current research adopted this design

because it is difficult to random sample representing the patient.

Setting:

The study carried out at the general surgical departments of El- Manial University Hospital, which is affiliated to Cairo University.

Sample:

A convenience sample of 60 adult male and female patients was collected within one year. Criteria for the subjects' inclusion was: (a) whose were scheduled for thyroidectomy,(b) recent admission, (c) had no previous thyroidectomy (d) had no other medical problems such as diabetes mellitus, liver disease, renal disease that may interfere with educational program outcome, and(e)had no hindering factors to communicate verbally.

Tools for Data Collection:

Tools were tested for content validity and reliability. Four tools were constructed and developed by the researcher to collect data pertinent to the study:

1) Socio-Demographic and Medical Data Sheet; the first part covers variables related to age, gender, occupation, marital status, level of education; the second part covers data related to patient's diagnosis, type of surgery, and medication after hospitalization, laboratories values about thyroid hormones.

2) Lifestyle Assessment Questionnaire: is related to smoking habits, stress, nutritional habits, and physical activity;

3) Knowledge Questionnaire: is pertinent to knowledge related to discharge care such as medications and its importance, method of administration, monitoring, and side effects, proper thyroid nutrition, and healthy lifestyle factors. Total score was (13) grade, each right answer takes one grade.

4) Compliance Discharge Instructions: It includes medication and lifestyle compliance instructions; the first part pertinent to anti-thyroid drug, monitoring, calcium, and adjuvant therapy. The total medication compliance score was (16 items 48 score).The second part was lifestyle modification compliance that includes instructions about stress reduction, smoking cessation, proper thyroid nutrition, and improving physical activity. The total lifestyle compliance score was (21 item-63 score).Score for each level of compliance ranged from (1-3score).

Ethical Consideration

Written informed consent was taken from each patient after explaining the nature and benefits of this research. The researcher emphasized that participation in the study was entirely voluntary and each patient has the right to withdraw from the study at anytime without giving any reason. As well,

anonymity and confidentiality were assured through coding the data.

Pilot study:

Pilot study conducted on (10) percent of sample population to estimate the needed time for data collection, and to test the feasibility, objectivity, and applicability of the study tool. The six patients who participated in the pilot study were excluded from the actual research.

Procedure:

The current study was conducted on three phases; the preparatory phase was involved in designing the educational program materials including educational booklet, construction, and testing of different study tools. Also, it was concerned with managerial arrangements to carry out the study.

The second phase was the implementation. Patients who were meeting the criteria for inclusion were identified daily from admission records. Data were collected from the patients through structured interview and patients' files to assess patients' needs and problems. Socio-demographic & Medical data, Lifestyle sheet were filled out by the researcher. In the second session the researcher assess the patients' knowledge by written pre-test regarding to discharge information. In discharge day; discharge plan was taught to the subject. It includes information about lifestyle modification, and medication compliance instruction. Written booklet was given to the patients. Before patients discharged post-discharge knowledge test was done.

The third phase was the evaluation phase. The evaluation was done two times for knowledge and three for compliance. Discharge compliance instruction was completed from the participant at outpatient clinics of general surgery at the first month after discharge. There was an open channel of communication between the researcher and the patients for consultation, feedback and follow up by utilizing telephone call, during second and third month.

Statistical Analysis:

Statistical Package for Social Science (SPSS), version 17, was used for statistical analysis of the data. The following tests were used; (a) arithmetic mean as an average, describing the central tendency of observations (b); the standard deviation as a measure of dispersion of results around the mean; (c) The frequency and percentage of observations and (d). Repeated Measure ANOVA was used to measure the change over time for the studied variables.

Limitations of the Study:

Generalization of the study cannot be reassured because of the following; the findings in

this study were limited to 60 subjects; the sample was not randomly selected; specific criteria established. Follow up after discharge phase for the educational program needed to be longer 3 months.

3. Results:

Regarding to socio-demographic characteristics table (1) shows that the age of sample ranged from (20 to 60) years old: with a mean of (37.0±11.14). (61.7%) of studied sample were found in the age group (30-49) years. The majority (90.0%) of studied sample were female patients. Approximately (71.6%) of studied sample were married, and (55%) were educated.

Table (2) shows that thyroid nodule, multinodular goiter, and thyrotoxicosis were, respectively as follows (43.3%, 26.7%, & 18.3%). The most common surgical operations for patients with thyroid diseases were hemi-thyroidectomy and total thyroidectomy (40.0%, & 31.7%) respectively. Anti-thyroid and other drugs were prescribed for (83.3%) of studied patients after discharged. About (6.7%) were given adjuvant therapy (radiotherapy) after hospitalization.

Table (3) depicts that (93.3%) of the studied sample were nonsmoker, but (66.7%) of studied sample significant others were smoker. (53.3%) of the patients were eating complete balanced diet. Most of the studied subject (91.7%) was not heavily consuming of raw goitrogenic containing foods, and (50.0%) used this type of food every month not on regular basis. Also (83.3%) was not heavy consuming of fast foods, and canned foods. (40.0%) was heavily consumed of table salt, used table salt without proper iodine supplementation as it was not properly packed. Table (4) revealed that about half (48%) of studied sample personality traits were irritable, aggressive, impatient, and had difficulty to communicate with others. More than half (58.3%, 66.7%, 68.3, & 66.7%) of sample had other personality traits such as a need to excel in mostly everything, always rushed or pressed for time, hard driven, had difficulty to sleep. (45.0%) of sample had conflicts with mate, in-laws, family or friends. (43.3%) practiced walking exercise daily. (13.3%) did not know that physical activity helps the mind as well as the body. Approximately (76.7%) of sample evaluated their exercise practice as weak.

Table (5) revealed that only (5.0%) of patients were oriented about medication, and healthy lifestyle in pre test knowledge as compared with the satisfactory post test of discharge knowledge reached to (75.0%, 96.7) respectively. Also, there was statistical significant difference between post & pre test of discharged knowledge regarding medication,

lifestyle, and overall discharge compliance, t-test (15.690, 24.267* and , 21.415* at P values=.000*).

Table (6) shows that lifestyle compliance was gradually increased in complete compliance during three months (5.0%, 36.7%, & 83.3%) respectively. Further analysis indicated increase in medication compliance during three month (12.0%; 44.0%; & 50.0%) respectively. Furthermore, total

overall compliance scores during three months increased gradually (7.71%, 39.6%, and 74.3%).

Table (7) illustrated, that there is statistically significant difference put into evidence among the studied sample during three months in relation to medication, lifestyle, and overall compliance discharge with F -ratio = 125.929*, 251.808*, and 367.478* at p values =.000*).

Table (1): Frequency and percentage distribution of socio-demographic characteristics among the studied subjects (n= 60).

Variables:	No	%
Age		
20-	17	28.3
30-	19	31.7
40-	18	30.0
50-	6	10.0
Mean ±SD	37.0±11.14	
Sex:	No	%
Female	54	90.0
Male	6	10.0
Level of education:		
illiterate	27	45.0
Educated	33	55.0
Marital status:		
Single	12	20.0
Widowed	5	8.4
Married	43	71.6

Table (2): Frequency and percentage distribution related to indications and types of surgeries, and medication among the studied patients (n= 60).

Variables:	No	%
Indications of Surgery		
Thyroid Cancer	4	6.7
Solitary Thyroid Nodule	26	43.3
Multinodular Goiter	16	26.7
Thyrotoxicosis	11	18.3
Others	3	5.0
Types of Surgeries		
Hemithyroidectomy	24	40.0
Near Total Thyroidectomy	5	8.3
Total Thyroidectomy	19	31.7
Partial Thyroidectomy	12	20.0
Medication		
NO	10	18.7
Yes		
Anti-thyroid & other medications	50	83.3
Anti-thyroid	32	53.3
Beta-blockers, Antibiotics, & Anti-thyroid	4	6.6
Antibiotics, and Anti-thyroid	14	23.3
Adjuvant therapy (radiotherapy):		
No	56	93.3
yes	4	6.7

Table (3): Frequency and percentage distribution of dietary and smoking habits.

Smoking habits& dietary habit	N	%
Used tobacco		
No	56	93.3
Yes	4	6.7
Exposed to inhalation of smoke from significant others		
No	20	33.3
Yes	40	66.7
Eat complete balanced diet		
you don't know	11	18.3
never	8	13.3
Often`	32	53.3
always	9	15.0
Eating goitrogenic foods		
daily	1	1.7
weekly	25	41.7
monthly	30	50.0
twice /weekly	4	6.7
Eating fast foods, canned foods		
No	50	83.3
yes	10	16.7
Used table salt		
Restricted	5	8.3
Heavily consumed	24	40.0
moderation	31	51.7
Use salt table without iodine supplement/not properly packed		
No	36	60.0
yes	24	40.0

Table (4): Frequency and percentage distribution of some characteristics of personality traits, stressors, and exercise habits among the studied patients (n= 60).

Characteristics of personality traits:	No	%
Irritable, aggressive ,impatient	29	48.3
Have a need to excel in mostly everything	35	58.3
Always rushed or pressed for time	40	66.7
Hard driven and competitive	41	68.3
Had difficulty to sleep at least 7-8 hours per day.	40	66.7
Had difficulty to communicate with others	29	48.3
Stressors:		
-Have too many responsibilities	22	36.7
-Death of significant person i.e., a spouse, friend, relative	22	36.7
-Serious illness or injury	11	18.3
-Conflicts with mate, in-laws, family or friend(s)	27	45.0
-Problems with child care	7	11.7
-Not enough money and/or heavy debt	4	6.7
-Other personal stressors	2	3.3
Exercise Habits:		
- do at least 30 minutes of regular walking/day	26	43.3
- know that physical activity helps the mind as well as the body	8	13.3
- evaluation to exercise practice		
Weak	46	76.7
Moderate	12	20.0
High	2	3.3

Table (5): Frequency and percentage distribution, and test of significance of pre and post discharge knowledge among the Studied Patients N = (60).

Discharge knowledge	Pre- knowledge				Post- knowledge				t-test	P value
	= ≥ 50%		= < 50%		= ≥ 50%		= < 50%			
	N	%	N	%	N	%	N	%		
Medication(7)	3	5.0	57	95.0	45	75.0	15	25.0		
x ±SD	.8500±1.08				4.51±1.64				15.690*	.000*
Healthy lifestyle(6)	3	5.0	57	95.0	58	96.7	2	3.3		
x ±SD	1.0167±1.0166				5.033 ± .95610				24.267*	.000*
Overall compliance(13)	4	6.6	56	93.4	44	73.3	16	26.7		
x ±SD	1.200±1.1903				6.250±1.653				21.415	.000*

N.B unsatisfactory level < 50 %, Satisfactory level= ≥ 50, *significant at P. values ≤ 0.05

Table (6): Frequency and Percentage distribution of discharge compliance during three months among the studied patients:

Discharge compliance:	Lifestyle(63)		Medication(48)		Overall compliance	
First month:	N	%	N	%	sum	%
Non compliance(1)	33	55.0	31	62.0	1189	57.8
Partial compliance(2)	24	40.0	13	26	1424	34.5
Complete compliance(3)	3	5.0	6	12.0	477	7.71
Second month:						
Non compliance(1)	18	30.0	13	26	586	28.45
Partial compliance(2)	20	33.3	15	30.0	1320	32.03
Complete compliance(3)	22	36.7	22	44.0	2442	39.6
Third month						
Non compliance(1)	7	11.6	1	2.0	163	7.91
Partial compliance(2)	3	5.0	19	38.0	734	17.81
Complete compliance(3)	50	83.3	30	60.0	4590	74.3

* (1) Score was given for non compliance,(2)score for partial compliance, and(3)score for complete compliance --

*number of studied subject who received medication were (50) patient.

Table (7): Comparison of post discharge compliance using repeated measure ANOVA all though out the study periods.

Test variables	First month	Second month	Third month	F-ratio	P-value
	X+ SD	X + SD	X + SD		
Medication compliance	20.03+11.55	29.02+14.028	34.37+16.01	125.929*	.000*
Lifestyle compliance	31.40+9.81	42.65+8.45	57.16+7.11	251.808*	.000*
Overall compliance	51.44±17.16	71.68+18.10	91.54+17.77	367.478*	.000*

*significant at P. values ≤ 0.05

4. Discussion

Regarding to socio-demographic and medical data the current study shows that (61.7%) of studied sample were found in the age group (30-49) years. The majority were female patients. Thyroid nodule, multinodular goiter, and thyrotoxicosis were the most common thyroid disorders. In accordance with these results, Manji, *et al.* (2006) reported that, approximately more than half of subjects with thyroid disorders were females. In this regards, Knudsen, *et al.* (2005), who studied the prevalence of thyroid disease in Denmark, reported that there was variation in the prevalence of thyroid disease with age and sex. The height of the incidence of hyperthyroidism was

seen in the age around 30-40 years, thyroid nodules were found more prevalently in women than in men, whereas the prevalence of multinodular glands increased with age.

The current study revealed the antithyroid drugs (Levothyroxine) was prescribed for the majority of the studied subjects after discharged. In agreement, Mandel, *et al.* (2006) reported that Levothyroxine is generally recommended for replacement or suppressive therapy. Also, Harada, *et al.* (2007) added that, the recurrence rate was less than after the administration of antithyroid drugs, and postoperative complications were rare. Those patients with sustained subclinical hypothyroidism after

subtotal thyroidectomy should receive supplemental thyroid hormone.

Concerning lifestyle assessment, the present study finding revealed that the majority of the studied subjects were non smokers. Although more than half of the studied subjects were passive smokers. The result was supported with many research studies. Metsios (2007) found that passive smoking exposure was accompanied by a statistically significant increase in metabolism and thyroid hormone levels of healthy nonsmokers. Offie, *et al.* (2011) reported that active and passive smoking can result in smoke-induced interference with thyroid hormone homeostasis. Also, they detected that cigarette smoking had been associated with an increased production of T3 and thyroglobulin, indicating decreasing levels of T4, while thyroid-stimulating hormone (TSH) levels had been found to be significantly lower in cigarette smokers compared to nonsmokers.

In addition, Ingrid *et al.* (2007) pointed out in their study that smoking was negatively associated with hypothyroidism but positively associated with hyperthyroidism. The associations with smoking cessation suggested that smoking may have reversible effects on thyroid function. Notably, they reported for the first time, a lower prevalence of overt hypothyroidism among current smokers. In similar findings Volzke, *et.al* (2005) reported that current smoking was strongly associated with the risk of goiter in men and women. These findings should influence activities which were intended to prevent thyroid disease. Furthermore, Vestergaard (2004) concluded that smoking was a risk factor for Graves' hyperthyroidism in women.

As regards exposure to stress as one of the important lifestyle among patients with thyroid dysfunction, in study done by Gulseren, *et al.* (2009) it was found that the QoL was worse in overt or subclinical hyper- and hypothyroidism groups than in the control group, as well as thyroid dysfunction may impair the quality of life (QoL) and may cause psychological symptoms, anxiety and depressive symptoms that was more severe in patients with overt hypo- and hyperthyroidism. In this light, Watt, *et al.* (2006) who studied the quality of life in patients with benign thyroid disorders indicated that impairments in HRQL (health related quality of life) were also frequent in the long term. A wide range of problems had been reported, for example, problems concern physical symptoms, emotional distress, fatigue cognitive function, sleeping problems, anxiety, and sexual function.

In this respect, Yoshiuchi, *et al* (2005) reported that psychological stress and smoking were associated with Graves' disease in women, but not in men.

Moreover, Mizokami, *et al.* (2004), who studied stress and thyroid autoimmunity found that stress affects the immune system either directly or indirectly through the nervous and endocrine systems. Stress can be one of the environmental factors for thyroid autoimmunity. In agreement with these previous studies findings, the present study finding pointed out that about more than half of studied sample had some stressful personality traits such as anxiety nervousness, irritability, and sleeping difficulty.

Regarding to eating habits, the present study indicated that the majority were not heavily consuming of raw goitrogenic foods, not heavily consuming fast, and canned foods, however, more than half of studied sample was heavily consuming table salt, used it without iodine supplement/not properly packed. Congruent with the present study finding, Xu, *et al.* (2008) who studied the surveillance on iodized salt in China, in (2006). The study was carried out to understand the national situation of quality and consumption of iodized salt at production and household levels. In 2006, 80 counties did not conduct the iodized salt surveillance and non-iodized salt coverage rate of 185 counties was higher than 10%. In the respect of the qualified iodized salt coverage rate at household level, there were about 10 percent lagging behind the national goal that 95% of all the counties in China should achieve virtual elimination of iodine deficiency disorder before 2010. The study concluded that at national level, the lot qualified rate at production level and the iodized salt coverage rate at household level maintained comparatively well. However, at county level, there were 75 counties whose iodized salt coverage rate was below 70%.

Consistent to the present study findings, In Egypt in published report by National Nutrition Institute (2010) pointed out that, Egypt Demographic Health Survey (DHS) (2008) revealed that household iodized salt consumption at the national level reached 79%, which is below the recommended level (90%), of households were using adequately iodized salt. In congruent with present study, In (2006) a national survey was conducted by WOH in collaboration with UNICEF revealed that seven governorates (Behera, Menofia, Dakahlia, BeniSuef, Minya, South Sinai and El-wadielgedid) showed the lowest use of iodized salt at household level (WOH/UNICEF, 2007).

In addition, Laurberg *et al.* (2004) who studied the environmental iodine intake affects the type of nonmalignant thyroid disease. Study was carried out to assess the relationship between the iodine intake level of a population and the occurrence of thyroid diseases. The study found that; (1) less severe iodine deficiency was associated with multinodular autonomous growth and function of the

thyroid gland leading to goiter and hyperthyroidism in middle aged and elderly subjects, (2) The lower the iodine intake, the earlier and more prominent abnormalities;(3) Moderate and mild iodine excess were associated with a more frequent occurrence of hypothyroidism, especially in elderly subjects.

Moreover, Carella *et.al* (2007) who evaluated the iodized salt in improving the effectiveness of L-thyroxine(L-T4) therapy after surgery for nontoxic goiter found that ;(1) the iodine prophylaxis improves the effects of post-surgery non-suppressive L-T4 therapy on thyroid remnant size; (2) In patients treated with L-T4 alone the therapeutic effectiveness decreased in the presence of a large post-surgery thyroid remnant. With the addition of iodine, the L-T4 maintains a similar efficacy in patients with either a large or a small remnant; (3) during treatment with L-T4 alone the highest therapeutic effectiveness is attained by lowering the plasma TSH concentration. With the addition of iodized salt to the daily diet the effects of L-T4 on remnant size were relevant independently of the TSH levels. This finding emphasized that educating patients about adding proper amount of iodized salts to diet, after- thyroidectomy helps to promote patient compliance with the treatment plan.

Lack of exercise had been hypothesized to influence cancer risk through a variety of mechanisms including hormonal, metabolic and immunologic effects; Risk of thyroid cancer was reduced among women who reported that they engaged in regular recreational exercise during the two years before diagnosis relative to women who did not report exercise during that time period(Rossing,*et al.*, 2006).Likewise, Ciloglu, *et al.*, (2005) explained that Physical activity influences energy metabolism in human subjects by increasing activity-induced energy. The researchers concluded that maximal aerobic exercise greatly could affect the level of circulating thyroid hormones. In consistent with these results the present found that approximately three quarters of the sample evaluated their exercise practice as weak. In spite of regular physical activity also helped in relieving some of the symptoms of thyroid problems, by providing more energy and decreasing stress levels (Van Reddy, 2010).

To sum up, a connection had been established between the thyroid disorder and lifestyle including diet, stress, smoking, and physical activity that were mostly supported by the other research studies.

The current study finding revealed that, the overall total post discharge knowledge mean score was higher than overall total pre discharge knowledge means score among the studied patients. These results supports the study hypothesis which suggested that

H₁- Thyroidectomy patients who will participate in an educational program will have higher post-test discharge knowledge mean score than pre-test discharge knowledge mean score.

The rationale for knowledge improvement among the study group might be attributed to the implementation of educational program, provision of booklet, and /or verbal instructional information as a part of educational program. On line with this finding, Pehlivan *et al.* (2011) found that patients in the verbal information group responded more accurately to the questions related to the procedure. These patients experienced less pain, breathing difficulties and regret. Compliance with the procedure was better in these patients than in the other groups, and the difference was statistically significant. In light of their findings, they suggested that providing verbal information to patients was recommended due to its positive effects on the patients' perception, compliance and anxiety level associated with the procedure. Moreover, Asefzadeh *et al.* (2005) added that patients need advice and supported information from professionals about their health and therapies to improve their adherence.

Also, World Health Organization, (2010) pointed out that non-compliance was a major obstacle to the effective delivery of health care. About, 50% of patients estimated from those with chronic diseases living in developed countries follow treatment recommendations. Low treatment compliance decreased dramatically drug effectiveness and was also a big problem for an optimum health care delivery, causing complications and admissions in hospitals. One of the most important factors in treatment compliance was lack of knowledge. As the WHO affirms that health care providers also had lack of knowledge and training. Patients' lack of information and poor health education of the patient were main causes of non-compliance.

In support to this explanation, Tang and Newcomb (2009) reported that patients participating in their focus groups felt that providing printed summary information to patients at the end of a clinic visit improves their understanding of their care, enhances their relationships with providers, improves their satisfaction with care, and motivates them to adhere to treatment plans. Similar finding was pointed by Blinder *et al.* (2009) who mentioned that verbal and written recommendations worded simply with details were important for patient compliance and reduced postoperative stress and complaints.

Further analysis in the present study indicated that there was gradual improvement in compliance during three months after discharge respectively. This finding support the stated H₂ which suggested that thyroidectomy patients who will

participate in the educational program will have higher compliance score in the post discharge compliance instruction in the third month than first and second month. The rationale for compliance improvement among the study group might be attributed to the implementation of educational program, provision of booklet, and /or verbal instructional information as a part of educational program.

This finding was congruent with Mini *et al.* (2010) who evaluated the influence of pharmacist provided education on knowledge, attitude and practice of chronic diseases patients towards their disease and treatment. At final follow up after 3 months, Influence of education on KAP (knowledge, attitude and practice) was assessed by re-administering the KAP questionnaire. The researchers found that education had a positive influence on knowledge, attitude and practice of those patients. on the same line, Delamater *et al* (2010) stated that, in developed countries, compliance had been found to be highest among patients who manage chronic illness with the help of a dedicated healthcare team, with whom they had regular and request contact. This team provides a three-pronged approach, using a combination of educational, behavioral and effective communications to help to educate patients.

In addition, unpublished thesis, Selomain, (2010) at El-Manial University Hospital, Faculty of Nursing, Cairo University, Egypt. The study was conducted to examine the impact of clinical pathway guidelines on cardiac pacing patients' outcome during three months after patients' discharge. The researcher reported that enrichment of patients' knowledge and practices in relation to their condition and adherence to the therapeutic regimes could have a positive impact upon reduction of complication, and improvement of patients' outcome. Similar finding was recorded by

Cacoub *et al.* (2008) who evaluated the impact of therapeutic education on adherence to antiviral treatment for hepatitis C patients, on 370/674 patients received education during the first 3 months of treatment. The researcher found that after 6 month adherence to antiviral was higher in educated patients, therapeutic education helped maintain real-life adherence to therapy.

In support to the first explanation, Celeste, (2011) investigated how education programs impact compliance in human subjects' research. Participants were one hundred and twenty-one. Partial correlation was performed to examine relationships between education programs and letters of non-compliance when controlled for number of faculty and amount of research funding. These findings suggest that an increased number of education programs need to be

considered in order to optimally ensure the protections of human subjects in rise.

The second possible explanation was supported by, Lincolna, *et al.* (2011) who assessed the need for a thyrotoxicosis patient education program and to evaluate a group education session. The study concluded that, the provision of leaflets alone seemed to improve knowledge and satisfaction compared with no leaflets. Also, Golay *et al.* (2007) pointed that, Therapeutic patient education is being offered more and more frequently not only to help patients understand their illness and treatment, but also to "help them become autonomous." Putting this into practice in the long term will depend on their "motivation" in treating themselves. The function of therapeutic education (TE) is not only to increase patients' knowledge and skills. Its main objective is to make them aware of their problem, whether as a diagnosis of the illness or a description of the risk factors involved. This allows them to integrate these notions and follow the recommendations more closely. Most of all, TE is used to help patients follow a treatment over a long period of time, or even to help them change "an aspect of their lifestyle.

On the same line, by Sharaf (2011) who studied "Impact of health education on compliance among patients of chronic diseases", done, in Al Qassim, Saudi Arabia to assess the impact of health education on diet, smoking and exercise among patients with chronic diseases (coronary artery disease, hypertension and type 2 diabetes mellitus). The study revealed that, at baseline, chronic disease patients had generally healthier diet and did more exercise than patients of other diseases. Among chronic disease patients, significant improvements in smoking, diet and exercise habits were observed at end-line survey compared to baseline. These changes persisted after controlling for age, sex, marital status and education. Education for patients visiting the PHC centers for follow-up of chronic diseases would significantly improved compliance to doctor's advice regarding smoking, diet and exercise.

Furthermore, a 1-year, randomized study, done by Takala *et al.* (2011) conducted to test the possibility of improving compliance with therapeutic regimens in hypertensive by means of certain simple arrangements. Patients were given written treatment instructions concerning hypertension, a personal blood-pressure follow-up card, and, for those who failed to attend their blood-pressure check-up, an invitation for a new check-up, patient compliance could be significantly improved. By the end of the year, blood pressure had been lowered by at least 10% in 95% of the patients in the reorganized group and in 78% of those in the ordinary group.

To sum up, firstly, there is strong relationship between enrichment of patient with knowledge and practice in relation to their condition and adherence to therapeutic treatment; secondly, this result could have positive impact of patient' outcome that was supported by most of researches.

Regarding lifestyle compliance, the present study finding showed that there was statistically significant difference among the studied group as regards compliance for Lifestyle modification during the first, second, and third month. In consistent with this result, Sumner *et al.* (2005) who studied adherence to a multicomponent lifestyle modification program to apply long-term adherence to multicomponent lifestyle programs. The researchers assessed adherence to the 4 components of an ongoing lifestyle modification program (diet, exercise, stress management, group support) at baseline, 3, and 12 months into the program on 1679 participants with chronic diseases had completed the 3-month follow-up. The researchers found that patients were able to meet program guidelines at 3 months and maintained high levels of adherence at 1 year. Further analyses indicated that over 74% of participants were able to meet or exceed 4 out of 6 program benchmarks at both 3 months and 1 year. Further analysis delineated that the present study finding revealed that there was gradual increase in mean score of lifestyle during three months. Possible explanation may be related to the effect of educational program, telephone calls follow up, and provision of booklet. In support Chiu, and Wong ,(2010) found that nurse clinics have positive effects on blood pressure control and adherence to healthy lifestyle, but telephone follow-up after such clinics augmented the effects of the clinic consultation. This combined mode of services was worth considering for other chronic disease and management program. Horne, Weinman *et al.* (2005) also supported the present study finding , pointed out that there had been a great deal of research investigating the value of providing patients with written information, either on its own or as an adjunct to the consultation. The information provision and behavior change aspects of written information, a small number had explored the extent to which written information can take account of patient priorities and facilitate active participation in decision making, promoted better recall and understanding.

Regarding to medication compliance there was statistically significant difference among the studied group during first, second, and third month. Further analysis documented that there was gradual increase in the mean score of medication compliance in first, second, and third month respectively. One possible explanation might be due to effect of

educational program, secondly the presence of booklet. Lastly, follow up by telephone calls.

In agreement with this explanation, Morris, Halperin (2003) reported that, several studies indicated that written information can be effective in improving patient compliance with regimens for medication therapy. Patient knowledge of less commonly known information such as precautions, side effects, or special directions is frequently improved by written information. In the same context, Horne, Weinman *et al.* (2005) explored the relationship between a patient's knowledge of their medication regimen and their adherence concluded that 10 studies had demonstrated a positive association between knowledge and adherence.

In support, to study finding, Mandel *et al.* (2005) who studied the indications for and the proper monitoring and compliance of levothyroxine therapy in patients with thyroid disease reported that with proper patient monitoring and compliance, levothyroxine replacement therapy should be effective. In light of this finding, similar study done by, Çalik, et al., (2003) pointed out that the follow-up period was limited; the researcher thought that routine postoperative prophylactic thyroxin therapy for 9 to 12 months in patients who have had an operation for benign nodular goiter has clinical value. Moreover, Harada *et al.* (2007) documented that, the recurrence rate is less than after the administration of antithyroid drugs, and postoperative complications are rare.

In contradictory to the present study result, Horne *et al.* (2005) indicated that studies conducted since then generally reinforced the view that associations between knowledge and adherence are at best small and inconsistent and that enhancing knowledge does not necessarily improve adherence .Research focusing on knowledge as the primary determinant of adherence was flawed for two major reasons. First, many of the studies linking knowledge and adherence had used cross-sectional designs. This means that it was difficult to assign causality. Patients were less adherent because they lack knowledge or are non adherent patients less interested in their treatment and so do not seek out information Second, inconsistencies in the association between knowledge and adherence suggest that medication knowledge was not a unitary concept, and instead comprises different component.

Conclusion

Based on the results of the current study, it can be concluded that, patients who exposed to the designed educational program for thyroidectomy patients' showed improvement in knowledge and compliance level. This improvement was manifested by increase in patients' post total knowledge mean

score. Total discharge compliance mean score including medication and lifestyle increased all throughout three months by time.

Recommendations

The following recommendations could be inferred from the previously mentioned conclusion; Disrupting a simple illustrated booklet to thyroidectomy patients includes all therapeutic instruction could help in increasing patient's awareness, and understanding, thus patients' discharge compliance will be increased. Additional research on the epidemiology of environmental and risk factors for thyroid diseases is needed to explain the marked elevated incidence rates. There is a need for national monitoring and adjustment of iodine intake as a part of prevention program for thyroid disorders; period of follow up after total thyroidectomy need to be longer than 3months, it is suggested to be 6-12 month, this period is enough to monitor hypothyroidism, and permanent hypocalcaemia to maximize the program effect, and replication of the study on a larger probability sample from different geographical areas In Egypt.

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