QUALITY OF LIFE IN THYROID CANCER: A QUESTIONNAIRE BASED-STUDY

Elena BARBUS[a,b], Claudiu PESTEAN[a,b], Maria Iulia LARG[a,b],
Katalin GABORA[a,b], Marilena CHEPTEA[d],
Eduard-Alexandru BONCI[a,c], Claudiu BADULESCU[a,c],
Doina PICIU[a,b]*

[a] ″Iuliu Hatieganu″ University of Medicine and Pharmacy Cluj-Napoca, Romania
[b] Nuclear Medicine Department, ″Prof. Dr. Ion Chiricuta″ Institute of Oncology Cluj-Napoca, Romania
[c] Surgical Oncology Department, ″Prof. Dr. Ion Chiricuta″ Institute of Oncology Cluj-Napoca, Romania
[d] Medical records and data processing information Department, ″Prof. Dr. Ion Chiricuta″ Institute of Oncology, Cluj-Napoca, Romania

Abstract

The aim of the present study is to identify how the quality of life is affected in differentiated thyroid cancer population, and most important, how can we influence different factors in order to improve the well-being of our patients. A cross-sectional study of 135 differentiated thyroid cancer patients was conducted. Patients who met the inclusion criteria were invited to complete the quality of life questionnaire –thyroid version (QOL-TV). The questionnaire comprises four sections with the consequent items (physical well-being, psychological well-being, social concerns and spiritual well-being). We used Pearson correlation for uniform distribution of variables and Spearman correlation for monotonic relationship between variables. We found that tiredness is the most important factor influencing the physical well-being; initial diagnosis and surgery had a big impact on psychological well-being, thyroid cancer has a big impact on patient's families and religious activities may help the patients to restore the spiritual well-being. The quality of life in thyroid cancer patients is influenced by many factors and we are responsible

* Correspondence concerning this article should be addressed to Elena Barbus, Nuclear Medicine Department, "Prof. Dr. Ion Chiricuta" Institute of Oncology, 34-36 Republicii Street, 400015 Cluj-Napoca, Romania. Tel: +40 770 83 88 13
E-mail: elena.barbus@umfcluj.ro

for identifying which of the problems are having the biggest impact on our patients. We must help them in order to restore the quality of life and to make them feel that thyroid cancer is the real "good" cancer.

Keywords: cancer, life, quality, questionnaire, radioiodine, thyroid

Introduction

Thyroid cancer

Thyroid gland is part of the endocrine system with a major role in the normal functioning of the most important metabolic processes. The malignant events of the thyroid are not so uncommon anymore with a worldwide increase in thyroid cancer based on incidental findings (incidentalomas). Another factor that influences the rising incidence is the better access to medical information and health services with a high addressability (Piciu, 2014; Piciu, 2013).

Thyroid cancer treatment follows 3 steps in order to provide disease free status: surgery (total thyroidectomy), radioiodine ablation (if it is necessary according to the international guidelines) and thyroid hormone supplementation with TSH suppression. Every step in the management of the thyroid cancer patients may also comprise different complications (Irimie, 2017; Petrulea, 2015). Complications reported after surgery mainly include physical or functional impairments, including voice and discomfort during swallowing, recurrent laryngeal nerve injury with voice changes, extensive/ keloidal scars. Radioiodine ablation might be associated with acute and long term complications within thyroid cancer patients. Acute risks associated with radioactive iodine include nausea, vomiting, ageusia, salivary gland swelling and sometimes pain/ discomfort. Long-term complications include recurrent sialoadenitis, xerostomia, pulmonary fibrosis, nasolacrimal outflow obstruction and second primary malignancies (Haugen, 2016; Lee, 2010).

The adverse reactions of the long-term hormone treatment, the periodically thyroid hormone withdrawal, the surgery and the subsequent radioiodine treatment might give symptoms affecting the health-related quality of life (HRQoL) (Hedman, Djärv, Strang, & Lundgren, 2016).

Quality of life in thyroid cancer

Thyroid neoplasia with a special emphasis on differentiated thyroid cancer, due to a very long follow-up and risk of recurrence, has been recently studied according to patient's HRQoL. Despite a very good prognosis even in advanced stages, with more than 90 % of the patients reaching disease free status, the new studies regarding the quality of life in thyroid cancer patients reported a high distress in this category of the population (Haugen, 2016; Piciu, 2012). The diagnosis of cancer cannot be forgotten if the patient needs to take his treatment every day and to be followed for long periods of time in order to check the status of

the disease. This impacts on the quality of life, especially in young patients due to the very long follow-up (Hedman, Strang, Djärv, Widberg, & Lundgren, 2017).

Even if we expected that the severity of the disease would play a major role in HRQoL the practice revealed a slightly different situation. The superior overall survival in differentiated thyroid cancer patients, despite the stage of the disease, conducts to a modified HRQoL, mostly influenced by the psychological and social aspects of the disease not by the severity or advanced stages. A study conducted by Baohui Zhang et al revealed that the overall quality of life of advanced stage patients is improving if they are out of the hospital environment; the focus on this patients is not in prolonging life but in promoting quality of life (Zhang, Nilsson, & Prigerson, 2012)**.**

Quality of life (QoL) is a broad multidimensional concept that includes individuals' subjective perceptions of their position in life and evaluation of both the positive and negative aspects of life ("The World Health Organization Quality of Life Assessment (WHOQOL): development and general psychometric properties.," 1998). The quality of life has a subjective component: it can be understood only by the individuals involved and it can be assessed only by them (Cella, 1995). HRQoL is the functional effect of a medical condition and/or its consequent therapy upon a patient. Measuring the HRQoL can give us an overview of the burden in a specific disease.

Measurements instruments for QoL

Many measurement instruments used for assessing the quality of life in thyroid cancer patients were developed over time, like for example WHOQOL-Bref (the World Health Organization Quality of Life), EORTC QOL-C30 (European Organization for Research and Treatment of Cancer, the Quality of Life Questionnaire-core 30), QOLTV (Quality of life thyroid version questionnaire), FACIT (Functional assessment of chronic illness and therapy), ThyPRO-QoL (quality of life questionnaire for thyroid patients) (Bãrbuş, Peştean, Larg, & Piciu, 2017).

The purpose of this study

We still have very few studies worldwide regarding the HRQoL in thyroid cancer patients and the possible factors which can influence it. We must adapt our treatment strategies in order to improve their impact on the overall status of our patients.

Quality of life studies referring to thyroid cancer started to be published back in 1996 with a peak in 2016. In the last 2 years, according to PubMed database, there were published 17 new studies concerning this issue. Indeed, it is an increasing interest on studying the HRQoL in this category of patients, but comparing to other oncological malignancies (breast cancer, lung cancer, melanoma) we are still missing a lot of data.

Considering this, we decided to study even more the aspects related to the quality of life because there is no existing data or previous studies underwent for Romania; this is the first study related to quality of life in thyroid cancer patients in our country.

We selected the most important factors that could influence the life status and organized them in a QOL- questionnaire (quality of life questionnaire) in order to find how the quality of life in our thyroid cancer population is affected and most important how we can influence different facts in order to improve the well-being of our patients.

Method

Patient's characteristics

We conducted a cross-sectional study of 160 patients from the Nuclear Medicine Department of "Prof. Dr. Ion Chiricuta" Institute of Oncology, Cluj-Napoca, Romania. Subjects who met the inclusion criteria were able to participate in our study: age of the subject between 14-80 years old, previously diagnosed with DTC (differentiated thyroid cancer), patients with total thyroidectomy who underwent radioiodine ablation, patients in the follow-up period who came for oncological follow-up after 2 weeks of hormone withdrawal. The exclusion criteria comprised of: patients with other type of thyroid cancer (medullary, anaplastic), patients who were unable to complete the questionnaires, history of other types of cancer. The study was approved by the Ethics Committee of the "Iuliu Hatieganu" University of Medicine and Pharmacy Cluj-Napoca. Every patient gave an informed consent to participate in the study. No name or surname of the subjects was required. After the revision of the questionnaires 15 of them were cancelled based on inappropriate completion (there were items without answers). We started the study with a total number of 135 patients who passed the inclusion criteria.

Procedure

For the evaluation of the quality of life we used the already tested QOL-TV questionnaire (quality of life thyroid version questionnaire), which was adapted into a 22 questions questionnaire, and translated into Romanian. The questionnaire comprises four sections with items which can influence the quality of life: the physical well-being section which includes questions about tiredness, appetite changes, aches or pain, sleep changes, constipation, menstrual changes of fertility, weight gain, tolerance to cold or heat, dry skin or hair changes, voice changes, motor skills and coordination, swelling and fluid retention, changes in the overall appearance and a general question about the whole physical well-being perception. The second part comprises items regarding the physiological well-being: coping with the disease and treatment, the control of the surrounded things, the satisfaction

of life, the ability to concentrate/ remember things, the distress about the illness and treatment (initial diagnosis, surgeries, initial treatment/ radioiodine ablation, whole-body scan, thyroglobulin testing, withdrawal from thyroid hormone), anxiety and fears about future diagnosis tests, second malignancy, recurrence or metastasis of the existing cancer. The third part is related to social concerns: impact of the illness on the family, the support from other people, healthcare interfering with relationships, impact of the illness on sexuality, interference with the employment, home activities, isolation and financial burden. The last part comprises items about spiritual well-being: spiritual activities, uncertainty about the future, positive changes in life due to illness and sensing a purpose/ mission for life/ reason for being alive (Quality of life- Thyroid version).

The quality of life thyroid version questionnaire was adapted from the cancer survivor questionnaire survey by Grant, Padilla and Ferrell. The psychometric analysis was performed in a study from 1995 on 686 respondents. The overall test-retest reliability was r= 0.89 with an interval consistency of r= 0.93 (measure of agreement between items and scale). Seventeen variables were found to be statistically significant accounting for 91% of the variance in overall QOL with a good validity ("The Quality of Life - Thyroid Version (QOL-TV) | Measurement Instrument Database for the Social Sciences," n.d.)**.**

The patient was asked to read each question and decide if he/ she agrees or disagrees with the statement by circling a number to indicate the degree to which he/ she agrees or disagrees with the statement according to the word anchors on each end of the scale. The scoring is based on a scale of 0 = worst outcome to 10 = best outcome. Several items have reverse anchors and this fact was taken into account for the statistical part. The interesting part is that every patient filled in the online version of the questionnaire after receiving all the necessary instructions. We developed an online platform for our patients so they can receive and fill in the quality of life questionnaires.

For the physical well-being an overall composite score was calculated using the mean of all domains included in the first part and it was compared with the number gave by the patient to the general question about the overall impression about his/ her physical quality of life.

A descriptive analysis of the demographic variables, as well as the quality of life scores was performed. We reported continuous variables as mean ± standard deviation. For assessing the relationship between each item on the QOL-TV questionnaire we used Pearson correlation (parametric test, bivariate correlation) for uniform distribution of variables and Spearman correlation (non-parametric test, bivariate correlation) for monotonic relationship between variables. Results were considered significant at p values below 0.05.

Results

Descriptive statistics

A total of 135 patients were recruited and eligible for the study. We analysed the questionnaires for different aspects including: physical, psychological, social and spiritual. The mean age of the selected population was 50.26 ± 12.54 years (range 16-75 years), 122 (90,37 %) women and 13 (9,63 %) men.

Physical issues

For the physical part of the questionnaire the tiredness was the most important aspect with a total number of 30/135 (22,22 %) patients pointing a 5 on the score scale. 99/135 (73,33%) declared a 0 on the score scale for the menstrual changes or fertility. The overall appearance was not affected in 74 patients (54,81%), pointing a 0 on the score scale. 29/135 (21,48%) patients reported that the subjective physical well-being perception is 8 with a mean of 6.08 ± 2.42. The physical well-being calculated had a mean value of 2.88 ± 1.88 (on a scale score from 0-10 where 0 means no problems and 10 means severe problems) (Table 1).

Table 1. Physical issues-descriptive statistics.

Issue	N	Mean	Interval of confidence IC95%		± SD	Me-dian	Mode	Fre-quency	Min.	Max.
Tiredness	135	4.20	3.71	4.68	2.84	5	5	30	0	10
appetite changes	135	2.03	1.57	2.49	2.70	1	0	63	0	10
aches or pain	135	2.94	2.44	3.45	2.95	2	0	43	0	10
sleep changes	135	3.91	3.31	4.50	3.45	3	0	36	0	10
Constipation	135	2.15	1.68	2.62	2.73	1	0	65	0	10
menstrual changes or fertility	134	1.20	0.76	1.63	2.53	0	0	99	0	10
weight gain	135	3.68	3.09	4.26	3.44	3	0	36	0	10
tolerance to cold or heat	135	4.41	3.84	4.98	3.33	4	0	23	0	10
dry skin or hair changes	135	3.74	3.18	4.29	3.25	3	0	39	0	10
voice changes	135	2.53	1.99	3.06	3.14	1	0	61	0	10
motor skills and coordination	135	2.33	1.83	2.83	2.93	1	0	66	0	10
swelling and fluid retention	135	2.28	1.78	2.78	2.93	1	0	64	0	10
overall appearance	135	1.97	1.48	2.47	2.91	0	0	74	0	10
physical well-being perception by the subject	135	6.08	5.66	6.49	2.42	6	8	29	0	10

Issue	N	Mean	Interval of confidence IC95%		± SD	Me-dian	Mode	Fre-quency	Min.	Max.
Age	135	50.26	48.12	52.41	12.54	51	58	8	16	75
Physical well-being calculated	135	2.88	2.56	3.20	1.88	2.69	0.46	6	0	9.15

Note: Mean is the result we get by adding all the scores from a specific issue and dividing the total by 135; Median is the median score of a range of scores; Mode is the score that appears more often; Frequency of an event is the number of times the event occurred in an experiment or study; Min represents the minimum score of an issue; Max represents the maximum score of an issue.

Psychological problems

Regarding psychological problems we found that 44/135 (32,59%) patients declared having no problems being in total control with their lives (a 10 on the score scale), and 28/135 (20,74%) declared being totally satisfied with their lives. When we get to the impact of the illness and the treatment on patient's quality of life we found that for 39/135 (28,8%) patients the initial diagnosis was very distressing with a score of 10, and for 29/135 (21,48%) of patients surgery had a very big impact causing a lot of distress (pointing a 10 on the score scale). Most of the patients answered being very afraid (a score of 10) about future diagnosis tests, another cancer and recurrence or metastasis of the present neoplasia (Table 2).

Table 2. Psychological problems-descriptive statistics.

Issue	N	Mean	Interval of confidence IC 95%		± SD	Me-dian	Mode	Fre-quency	Min	Max
coping with the disease and treatment	135	3.11	2.61	3.60	2.88	2	0	34	0	10
control of the surrounded things	135	7.04	6.51	7.57	3.10	8	10	44	0	10
satisfaction of life	135	7.18	6.76	7.60	2.45	8	10	28	0	10
the ability to concen-trate/remember things	135	6.67	6.24	7.10	2.53	7	8	27	0	10
How distressing were the following aspects of your illness and treatment:										
initial diagnosis	135	6.34	5.75	6.92	3.44	7	10	39	0	10
Surgeries	135	5.58	4.98	6.18	3.50	6	10	29	0	10
time before completion of treatment	135	4.58	4.00	5.16	3.43	5	0	26	0	10
radioiodine ablation	135	3.82	3.21	4.44	3.59	3	0	43	0	10
Whole-body scan	135	3.25	2.68	3.83	3.37	2	0	51	0	10
thyroglobulin testing	135	2.82	2.29	3.34	3.07	2	0	49	0	10
withdrawal from thyroid hormone	135	3.12	2.57	3.67	3.25	2	0	49	0	10

Issue	N	Mean	Interval of confidence IC 95%		± SD	Me-dian	Mode	Fre-quency	Min	Max
Anxiety related with the illness	135	3.91	3.39	4.42	3.04	3	0	21	0	10
To what extent are you fearful of:										
future diagnosis tests	135	4.97	4.38	5.57	3.49	5	10	22	0	10
second malignancy	135	5.80	5.12	6.48	4	7	10	44	0	10
recurrence or metastasis	135	5.37	4.69	6.05	3.99	6	10	36	0	10
Age	135	50.26	48.12	52.41	12.54	51	58	8	16	75
Psychological well-being calculated	135	4,90	4,62	5,19	1,67	4,86	multiple	-	1,20	8,26

Note: Mean is the result we get by adding all the scores from a specific issue and dividing the total by 135; Median is the median score of a range of scores; Mode is the score that appears more often; Frequency of an event is the number of times the event occurred in an experiment or study; Min represents the minimum score of an issue; Max represents the maximum score of an issue.

Social concerns

Social concerns became important reaching an impact of the overall quality of life of the patients and is related in the most cases to the impact of the illness on patient's family, but when it comes to receiving support from the surrounding people 73/135 (54,07%) patients responded with a maximum score of 10, meaning that they receive support from others. The majority had no problems in the management of the job or the household activities (Table 3).

Table 3. Social concerns-descriptive statistics.

Issue	N	Mean	Interval of confidence IC 95%		± SD	Me-dian	Mode	Fre-quency	Min	Max
impact of the illness to the family	135	6.57	6.02	7.11	3.18	7	10	35	0	10
the support from the others	135	8.31	7.85	8.78	2.72	10	10	73	0	10
health care interfering with the relationships	135	4.77	4.09	5.46	4.02	5	0	40	0	10
impact of the illness to the sexuality	135	2.41	1.86	2.96	3.22	0	0	71	0	10
To what degree has your illness and treatment interfered with your employment?										
motivation to work	135	2.71	2.15	3.26	3.26	2	0	64	0	10
time away from work	135	1.87	1.37	2.36	2.90	0	0	82	0	10
productivity at work	135	2.64	2.08	3.20	3.29	1	0	65	0	10
quality of work	135	2.59	2.04	3.13	3.20	1	0	67	0	10
To what degree has your illness and treatment interfered with your activities at home?										
driving a car	135	1.17	0.76	1.58	2.39	0	0	96	0	10

Issue	N	Mean	Interval of confidence IC 95%		± SD	Me-dian	Mode	Fre-quency	Min	Max
household chores	135	2.41	1.94	2.88	2.75	1	0	61	0	9
preparing meals	134	1.98	1.55	2.41	2.53	0	0	69	0	9
leisure activities	135	2.02	1.57	2.46	2.60	1	0	67	0	10
isolation	135	2.44	1.88	3.00	3.28	1	0	67	0	10
financial burden	135	3.08	2.48	3.68	3.50	2	0	56	0	10
age	135	50.26	48.12	52.41	12.54	51	58	8	16	75
social concerns calculated	135	3,22	2,90	3,53	1,83	2,64	multiple	-	0,07	8

Note: Mean is the result we get by adding all the scores from a specific issue and dividing the total by 135; Median is the median score of a range of scores; Mode is the score that appears more often; Frequency of an event is the number of times the event occurred in an experiment or study; Min represents the minimum score of an issue; Max represents the maximum score of an issue.

Spiritual aspects

The last part of the questionnaire presented an overall impression of the spiritual aspects impact on the quality of life. For 60/135 (44,44%) patients religious activities are very important and most of the patients (106/135 patients – 78,51%) declared having a purpose/ mission in life (Table 4).

Table 4. Spiritual aspects-descriptive statistics.

Issue	N	Mean	Interval of confidence IC 95%		± SD	Me-dian	Mode	Fre-quency	Min	Max
Importance of religious activities	135	7.14	6.56	7.73	3.41	9	10	60	0	10
uncertainty about the future	135	4.62	4.00	5.23	3.60	5	0	26	0	10
positive changes in life due to illness	135	4.05	3.44	4.66	3.57	3	0	36	0	10
sense a purpose/mission for life	135	9.36	9.06	9.65	1.72	10	10	106	0	10
Age	135	50.26	48.12	52.41	12.54	51	58	8	16	75
Spiritual well-being	135	6,30	5,98	6,61	1,85	6,25	6,25	13	0,25	10

Note: Mean is the result we get by adding all the scores from a specific issue and dividing the total by 135; Median is the median score of a range of scores; Mode is the score that appears more often; Frequency of an event is the number of times the event occurred in an experiment or study; Min represents the minimum score of an issue; Max represents the maximum score of an issue.

Correlation analysis

As it was mentioned in the method part of this study we used the Pearson and Spearman's correlation coefficients in order to assess different correlations between items. The value can be between +1 and −1, where 1 is total positive linear correlation, 0 is no linear correlation, and −1 is total negative linear correlation. Depending on the value we interpret it in negative or positive, strong, moderate or weak as follows: exactly –1 a perfect downhill (negative) linear relationship; –0.70 a strong downhill (negative) linear relationship; –0.50 a moderate downhill (negative) relationship; –0.30 a weak downhill (negative) linear relationship; 0 no linear relationship; +0.30 a weak uphill (positive) linear relationship; +0.50 a moderate uphill (positive) relationship; +0.70 a strong uphill (positive) linear relationship; exactly +1 a perfect uphill (positive) linear relationship. For being statistically significant the p value has to be < 0.05 (confidence interval of 95%).
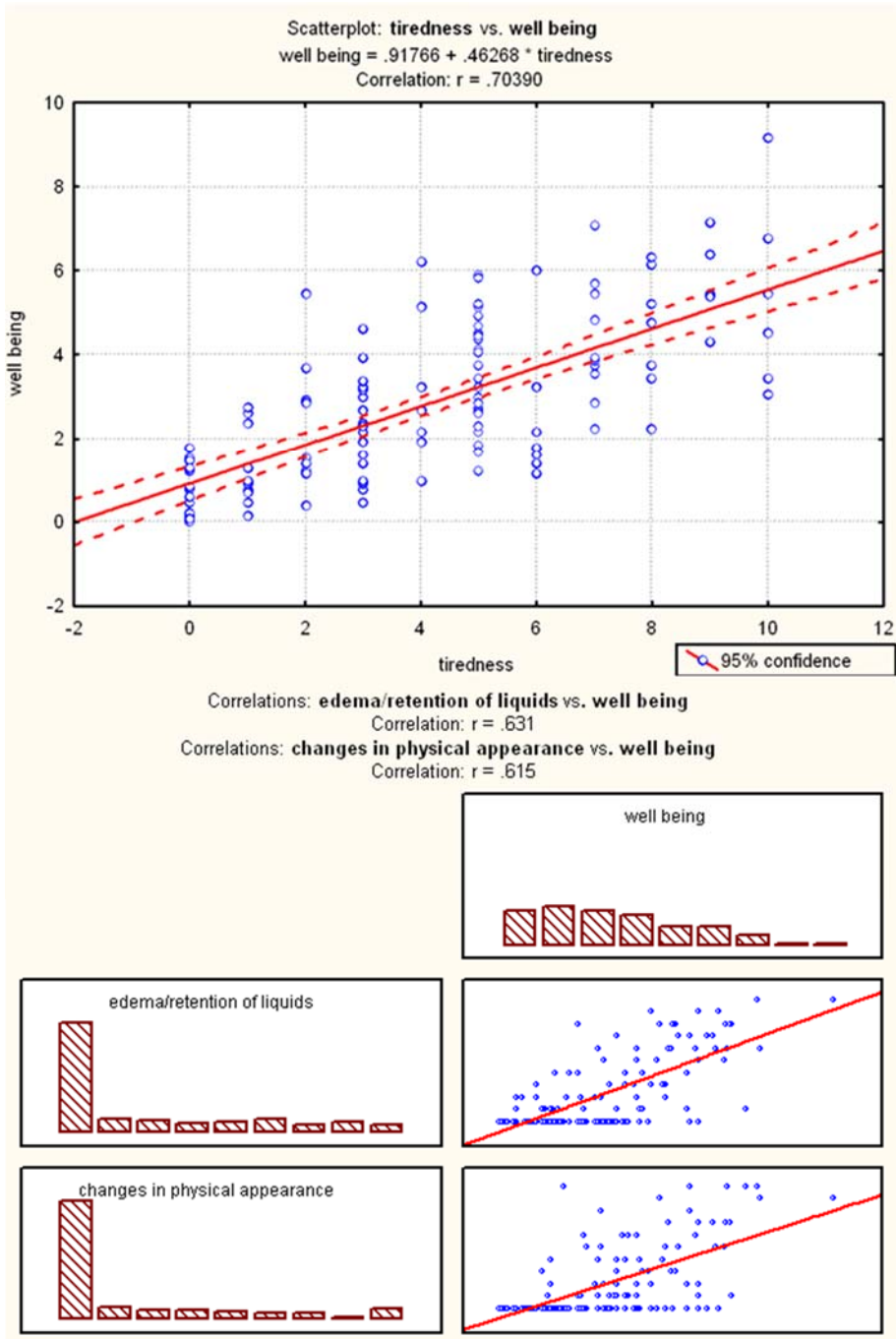
Physical issues (Table 5 and Figure 1)

Table 5. Correlations between different variables
from the physical well-being aspects of the questionnaire.

Variable 1	Variable 2	Correlation coefficient (r) value	P value
Tiredness	Physical well-being	0.704	0.001
oedema/retention of liquids	Physical well-being	0.631	<0.05
changes in physical appearance	Physical well-being	0.615	<0.05
weight gain	Physical well-being	0.645	<0.05
discomfort/pain	Physical well-being	0.671	<0.05
sleep changes	Physical well-being	0.707	<0.05

Note: p value is considered to be significant below 0.05

Figure 1. Correlation between tiredness, overall appearance and physical well-being.
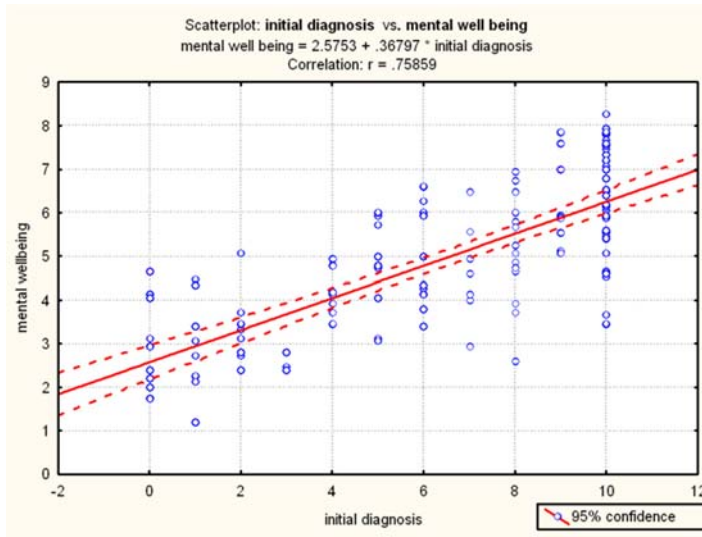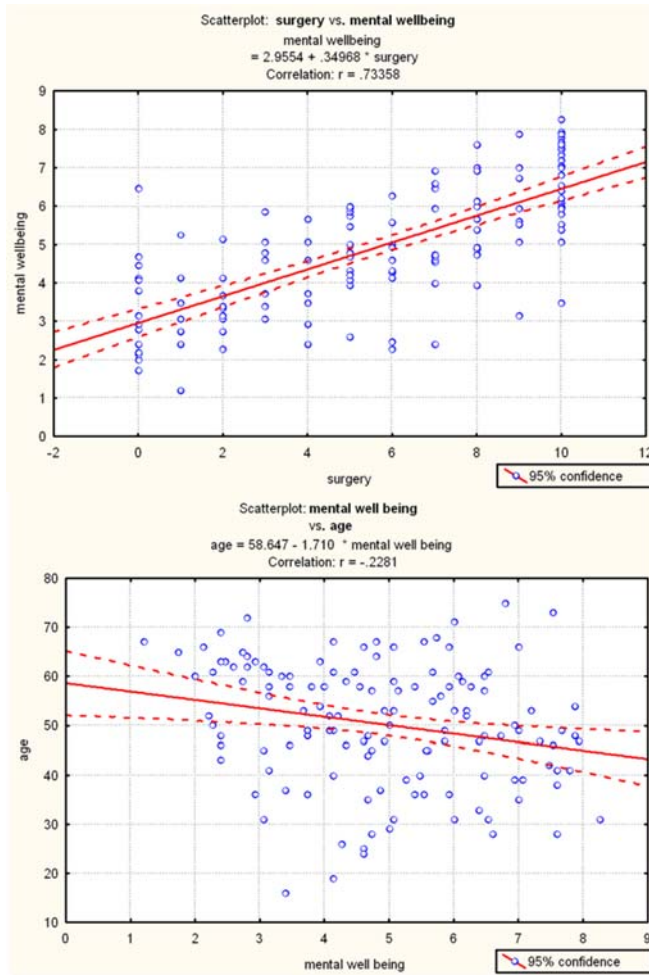
Psychological aspects (Table 6 and Figure 2)

Table 6. Correlations between different variables
from the psychological well-being aspects of the questionnaire.

Variable 1	Variable 2	Correlation coefficient (r) value	P value
initial diagnosis	psychological well-being	0.759	<0.05
Surgery	psychological well-being	0.734	<0.05
time before completion of treatment	psychological well-being	0.771	<0.05
radioiodine ablation	psychological well-being	0.670	<0.05
future diagnostic tests	psychological well-being	0.687	<0.05
second malignancy	psychological well-being	0.630	<0.05
recurrence or metastasis	psychological well-being	0.591	<0.05
psychological well-being	age	- 0.228	0.008
initial diagnosis	age	- 0.216	0.12

Note: p value is considered to be significant below 0.05

Figure 2. Correlation between initial diagnosis, surgery,
age and psychological (mental) well being.

Social concerns (Table 7 and Figure 3)

Table 7. Correlations between different variables from the social concerns part of the questionnaire.

Variable 1	Variable 2	Correlation coefficient (r) value	P value
motivation to work	social concerns	0.792	<0.05
productivity at work	social concerns	0.769	<0.05
household chores	social concerns	0.735	<0.05
financial burden	social concerns	0.652	<0.05
Isolation	social concerns	0.648	<0.05
impact of the illness to the family	Age	-0.197	<0.05
time away from work	Age	-0.192	<0.05

Note: p value is considered to be significant below 0.05

Figure 3. Correlation between initial diagnosis,
family stress, sick leave (time away from work) and age.
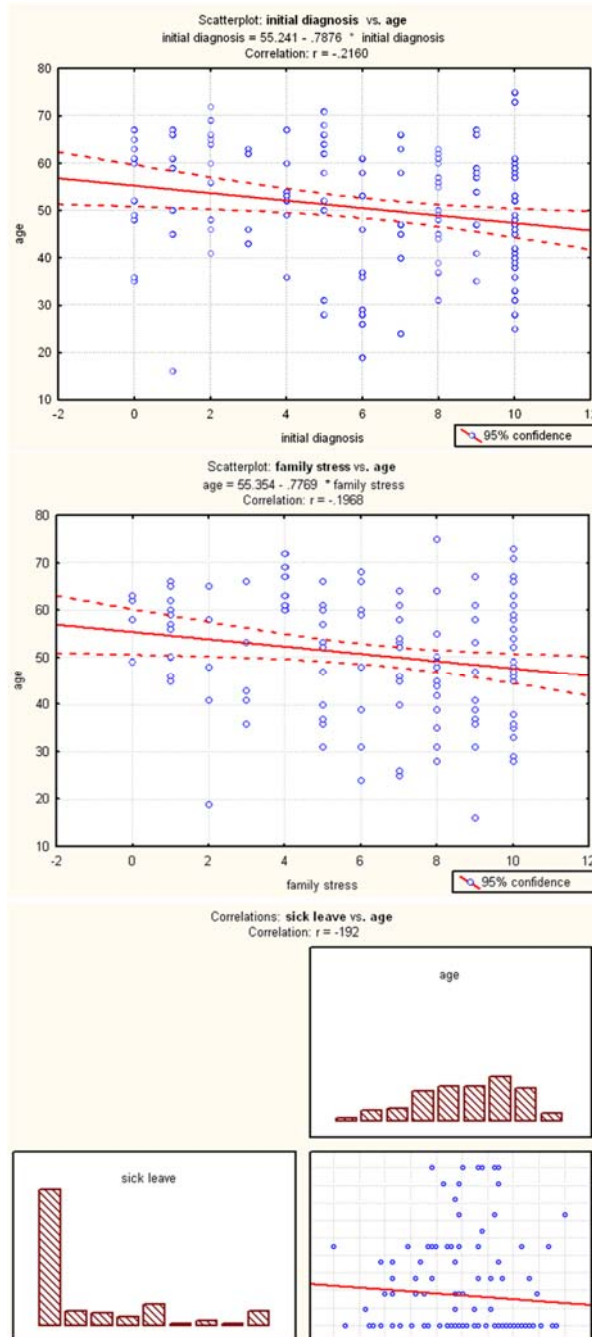
Spiritual well-being (Table 8 and Figure 4)

Table 8. Correlations between different variables from the spiritual well-being part of the questionnaire.

Variable 1	Variable 2	Correlation coefficient (r) value	P value
importance of religious activities	Spiritual well-being	0.663	<0.05
uncertainty about the future	Spiritual well-being	0.615	<0.05
positive changes in life due to illness	Spiritual well-being	0.674	<0.05

Note: p value is considered to be significant below 0.05

Figure 4. Correlation between positive changes in life, religious activities and spiritual well-being.
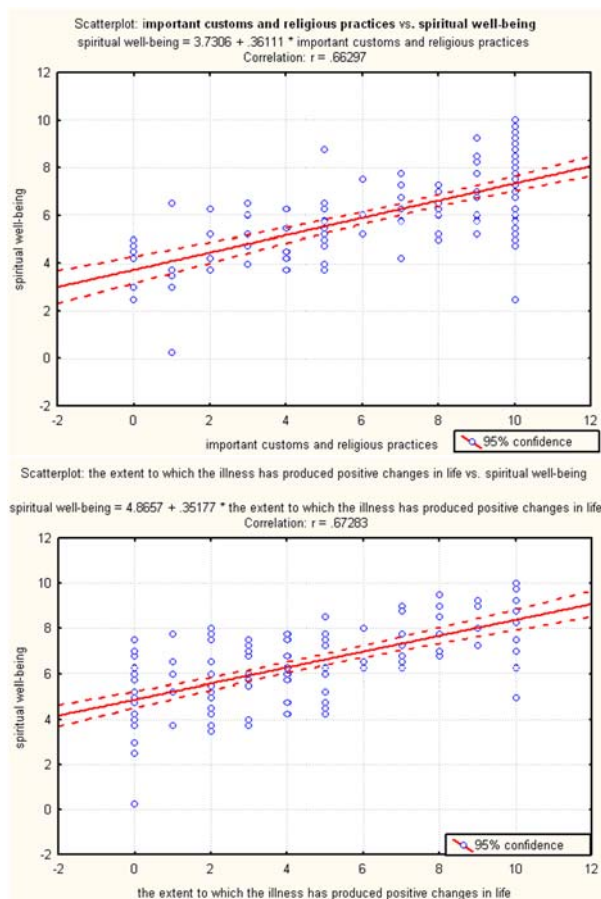
Discussion

The aim of our cross-sectional study was to identify what is the health related quality of life of the thyroid cancer patients from our department. We also tried to identify the most important factors which can affect the HRQoL in order to find solutions to improve it (Gamper, 2015; Sucală, 2014).

Physical well-being

Physical well-being calculated based on the mean values of the studied items is directly influenced by the symptoms or functional impairments of the disease. Hypothyroidism symptoms (tiredness, weight gain, fluid retention, and sleep changes) which are very common when patients are evaluated for oncological control by withdrawing the medicine may influence health related quality of life. Complications of total thyroidectomy related to voice changes, or existing scars influencing the overall appearance can also affect the physical well-being of the patients. We do have solutions for these problems by using the rh-TSH (recombinant human thyroid stimulating hormone) instead of withdrawing the thyroid hormone and by being careful in identifying the patients who are predisposed to have keloid scars and do the correct surgery. Despite of the good clinical outcome for the majority of patients, physical problems can strongly affect the quality of life and this goes for a long time. Our results are similar to those found in the literature: Gamper et al. (2015) in a study on 439 patients described a symptom and functional impairments burden despite the favourable clinical outcome of the disease (Gamper et al., 2015). The same results were described by Yuri Choi et al. (2014) related to the influence of post-thyroidectomy scar on quality of life in thyroid cancer patients (Choi et al., 2014). The tiredness as main and most important factor influencing the physical well-being was reported by Rubic et al. (2014) in a 150 patients study in accordance with our study (Rubic et al., 2014).

We were interested in identifying if there was any correlation between physical well-being based on mean values of the items and the physical well-being reported by the subject. The results were very interesting showing that there is no correlation between the two. It is known that for a patient suffering from a malignant disease a single factor can disturb him/ her in such a manner impacting the QoL and translating into the score related to the physical well-being reported. This must motivate the health care providers to highlight that specific factor and find solutions for improving the quality of life in this category of patients.

Psychological well-being

Psychological well-being is influenced by the related treatment, the fear of radio-ablation, future diagnosis tests, possibility of another cancer emergence and recurrence/ metastasis of the subsequent malignant disease. When patients face the moment of the treatment they already came with a lot of unclear or wrong

information about what is going to happen. We think it is very important to dedicate sufficient time to every patient and to train the medical stuff to be able to explain all the procedures and to answer the raising questions of the patient. Good and valid information spread on the most used websites by the patients is another way to save time and to have a good compliance in order to do the treatment without bad impacting on quality of life. We found a negative but moderate correlation between age and initial diagnosis. Young patients are very fearful of any kind of disease and a cancer diagnosis has a strong impact of their lives. The expectancy of life in young patient is very good and the idea of a thyroid cancer diagnosis early in life affects the majority of the young patients. Surprisingly, negative correlation was found between psychological well-being and age meaning that even if the young patients faced the diagnosis of cancer they usually encounter many reasons to live, to defeat the disease and to fight for recovering the health.

Social concerns

Social problems may also interfere with the overall quality of life in thyroid cancer patients being influenced by the disturbance of household activities, employment or the impact of the illness on patient's family. Isolation may also become a problem if the distress management of the patients is not adequate. A negative and moderate correlation between age and time away from work might be explained by the fact that young people tend to have initial problems in accepting the neoplastic disease with a very serious impact on every aspect of their lives. They usually get more days off from work, have problems with isolating and hiding the diagnosis from the family and friends. For the young people's family the impact of this diagnosis is also a big problem especially in patients who are children or teenagers.

Spiritual activities

Religious activities may also help the patient restoring the spiritual balance and having a good impact on quality of life.

Age and gender related to quality of life

Our study underlined that there was no correlation between age and different factors that could influence the health related quality of life. We could think that aging must come with a decreasing in the overall quality of life. It is not necessary the case, especially in the early retired category of people (50- 65 years old) who report to improve the quality of life. Age by itself does not influence the overall quality of life, what is triggering a decrease in the quality of life aspects are the financial problems, the longstanding illness, the chronic treatments and the lack of mobility. Also, the influence of age on quality of life was not enough studied because there are very few studies including patients over 65 years old, even more

if we think of oncological studies. Until now our results are in concordance with the ones literature suggests. The differences between men and women are still not enough studied, but it can consist of a new direction of study and research (Netuveli, Wiggins, Hildon, Montgomery, & Blane, 2006).

The novelty of the study

The novelty of our study is the new modality of filling in the questionnaire based on the online version with all the information given by the medical staff. We revised the medical literature and we didn't find until now any other study where patients had the possibility of filling in the quality of life questionnaires in an unstressful environment, all by themselves, taking all the necessary time for answering the questions. We all know that our patients are already stressed when they come for medical consultation and we thought that filling in a questionnaire under these conditions may conduct to wrong or altered answers. So the medical team including the psychologist decided that the best way for patients to fill in this kind of questionnaire is at home in their own environment. So we developed an online platform which has all the necessary information regarding different aspects of thyroid cancer and different implications including the quality of life questionnaire. The advantage of an online questionnaire is the low cost of the entire procedure, a real time access and less time to spend on filling in, very comfortable for the responders, flexibility over time and no interviewer on site meaning less influence on answers. There can be some disadvantages concerning the cooperation problems or the availability of internet access to some degree.

Limitations of the study

Our study has some limitations which can become a base for future research. Our thyroid cancer population comprises of subjects who already were treated with radioiodine being continuously hospitalized in our department. It will be useful to see if for the patients who are just undergoing follow-up controls and didn't received iodine treatment the quality of life is better than for the patients who underwent all the therapeutic steps (surgery, iodine treatment and hormonal substitution). It will be also very important to know if there is any impact on thyroid cancer related to the TNM stage and tumour markers. Another field which has not been studied is the quality of life in medullar thyroid cancer population and in patients with differentiated thyroid cancer who underwent tyrosine-kinase inhibitors.

Conclusion

Every step in the treatment of thyroid cancer patients may impact over different aspects of the overall quality of life. As health care providers we must be aware that we are responsible not only for "serving" a correct diagnosis and a correct treatment but also we must be careful about re-establishing the quality of life balance of our patients.

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