

Original Article

QUALITY OF LIFE OF POST-THYROIDECTOMY PATIENTS BEFORE AND AFTER THE RADIOACTIVE IODINE ABLATION THERAPY: A QUASI-EXPERIMENTAL STUDY

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ABSTRACT

Background: Following thyroid cancer surgery, patients receive radioactive iodine (RAI) ablation to eliminate any leftover malignant tissue in order to reduce their chance of recurrence and raise their quality of life (QoL). This study aimed to evaluate thyroid cancer patients' quality of life before and after undergoing RAI therapy following thyroidectomy.

Methods: A quasi-experimental investigation was carried out at the Institute of Nuclear Medicine in Dhaka from August 2022 to July 2025, included 218 thyroid cancer patients who had undergone thyroidectomy. The FACT-G scale was used to measure QoL during face-to-face interviews conducted one and three months following surgery (pre-RAI and post-RAI) using a semi-structured questionnaire that had been pre-tested and validated. Every participant gave their informed consent, which covered all the relevant ethical considerations.

Results: Males had slightly higher median QoL scores than females (97 vs. 96; $p < 0.05$) post-RAI therapy. Younger age, higher educational attainment, marital status, and employment were associated to higher median improvements in QoL scores. ($p < 0.05$). Significant increase in median overall QoL scores from 48 to 96 ($p < 0.01$), with notable improvements in the physical (7 to 25), social (17 to 24), emotional (7 to 23), and functional (16 to 25) domains. Advancing age and marital status emerged as significant predictors of diminished quality of life (OR = 0.100, $p < 0.05$). In contrast, attainment of higher levels of education demonstrated a robust positive association with quality of life, as reflected by a markedly elevated odds ratio (OR = 1507.114).

Conclusion: Radioactive iodine ablation significantly improves multiple Quality of life dimensions in thyroid cancer survivors underscoring its broad therapeutic value.

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INTRODUCTION

Thyroid cancer is the most prevalent cancer of endocrine system making up barely 1% of all malignancies worldwide, accounts for about 92% of all endocrine cancers. Significantly, many nations have seen a significant rise in its incidence over the last few decades.¹ Currently, the ninth most frequent cancer worldwide, it keeps showing an increasing trend.² Though mortality rates have been declining consistently, thyroid cancer incidence has grown in men and women worldwide mostly as a result of the

increased use of diagnostic imaging technologies. An estimated 44,020 new cases and 2,170 fatalities should occur in 2024.⁴ Projections show that the annual worldwide burden of thyroid cancer might reach roughly 1.1 million new cases and 91,000 fatalities by 2050, it will increase of around 34% and 90%, respectively if current trends continue.⁵ Early-onset thyroid cancer was recorded worldwide in 2022 in an estimated 239,362 cases, making it the second most frequent malignancy among people younger than 40 years of age. This rising trend in younger people emphasizes how more and more

crucial long-term survival and quality of life factors are becoming.⁶ Moreover, younger people and Asian males are showing an especially rapid rise in thyroid cancer incidence, which points to a significant demographic shift and changes in risk factor profiles.⁷ At 98.4%, the five-year survival rate is generally excellent across all stages.⁸ Furthermore, women are roughly three times more likely than men to be diagnosed with thyroid cancer.⁴ Almost 20% of the Bangladeshi population suffers from thyroid problems, yet the exact extent of their impact is unknown.⁹

Conventionally, cancer treatment has concentrated mostly on patient survival; nevertheless, given improvements in treatment, QoL assessment has become increasingly crucial for judging treatment outcomes and directing healthcare policy, clinical decision-making, and resource allocation.¹⁰ According to the World Health Organization, quality of life is a person's view of their place in life in relation to cultural values, personal objectives, expectations, and worries.¹¹ Though thyroid cancer has great survival rates, its diagnosis and therapy might have a significant short- and long-term influence on the QoL of patients.¹² Therefore, apart from clinical results, the long-term consequences of therapy on the general well-being of individuals have to be assessed.¹³ Disease-related anxiety, hypothyroidism, and treatment side effects are among the variables influencing QoL in thyroid cancer patients.

The standard surgical treatment is total thyroidectomy, and effective surgical intervention is critical for achieving positive clinical results. Following surgery, patients frequently experience hypothyroidism as a result of the removal of their thyroid hormone. To guarantee that the next RAI treatment is as effective as possible, this is a required step.¹⁵ The benefits of RAI ablation include killing any remaining cancer cells, reducing the risk of recurrence, and facilitating remission. In the weeks following treatment, patients frequently experience an improvement in their quality of life as their hypothyroid symptoms gradually disappear. The majority of thyroid malignancies have a favorable prognosis, with remission rates approaching 90% after thyroidectomy and RAI therapy.¹⁸

Due to the increasing prevalence of thyroid cancer and the increasing attention on survivorship care, QoL has become an essential component of patient care. Even though survival is still a significant

clinical indicator, many survivors continue to have long-term social, psychological, and physical problems. In this regard, Bangladesh is particularly noteworthy because, despite the high prevalence of thyroid cancer, data on QoL among thyroid cancer survivors is still lacking. For this reason, the current study aimed to compare variations in QoL among thyroid cancer patients before and after RAI therapy following thyroidectomy, as well as to identify factors that have an impact on their health. The data is intended to offer insightful observations for doctors, legislators, and healthcare planners to improve survivorship care, direct targeted interventions, and facilitate efficient resource distribution.

METHODS

A quasi-experimental study was carried involving 218 thyroid cancer participants to assess the changes in quality of life before and after radioactive iodine (RAI) treatment after thyroidectomy at the Institute of Nuclear Medicine and Allied science (INMAS), Dhaka, Bangladesh. After surgery, cases passed thyroid hormone pullout, performing in an roughly one-month hypothyroid state, during which thyroid-stimulating hormone (TSH) were elevated above 30 mIU/L to enhance the perceptivity of RAI in detecting residual complaint.¹⁹ Data were collected through face-to-face interviews using a validated semi-structured questionnaire at two time points one month post-thyroidectomy (pre-RAI) and three months after RAI therapy (post-RAI). Quality of life was measured using the FACT-G instrument, which evaluates four disciplines physical well-being (7 particulars, score range 0–28), social well-being (7 particulars, 0–28), emotional well-being (6 particulars, 0–24), and functional well-being (7 particulars, 0–28), yielding a total score between 0 and 108, with advanced scores indicating better QoL. Statistical analyses were performed using SPSS interpretation 20.0 and included descriptive statistics, pairwise correlation analysis, Mann – Whitney U test, Kruskal – Wallis test, Wilcoxon inked-rank test, and multiple direct retrogression. A p-value of lower than 0.05 was considered statistically significant. Ethical approval was attained from the Institutional Review Board of Bangladesh University of Professionals, and written informed consent was secured from all participants in agreement with established ethical norms.

RESULTS

Table-I: Distribution of Patients According to Socio-Demographic Attributes (n=218)

Attributes	Number	Percentage
Sex		
Male	78	35.8
Female	140	64.2
Age(in years)		
20-40	107	49.1
41-59	63	28.9
60-78	48	22.0
Level of Education		
Illiterate	21	9.6
Primary to secondary	49	22.5
SSC	82	37.6
HSC	66	30.3
Occupation		
Service	57	26.1
Business	54	24.8
Housewife	76	34.9
Unemployed	31	14.2
Marital status		
Married	159	72.9
Unmarried	27	12.4
Widow	32	14.7
Monthly Income		
5000-20000	162	74.3
20001-50000	56	25.7

Table I summarizes the socio-demographic profile of the 218 study patients. Females constituted the majority (64.2%), compared to 35.8% males. Approximately half of the respondents (49.1%) were within the 20–40 years age group. In terms of educational status, 37.6% had attained education up

to the secondary (SSC) level, and housewives represented the largest occupational group (34.9%). The majority of participants were married (72.9%), and most (74.3%) reported a monthly household income ranging from 5,000 to 20,000 BDT.

Table-II: Median Quality of Life scores by Socio-Demographic characteristics in Post-RAI Thyroid Cancer Patients (n = 218)

	Total QoL Med (IQR)	PWB Med (IQR)	SWB Med (IQR)	EWB Med (IQR)	FWB Med (IQR)
Sex					
Male	97(94-98)	7(7-8)	17(10-19)	7(7-7)	16(8-18)
Female	96(80-98)	7(7-7)	18(6-19)	7(6-7)	15.5(8-18)
p value	^a 0.030 ^s	^a 0.660 ^{ns}	^a 0.913 ^{ns}	^a 0.901 ^{ns}	^a 0.564 ^{ns}
Age					
20-40	97(94-98)	7(7-8)	18(11-19)	7(7-8)	17(12-18)
41-59	96(81-98)	7(7-8)	17(6-19)	7(6-7)	15(8-18)
60-78	95(75-97.5)	7(7-7)	12(6-17)	7(5-7)	10(8-18)
p value	^b 0.005 ^s	^b 0.029 ^s	^b 0.001 ^s	^b 0.001 ^s	^b 0.038 ^s
Education					
Illiterate	79(71-82)	8(7-10)	5(4-6)	6(5-7)	7(6-8)
Primary to secondary	79(71-93)	7(7-7)	6(5-10)	7(5-7)	8(8-12)
SSC	97(96-99)	7(7-8)	19(17-19)	7(7-7)	18(16-18)

HSC	97(96-98)	7(7-7)	17(13-19)	7(5-8)	16(13-19)
p value	^b 0.001 ^s	^b 0.001 ^s	^b 0.001 ^s	^b 0.007 ^s	^b 0.001 ^s
Occupation					
Service	97(96-98)	7(6-7)	18(16-19)	7(7-7)	16(13-18)
Business	96(93-98)	7(7-8)	17(10-19)	7(6-7)	16(8-18)
Housewife	95(75-98)	7(7-7)	16.5(5-19)	7(5-7)	15(8-18)
Unemployed	95(81-98)	7(7-8)	18(7-19)	7(7-8)	14(8-18)
p value	^b 0.001 ^s	^b 0.016 ^s	^b 0.040 ^s	^b 0.376 ^{ns}	^b 0.109 ^{ns}
Marital status					
Married	97(92-98)	7(7-7)	17(9-19)	7(5-7)	16(8-18)
Unmarried	95(82-99)	7(7-8)	19(7-19)	7(7-8)	15(9-18)
Widow	95(75-97)	7(7-7)	18(5-19)	7(5.5-7)	14.5(8-18)
p value	^b 0.045 ^s	^b 0.133 ^{ns}	^b 0.254 ^{ns}	^b 0.036 ^s	^b 0.640 ^{ns}
Income					
5000-20000	96(80-98)	7(7-8)	17(6-19)	7(6-7)	15(8-18)
20001-50000	97(95.5-98)	7(7-7)	17(13.5-19)	7(5.5-8)	18(11-19)
p value	^a 0.062 ^{ns}	^a 0.010 ^s	^a 0.342 ^{ns}	^a 0.586 ^{ns}	^a 0.016 ^s

(Source: Researcher's Construct-2025)

s= significant

ns= not significant

^aP value reached form Mann-Whitney U

^bP value reached form Kruskal Wallis Test

Notes-PWB: Physical well-being, SWB: Social well-being, FWB: Family well-being, EWB: Emotional well-being.

Table II indicates that male patients had slightly higher overall QoL scores compared to females following RAI therapy, with the difference reaching statistical significance ($p = 0.030$). Younger patients (20–40 years) demonstrated significantly better outcomes across multiple domains, including physical ($p = 0.029$), social ($p = 0.001$), emotional ($p = 0.001$), and functional well-being ($p = 0.038$), suggesting that younger age is associated with superior post-treatment QoL. Educational attainment was also strongly correlated with overall QoL, as

patients with higher education reported improved physical ($p = 0.001$), social ($p = 0.001$), emotional ($p = 0.007$), and functional well-being ($p = 0.001$), indicating a positive relation between education level and QoL across all domains. Occupational status significantly affected overall QoL, with employed participants achieving higher total scores, including better physical ($p = 0.016$) and social well-being ($p = 0.040$), highlighting the influence of employment on post-RAI quality of life.

Table- III: Comparison the median scores of different domains of QoL of participants before and after RAI (n=218)

	QoL Before RAI Med (IQR)	QoL After RAI Med (IQR)	P value
Physical well being	7(7-8)	25(22-26)	0.001 ^s
Social well being	17(8-19)	24(22-24)	0.001 ^s
Emotional well being	7(6-7)	23(18-23)	0.001 ^s
Functional well being	16(8-18)	25(22-25)	0.001 ^s
Total QOL	48(28-51)	96(82-98)	0.001 ^s

s= significant, P value reached from Wilcoxon sign Rank test. Significant ($p < 0.05$) P value reached from Wilcoxon sign Rank test. Domain scores are derived from the Fact-G scale, with higher scores indicating better quality of life. Improving Quality of Life based on median cut-off points for each domain involves using median values to set benchmarks for different aspects of well-being

Table III demonstrates that Radioactive Iodine (RAI)

therapy significantly improves quality of life in thyroid cancer patients across all domains. Median scores increased markedly for physical well-being (7 → 25), social well-being (17 → 24), emotional well-being (7 → 23), and functional well-being (16 → 25), all reaching statistical significance ($p = 0.001$). The total QoL score nearly doubled, rising from 48 to 96 ($p = 0.001$), indicating substantial post-treatment improvement. These findings strongly support the positive impact of RAI therapy on patient well-being.

Table-IV: Multivariable Analysis of Factors affecting QoL Before Radioactive Iodine Therapy (n=218)

Attributes	B	S.E.	p value	OR	95% C.I. for EXP(B)	
					Lower	Upper
Gender	0.595	0.421	0.157 ^{ns}	1.813	0.795	4.133
Age	-1.079	0.257	0.001 ^s	0.340	0.205	0.562
Education	1.862	0.300	0.001 ^s	6.437	3.573	11.599
Occupation	0.101	0.220	0.645 ^{ns}	1.106	0.719	1.701
Marital Status	-0.217	0.250	0.384 ^{ns}	0.805	0.493	1.313
Income	-1.399	0.560	0.012 ^s	0.247	0.082	0.739

s= significant, ns= not significant, Multiple regression analysis

Table- V: Multivariable Analysis of Factors affecting QoL After Radioactive Iodine Therapy (n=218)

	B	S.E.	p value	OR	95% C.I. for EXP(B)	
					Lower	Upper
Gender	-1.345	1.080	0.214 ^{ns}		-3.474	0.784
Age	-2.303	0.779	0.003 ^s	.100	-3.839	0-.767
Education	7.325	0.671	0.001 ^s	1506.28	6.002	8.648
Occupation	-0.611	0.568	0.284 ^{ns}		-1.731	0.510
Marital Status	-1.872	0.743	0.013 ^s	.154	-3.337	-0.407
Income	-3.598	1.381	0.010 ^s	.027	-6.320	-0.876

s= significant, ns= not significant

Table IV indicates that age and income were negatively associated with post-RAI quality of life. Specifically, older age (B = -1.079, $p = 0.001$, OR = 0.340) and lower income (B = -1.399, $p = 0.012$, OR = 0.247) were linked to poorer QoL, whereas higher educational attainment was positively associated (B = 1.862, $p = 0.001$, OR = 6.437), suggesting that more educated participants were significantly more likely to report better QoL.

Table V further confirms these associations. Older age (OR = 0.100, 95% CI: -3.839 to -0.767) and lower income (OR = 0.027, 95% CI: -6.320 to 0.876, $p < 0.05$) were significantly associated with reduced QoL. Higher education showed a strong positive association (OR = 1507.114, 95% CI: 6.002–8.648), while marital status was negatively associated (OR = 0.154, 95% CI: -3.337 to -0.407), indicating that certain marital conditions corresponded to lower QoL.

DISCUSSION

This quasi-experimental design involving 218 purposively selected thyroid cancer patients was carried at the Institute of Nuclear Medicine and Allied Sciences (INMAS), Dhaka, to assess the changes in QoL before and after radioactive iodine ablation following thyroidectomy.

Socio-demographic attributes

The average respondent age was 44.14 ± 15.41 years (range: 20–85), and 49.1% were under the age of 40 according to the present research. These findings are consistent with a study that reported a mean age of 46.53 ± 13.92 years (range: 20 to 82).¹⁷ The consistent mean ages indicate a comparable demographic profile across study populations. (Table-I)

The study revealed a diverse distribution of occupations among patients, with 34.9% were housewives and 26.1% worked in service positions. In a study, 27.6% of those surveyed were involved in housework and 29.3% held clerical jobs.²¹ Occupational variables might indirectly increase the likelihood of cancer through associated environmental exposures and lifestyle choices. Study depicted that most of the patients had secondary or beyond schooling; 37.6% had SSC and 16.1% had HSC qualifications. These findings are consistent with a study that reported similar educational levels.²¹ Higher education can raise health literacy, promote good behavior, and broaden access to healthcare facilities.(Table- I)

In terms of marital status, most of the patients were married (72.9%), consistent with earlier studies indicating 77% and 79% of participants were married respectively.^{21,22} This alignment suggests that marital status may provide social support that improves cancer diagnosis and treatment outcomes.(Table- I)

In this study, 74.3% of participants were from the lower income range (5,000–20,000 TK). These findings highlight how financial status influences patients, 62.5% of whom were in comparable low-income levels, according to studies.²² These findings highlight the impact of economic status on healthcare access, treatment quality, and overall well-being.(Table- I)

Comparison of median score of QoL of respondents by socio-demographic character after RAI

Younger participants (aged 20–40 years) revealed higher median QoL scores in all domains compared their older counterparts. This finding aligns with a study that reported increased quality of life among individuals aged 30–39 following RAI therapy.²³ Enhanced QoL in younger patients may stem from better physical health, psychological resilience, and stronger social support, promoting effective coping and overall well-being. (Table- II)

The study found that male participants reported slightly higher median quality of life (QoL) scores than females, consistent with previous studies.^{24,25} Gender differences in QoL may reflect distinct physical, emotional, and social responses to illness. Men often report fewer psychological symptoms like anxiety and depression, which are more common in women and negatively impact QoL.(Table-II)

Individuals with higher levels of education demonstrated significantly better quality of life (QoL) scores across all domains. This finding aligns

with previous research showing that people with greater educational attainment tend to experience more favorable QoL outcomes.²² This association may be influenced by demographic factors like age, socio-economic status, and health, which can mediate the link between education and perceived QoL.(Table-II)

Comparison the median scores of different domains of QoL for thyroid cancer patients

Physical well-being

The study showed a notable rise in physical well-being scores following RAI treatment (from 7 to 25) and quality of life (QoL).^{17,22} However, conflicting findings in other studies underscore the impact of variations in methodologies, patient populations, and treatment protocols on these outcomes.^{23,24}(Table-III)

Social well-being

Following RAI treatment, the median social well-being score rose from 17 to 24, showing a considerable improvement. This result is consistent with studies reporting improved social functioning after RAI therapy^{17, 22}. These gains are likely linked to a reduced disease burden and overall better health. However, another study noted a temporary decline in social functioning, which was attributed to the physical recovery period and lingering stress related to cancer.²³ (Table-III)

Emotional well-being

The study found a substantial improvement in emotional well-being with average scores rising from 7 to 23, therefore showing clear psychological and emotional advantages for thyroid cancer patients. This finding is in line with research indicating that structured psychological support during RAI therapy can enhance emotional well-being and lead to better clinical outcomes.²⁶ Similarly, one study found better quality of life and lower psychological discomfort one year after RAI treatment; another emphasized the harmful effect of psychological distress. Stress on many quality-of-life domains stressed the advantages of early psychiatric intervention. Together these studies underline the necessity to combine psychological and emotional care with RAI treatment.^{14,27} Collectively, these studies highlight the need to integrate psychological and emotional care with RAI treatment. (Table-III)

Functional well-being

The increase in functional well-being scores from 16 to 25 suggests a notable improvement in patients'

daily functioning following treatment with radioactive iodine (RAI). This aligns with a study that reported a median cognitive functioning score of 67.01 post-RAI.¹⁸ The relief of symptoms probably causes improvements in functional status which improves patients' capacity to complete daily tasks. Three months post-RAI, studies reported improvements in quality of life, cognitive performance, and functional well-being, supporting RAI's beneficial effects.^{17,28}(Table-III)

Total QoL Score

Almost twofold rise in the total QoL score points to a significant improvement in general QoL following radioactive iodine treatment. consistent with earlier studies finding decreases in anxiety and melancholy after RAI therapy, yet another study notes major improvements in quality of life within four weeks post-RAI treatment as well as another study noting significant worldwide changes in QoL^{14, 23, 28} These results further substantiate the positive impact of RAI on overall quality of life.(Table-III)

Multivariable Analysis of Factors affecting QoL of thyroid cancer patients

The multivariable analysis exploring factors that influence quality of life after radioactive iodine (RAI) therapy in thyroid cancer patients provides valuable insight into how socio-demographic characteristics shape post-treatment QoL.

QoL declined with **increasing age**, therefore age was negatively related to QoL. This result is consistent with a study claiming lower QoL. Greater comorbidities, lower physiological resilience, and age-related frailty in older patients.²⁴ (Table-IV)(Table-V)

Consistent with results from earlier research, greater **educational attainment** was substantially linked with better quality of life (QoL).^{22, 29} On the other hand, lower educational levels were related under lower quality of life in another study.³⁰ Better post-RAI treatment is probably helped by education since it improves healthcare access, raises health literacy, and strengthens coping mechanisms. (Table-IV)(Table-V)

In this study, **marital status** was inversely linked with QoL, opposite to findings from a prior study that noted greater QoL among married people.²⁹ Variations in care giving load or relationship quality may explain this difference. In some situations, the stress of care giving or emotional strain inside the marriage might counteract the usually protective benefits marriage has on well-being. (Table-IV)(Table-V)

Lower income people reporting lower QoL probably suffer from restricted access to medical care, decreased social support, and more financial stress. Higher incomes, however, seems to raise QoL, especially when combined with other defensive elements including social support and education. A similar result was noted in a past Further supporting the connection between financial condition and quality of life, study found a negative correlation between income and QoL.³¹(Table-IV)(Table-V)

LIMITATIONS OF THE STUDY

Thyroid cancer patients frequently face psychological stress, which might have impacted their involvement in interviews and the accuracy of their answers. Some of the data was based on patients' memory, which could lead to recall bias. Furthermore, differences in how doctors make decisions and provide care may result in varying treatment approaches, possibly affecting patients' quality of life.

CONCLUSION

In this study, the patient cohort was predominantly female, with most participants being married, having secondary-level education, belonging to lower-income households, and primarily engaged as housewives. Socio-demographic factors such as male gender, younger age, higher educational attainment, marital status, and employment were positively associated with better quality of life (QoL) outcomes, whereas older age was linked to lower QoL, potentially due to co-morbidities and diminished physiological resilience. Higher educational levels correlated with improved QoL, likely reflecting greater health literacy and enhanced access to healthcare resources, while lower income consistently predicted poorer QoL, underscoring the adverse effects of financial constraints on access to care and overall well-being. Overall, the findings highlight the beneficial effects of radioactive iodine (RAI) therapy on physical, emotional, and social well-being, emphasizing the need for holistic survivorship care that integrates mental health support, social resources, and coping strategies. Future research should examine the long-term impact of RAI therapy on QoL, with particular attention to personalized care pathways and promoting sustained well-being among thyroid cancer survivors.

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