A survey of the young person’s experience of Graves’ disease and its management

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Abstract
Objective: A suboptimal quality of life (QoL) has been reported in patients with Graves’ disease treated in adult life, but long-term QoL in those treated in childhood and adolescence is unclear. We wanted to understand how Graves’ disease and its management impact on the physical, psychological and social well-being of young people and their longer-term QoL.

Design, patients and measurements: Two questionnaires were used to assess QoL and patient experience of Graves’ disease; PedsQL™ Generic Core Scales and a Graves’ disease questionnaire devised for this project. The anonymized questionnaires were sent to young people (<30 years) diagnosed with Graves’ disease in childhood and adolescence and managed at a tertiary paediatric endocrine unit in the North of England. Respondent QoL scores were compared with a healthy UK cohort.

Results: Questionnaires were sent to 51 young people, and 26 responded (51%). Graves’ patients reported a lower total QoL score compared with the healthy cohort (p = .003). This was particularly apparent in the psychosocial domain (p = .0016). No patient regretted having definitive treatment (surgery/radioiodine), and all said they would recommend it to others. Half of those who had received definitive treatment still did not feel recovered. There was no difference in the long-term QoL in those who did/did not receive definitive treatment (p = .40).

Conclusions: This study highlights short- and long-term impacts on the QoL and general well-being of young people with Graves’ disease. There were no regrets regarding the choice of definitive treatment. This information will help inform the counselling of patients and their families.

Keywords
Graves’ disease, hyperthyroidism, paediatric, quality of life, thyroid

INTRODUCTION

The most common cause of hyperthyroidism in childhood is Graves’ disease.1 Graves’ disease is an autoimmune disorder where antibodies to the thyroid-stimulating hormone (TSH) receptor on the thyroid gland result in excess thyroid hormone production. The three treatment options for Graves’ disease are anti-thyroid drugs (ATD), surgery or radioiodine (RI). Initial treatment usually involves the administration of ATD; in the UK, this is usually carbimazole. Whilst ATD offers the prospect of a life without long-term medication, only...
25% of young patients remit after 2–3 years of treatment.\(^2\) This contrasts with a figure of 50% in adults.\(^3\)

Definitive treatment in the form of surgery (total thyroidectomy) and RI therapy tend to be used in patients who do not remit following a course of ATD or in patients who develop side effects to the ATD treatment. Both surgery and RI result in a requirement for long-term levothyroxine replacement therapy. The young person with Graves’ disease tends to have a more profound biochemical disturbance at diagnosis than adult patients and is more likely to experience side effects of ATD therapy.\(^4\)–\(^6\) The diagnosis of Graves’ disease in a young person is therefore associated with repeat visits to hospital without a realistic possibility of cure in most cases.

Adult studies have demonstrated an impaired health-related quality of life (HRQOL) at the time of Graves’ disease diagnosis, which for many patients persists despite having a year or more of treatment.\(^7\)–\(^13\) Studies in adults have also demonstrated that hypothyroid patients requiring levothyroxine substitution (including those who have been treated surgically or with RI) have persistent symptoms and a lower quality of life (QoL) and psychological well-being, despite being rendered euthyroid.\(^14\)–\(^16\)

The diagnosis of Graves’ disease and its management could have different implications for the physical, psychological and social well-being of young people compared with adults. As well as management being frequently more complicated in the young, the brain of young people (under 25 years of age) is still developing and they have a unique set of physical, educational and developmental milestones to negotiate.\(^17\)

There is a paucity of data documenting the experience of the younger patient with Graves’ disease and the impact of this condition on their longer-term QoL. This quality improvement project set out to understand how the diagnosis of Graves’ disease and its treatment is perceived by the young person and to use established measures to assess their QoL. Collecting this information will help inform decisions around the different treatment options with families.

## 2 | MATERIALS AND METHODS

To assess the young person’s (<30 years) experience of Graves’ disease and any potential effects on QoL, two separate questionnaires were used. Firstly, a validated QoL questionnaire (PedsQL™ Generic Core Scales; UK-English version), each version of which is specific for a particular developmental stage (from toddler to young adult), ensuring that the participant received a relevant and age-appropriate questionnaire. This was used alongside a short questionnaire (8 items) specific to Graves’ disease that was devised for this study.

The World Health Organization (WHO) defines QoL as ‘an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns’.\(^18\) Previous QoL studies have highlighted the complexity and subjectivity in defining QoL, emphasizing the importance of obtaining the young persons’, as well as the parents’, perspective.\(^19\)–\(^20\) QoL was assessed in this study using the PedsQL™ questionnaires, which provide a validated approach to measuring HRQOL in children and young people.\(^21\) For those aged under 16 years, an additional questionnaire, the PedsQL™ parent report, was also sent out to measure the young person’s QoL from the parent’s perspective.

### 2.1 | PedsQL™ Generic Core Scales questionnaire

The PedsQL™ Generic Core Scales questionnaire is designed to measure the core dimensions of health as defined by the WHO, alongside functioning ability at school/work. It comprises 23 items: physical functioning (8 items); emotional functioning (5 items); social functioning (5 items); and school/work functioning (5 items). There are three summary scores produced: a Total Scale Score (23 items); Physical Health Summary Score (8 items); and Psychosocial Health Summary Score (15 items) (Figure 1). A licence was obtained from the Mapi Research Trust to use and distribute the PedsQL™ questionnaire.

### 2.2 | Graves’ disease–‘specific’ questionnaire

The Graves’ disease–‘specific’ questionnaire, devised as part of this project, collected anonymized (non-identifiable) demographic information including age, sex and current education/occupation. It also included health information such as the impact of Graves’ disease on mental well-being and enjoyment of life, which treatments had been received and their satisfaction with this treatment, including any definitive treatment that may have been undertaken (surgery or RI). The questionnaire was developed by LL, JR and TC with feedback obtained from two patients with Graves’ disease and their suggestions incorporated prior to finalization (Appendix A).

### 2.3 | Participants

Eligible patients included all those on our records aged between 8 and 30 years with a diagnosis of Graves’ disease for at least one year, and who previously or currently attend the Paediatric Endocrinology Department at The Great North Children’s Hospital, Newcastle-upon-Tyne. All patients were diagnosed when under paediatric services, and so, their experience was that of a child or adolescent growing up with Graves’ disease. These patients (n = 51) were invited by post to complete both anonymous questionnaires (PedsQL™ and Graves’ disease ‘specific’) in May 2020.

For some fields, there was an opportunity for participants to leave free-text comments. Patients were excluded from the study if they were involved in clinical trials of novel therapies on the basis that this would impact on their perception of standard treatment, or if they were unable to provide feedback because of their young age or having a learning disability. The required information to confirm these exclusions was extracted from our patient database and the patient medical notes.
2.4 | Analysis

For the Graves’ disease–specific questionnaire, the demographic and clinical data were used with the QoL data to explore differences between respondents. The qualitative free-text responses were analysed thematically whereby key themes were identified and explored with a deductive approach, using the Braun and Clarke’s 6-step framework. Each theme was examined to gain an understanding of the respondents’ experience of Graves’ disease and its management.

The three summary scores were calculated from the PedsQL™ questionnaires from each patient, and the parent report where applicable, by following the scaling and scoring guidance set out by the Mapi Research Trust.

The HRQOL scores were compared between the Graves’ disease patients and a healthy cohort of UK children (aged 8-18 years), in addition to children with a chronic illness (diabetes). This study developed a UK-English version of the US PedsQL™ generic questionnaire and assessed its performance in a group of UK children and their parents, including healthy children and those with chronic health problems. The UK-English version of PedsQL™ was reported to perform equally to the original PedsQL™ and consequently was recommended for assessment of paediatric HRQOL in the UK.

Statistical analysis was performed using SPSS version 25. A Shapiro-Wilk test was used to test for normality. An independent t test was performed for the parametric data, and a Mann-Whitney U test was performed for the non-parametric data. A multiple regression analysis was performed to determine whether the total HRQOL score in Graves’ disease patients was associated with age, sex or presence of a co-existing medical diagnosis. The level of statistical significance accepted was $p < .05$ (two-tailed significance).

2.5 | Ethics

As this was a quality improvement project seeking to improve patient care and involved only non-identifiable patient information with all the data processed by the individual’s healthcare team, ethical approval was not required.

3 | RESULTS

3.1 | Respondents

Of the 51 eligible patients to whom the questionnaires were sent out, 26 questionnaires were returned (51% response rate). We received one response with an unanswered PedsQL™ questionnaire, so this was excluded from the analysis. There were two respondents who did not complete their age on the questionnaire and were consequently excluded from the age-related analysis.

3.2 | Descriptive analysis

Table 1 shows the demographic and clinical data of the young people who completed the questionnaire. Of those who completed the questionnaire, 21/26 (81%) were female and the median age at the time of completing the questionnaire was 18 (ranging from 8 to 28) years. In terms of their current education/occupation, 13/26 (50%) were in school, 2/26 (8%) were in higher education, 9/26 (34%) were employed and 2/26 (8%) were unemployed. A third of the patients 8/26 (31%) had additional medical diagnoses other than Graves’ disease, including other autoimmune diseases such as type 1 diabetes, coeliac disease and vitiligo. Other medical
diagnoses included autism, bipolar disorder, DiGeorge syndrome, asthma and eczema.

The majority of the 26 patients (21/26; 81%) did not experience the inflammatory eye disease that can be associated with Graves’ disease, Graves’ orbitopathy (GO). However, of those individuals who had developed GO, 3/5 (60%) reported that they still had thyroid-related eye problems.

3.2.1 | Graves’ disease treatment

All of the respondents had received carbimazole to treat their Graves’ disease and had taken/have been taking it for a duration ranging from 1 to 3 years (10/26; 38%) to more than 4 years (12/26; 46%), with four respondents being unsure of the duration of the treatment they had received. Only one patient reported a side effect that may have been directly related to taking carbimazole (arthritis).

Of those who had received definitive treatment (11/26), six had undergone RI treatment and five a total thyroidectomy. When considering definitive treatment, all of the participants cited ‘the doctor’s recommendation’ as the most important factor in deciding between RI and surgery, followed by verbal (7/11; 64%) and written information (5/11; 46%).

Five respondents were not currently on any treatment for their thyroid, with the other patients either remaining on carbimazole with or without levothyroxine (9/21; 43%) (of which half had been on this treatment for over four years), or they were taking only levothyroxine (12/21; 57%) as a result of definitive treatment (apart from two cases of spontaneous hypothyroidism). Only one patient who had definitive treatment (RI) was not currently taking levothyroxine.

When asked how long it took to feel ‘back to normal’ after receiving the diagnosis of Graves’ disease, the response ranged from two weeks to four years. Despite their Graves’ disease being treated for at least a year, 12/26 (46%) reported that they did not feel recovered from their Graves’ disease, with 5/12 (42%) of these individuals being those who had received definitive treatment. The main reasons cited from these respondents for not feeling recovered included the need to undergo regular blood test monitoring and the requirement to take tablets every day. Of those who did not feel recovered, 7/12 (58%) were taking levothyroxine replacement therapy for hypothyroidism. Over three quarters (81%) reported ongoing regular contact with a healthcare professional because of their thyroid, at a frequency ranging from every 8 weeks to annually. The younger respondents (<10 years) reported more frequent blood tests, and those under the age of 16 years were more likely to be under secondary care rather than primary care follow-up.

3.3 | Qualitative analysis of free-text comments

There were a number of instances where participants wrote free-text to expand on ‘yes or no’ answers (Tables 2 and 3). This formed part of the questions regarding mental well-being and enjoyment of life, as well as various aspects of their experience of having definitive treatment (surgery/RI) and about whether they felt fully recovered from their Graves’ disease. There were a number of themes identified from these responses (Table 2).

3.3.1 | Mental well-being and enjoyment of life

17/26 (65%) reported that Graves’ disease affected their mood, and 13/26 (50%) felt that it had affected their enjoyment of life. Both aspects were closely related to 10/26 (38%) citing both their mood

### Table 1: Demographic and clinical characteristics of the 26 young people who completed the questionnaire

| Patient demographic | Graves’ Disease (GD) patients n (%) |
|---------------------|-------------------------------------|
| Sex                |                                     |
| Female             | 21 (81)                             |
| Male               | 5 (19)                              |
| Age in years (range)| 18 (8-28)                           |
| Current education/occupation |                       |
| School             | 13 (50)                             |
| Higher education   | 2 (8)                               |
| Employed           | 9 (34)                              |
| Unemployed         | 2 (8)                               |
| Other medical diagnoses | 8 (31)                        |
| History of Graves’ orbitopathy | 5 (19)                           |
| Received definitive treatment | 11 (42)                      |
| Surgery            | 5 (45)                              |
| Radioiodine        | 6 (55)                              |
| Length of Anti-Thyroid Drug treatment |              |
| 1-3 years          | 10 (38)                             |
| 4 + years          | 12 (46)                             |
| Unsure             | 4 (16)                              |
| Current GD treatment |                                    |
| None               | 5 (19)                              |
| LT only            | 12 (46)                             |
| CBZ only           | 7 (27)                              |
| CBZ + LT           | 2 (8)                               |
| Regular contact with healthcare professional |       |
| Primary care       | 7 (39)                              |
| Secondary care     | 11 (41)                             |
| Do not feel recovered from GD | 12 (46)                        |
| Received definitive treatment | 5 (42)                          |
| No definitive treatment | 7 (58)                  |
| Remain only on levothyroxine | 7 (58)                   |

There were a number of instances where participants wrote free-text to expand on ‘yes or no’ answers (Tables 2 and 3). This formed part of the questions regarding mental well-being and enjoyment of life, as well as various aspects of their experience of having definitive treatment (surgery/RI) and about whether they felt fully recovered from their Graves’ disease. There were a number of themes identified from these responses (Table 2).
and enjoyment of life had been affected. Many of the respondents highlighted the impact of Graves’ disease on both their family and peer relationships, as well as academic performance at school and lack of ability to participate in sporting activities (Table 2).

### 3.3.2 | Definitive treatment

All those who had definitive treatment did not regret the intervention and stated they would recommend it to others. Some reported that they would have preferred to have had definitive treatment sooner (rather than continuing with ATD) (4/11; 36%), with most citing they would have ‘felt normal sooner’. The positive and negative aspects of both surgery and RI from the perspective of the young person were highlighted (Table 3).

### 3.4 | PedsQL™ Generic Core Scales

As described above, three summary scores were calculated for the PedsQL™ questionnaires: Total Scale Score; Physical Health score; and Psychosocial Health score. The individual domains of functioning were also scored: emotional, social and school/work. Items were reverse-scored and linearly transformed to a 0-100 scale (0 = 100, 1 = 75, 2 = 50, 3 = 25, 4 = 0); higher scores indicate a better HRQOL.

The HRQOL scores were compared between the Graves’ disease patients and a healthy cohort of UK children (aged 8-18 years) (Table 4). Graves’ disease patients had an overall lower total HRQOL (P = .003), with lower scores reported in both psychosocial (P = .0016) and physical functioning (P = .029) (Figures 2 and 3). When the Graves’ disease patients were sub-analysed by age (8-18 years vs. ≥19 years), the Graves’ disease respondents who were aged 19 years...
There was no difference in the total HRQOL scores between those who had received definitive treatment or not (Table 5). When the healthy cohort reference group was compared to the younger Graves' disease patients within the same age range (8-18 years; n = 15), the only difference that remained was in the school/work domain (P = .03) explained variance in the total HRQOL score reported by Graves' disease patients (F(3, 19) =0.653, p = .59, R² = 0.09).

4 | DISCUSSION

We have found evidence to suggest that Graves' disease and its management significantly impacts on QoL in the young patient both in the immediate and longer term, similar to the findings of those presenting in adult life.7-13

Treating the young patient with ATD does not usually result in cure and therefore existing patients and health professionals will be interested to note that no patient who was treated 'definitively' with RI or surgery regretted this decision and all stated that they would recommend this course of treatment to others. Indeed, some would have preferred to have made this decision at an earlier stage. Given the relatively low possibility of a cure with ATD alongside the detrimental effects of hyperthyroidism, the importance of considering an earlier discussion and decision for definitive therapy in paediatric Graves' disease has previously been suggested.26 The fact that all of those who had definitive treatment cited 'doctors' recommendation' as a contributing factor in deciding which treatment to have highlights the importance of having an informed discussion with the patient and their families. This discussion will be more relevant and useful if earlier patient experience can be used as a framework.

The difference between QoL when Graves' disease and reference scores from healthy individuals was compared applied to every domain apart from 'social'. The reduced scoring in the psychosocial domain of the Graves' disease patients reflected decreased scores in both the school/work and the emotional domains. The difference in the school/work domain in the younger Graves' disease patients when compared to the healthy population may reflect the recognized impact of excess thyroid hormone on learning.26 Given the known impact of Graves' disease on learning and potential impact on academic achievement, it is important to note that unemployment rates were not obviously different from expected rates.27 The effect on the emotional state of on an individual in the acute phase of Graves' disease is well established, but our findings suggest that the impact on psychosocial functioning in young people is more longstanding. This is consistent with the findings in adult studies that have demonstrated a persisting impaired QoL, even months or years after achieving euthyroidism.11-13

The QoL scores in young people with Graves' disease did not differ markedly from those obtained in young people with diabetes. Whilst this might appear surprising, given the potentially onerous impact of regular injections and blood glucose monitoring, young
people with diabetes may adjust to their underlying condition better than anticipated.24

Although patients appeared to be satisfied with their definitive treatment of both RI and surgery, there was no obvious difference in terms of QoL when compared to those who had not received definitive treatment. This is in contrast to some adult studies which have demonstrated that patients who have had a thyroidectomy for Graves' disease report an improvement in QoL compared with those on prolonged ATD,28,29 and a recent study which reported that RI-treated adults had worse thyroid-related and general QoL than those treated with ATD or thyroidectomy.11 However, other adult studies have shown equal satisfaction and QoL improvement with all treatment modalities.13,30

In our cohort of young people, around half said that they did not feel fully recovered from Graves' disease despite at least a year of treatment, including half of those whom had already received definitive treatment. This compares to a figure of around 25% in the adult population who did not feel fully recovered 6-10 years following treatment for Graves' disease.12 Whether definitive treatment that results in hypothyroidism can be defined as a 'cure' for Graves' disease remains controversial,21 especially given our findings that suggest regular blood monitoring and visits to healthcare professionals prevented these young people feeling recovered. Indeed, only a fifth of the Graves' disease patients were currently on no treatment, either due to their receiving a prolonged course of ATD or requiring levothyroxine long term. It is also interesting to note that over half of those who did not feel recovered were taking levothyroxine supplementation for hypothyroidism, consistent with the findings from adult studies which have highlighted the association of thyroxine supplementation with a reduced QoL.14-16

Although ATD are associated with an increased risk of adverse effects in the young compared with the adult population, it is useful for health professionals and families to note that side effects of ATD were not a major issue or concern in this cohort of Graves' disease patients. This is particularly important as the authors of some longitudinal studies of Graves' disease in the paediatric population suggest taking a longer course of ATD to increase the likelihood of remission.32

This study does have some limitations. The number of respondents was small, and we recognize that there is a risk of bias as those who have chosen not to respond to the questionnaire may potentially have reasons linked to components of their QoL. However, we were encouraged by a response rate of 51% and Graves' disease is a rare disease in the paediatric population (~100 cases per year in the UK) (1), and therefore, this single centre study of 26 patients reflects around a quarter of the cases presenting each year in the UK. Furthermore, a strength of our study is that this report reflects the

FIGURE 3 Differences in the psychosocial and physical domains comparing Graves' disease patients and healthy individuals. HRQOL, health-related quality of life

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| Functioning domain | GD (8-18 years) | GD (≥19 years) | Healthy (8-18 years) | Definitive treatment | Non-definitive treatment | Diabetes (8-18 years) | p value |
|--------------------|----------------|---------------|---------------------|---------------------|-------------------------|----------------------|--------|
|                    | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Self-report        | n = 15 | n = 8 | n = 1033 | n = 10 | n = 15 | n = 124 |        | |
| Summary scores:    |      |      |          |          |          |          |        | |
| Total              | 79.3 | 19.5 | 72     | 12.6 | 83.9  | 11.8 | 74.6  | 15.7 | 78.4  | 19.2 | 82.5  | 12.8 | a.13 |
| Physical           | 83.5 | 18.5 | 84.8   | 13.2 | 88.5   | 11.6 | 79.7   | 14.9 | 85.9 | 18   | 84.8  | 13.7 | a.88 |
| Psychosocial       | 77   | 21   | 65.2   | 14   | 81.8   | 13.2 | 71.8   | 19.2 | 74.4   | 20.4 | 81.2  | 13.8 | a.02* |
| Emotional          | 73.3 | 25.6 | 53.1   | 21.5 | 78.5   | 18   | 67     | 29.6 | 66.6   | 24.3 | 78.9  | 18.2 | a.03* |
| Social             | 87.3 | 25   | 78.8   | 17.5 | 87.7   | 16.5 | 78     | 24.4 | 88     | 21   | 89.1  | 14   | a.13 |
| School/work        | 69.6 | 25.5 | 63.8   | 24.2 | 78.9   | 15.9 | 70.5   | 22.8 | 68.7   | 25.5 | 77.7  | 17.4 | a.55 |

Abbreviation: GD: Graves’ disease.

aGraves’ disease patients aged 8-18 years vs. ≥19 years
bGraves’ disease patients aged 8-18 years vs. a healthy UK cohort aged 8-18 years
cDefinitive vs. non-definitive treatment
dGraves’ disease patients 8-18 years vs. those with diabetes aged 8-18 years
*Significant values (p < .05)
experience of patients managed by one unit and therefore may reflect patient experiences based on a relatively consistent approach to management. Studies that report on patient response to advertisements are useful; however, the demographic and clinical background in terms of age and confirmed diagnosis cannot be guaranteed to the same degree. Although the young adult PedsQL™ Generic Core Scales questionnaire is designed for individuals up to the age of 25, we did have four respondents who were aged between 26 and 28 years. However, we feel that this ‘young adult’ questionnaire will be relevant to those in this slightly older age bracket. The findings from this study demonstrating an effect on the QoL in young people with Graves’ disease suggest that further expansion and validation in other centres are now warranted.

This quality improvement study has highlighted both the short- and long-term impacts of Graves’ disease on young people and their QoL. As such, this is important information for the clinician, patient and family. The feedback we obtained emphasizes the potential need for additional support for young people with Graves’ disease, both at school and from a psychological perspective. Understanding the implications of Graves’ disease on QoL may be a factor to consider when deciding on the most appropriate treatment option. It is clear that the short- and long-term impacts of Graves’ disease on young people and their personal and academic life should not be underestimated.

CONFLICT OF INTERESTS
The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX A

The young person’s experience of Graves’ disease and its management

Q1. Your details

| a) Are you male or female? | Male □ Female □ Prefer not to say □ |
|---------------------------|-------------------------------------|

Q2. Your current education/occupation

Please tick all those that apply. I am currently:

| a) At school | □ |
|-------------|---|
| b) In higher education (eg university/college) | □ |
| c) Employed | □ |
| d) Unemployed | □ |

Q3. Your health

a) Do you have any health condition(s) other than Graves’ disease? If no, skip to Q3(b) Yes □ No □

If yes, what condition(s)?

(Continues)
## APPENDIX A (Continued)

### Q1. Your details

| a) Are you male or female? | Male ☐ Female ☐ Prefer not to say ☐ |
|----------------------------|--------------------------------------|
| f) Doctor’s recommendation | ☐                                    |
| g) Other (please specify)  |                                      |

If you have had **radioiodine** to treat your Graves’ disease, please answer the following:

(If you had surgery, skip to Q7 (l))

h) Please describe the experience for you of having radioiodine treatment.

What was good about this treatment?

What was not so good?

i) Would you have wanted to have radioiodine treatment sooner? If no, skip to Q7 (j)

If yes, why?

j) Would you recommend radioiodine to others with Graves’ disease?

Why would you recommend, or not recommend it?

k) Is there anything else you would have liked to have known before having radioiodine treatment?

If no, skip to Q8

If yes, what?

If you have had **surgery** to treat your Graves’ disease, please answer the following:

l) Please describe the experience for you of having surgery for your Graves’ disease.

What was good about this treatment?

What was not so good?

### Q1. Your details

| a) Are you male or female? | Male ☐ Female ☐ Prefer not to say ☐ |
|----------------------------|--------------------------------------|
| m) Would you have wanted to have surgery sooner? If no, skip to Q7 (n) | Yes ☐ No ☐ |
| n) Would you recommend surgery to others with Graves’ disease? | Yes ☐ No ☐ |

Why would you recommend, or not recommend it?

o) Is there anything else you would have liked to have known before having this treatment?

If no, skip to Q7 (p)

If yes, what?

p) Did you have any temporary or long-term complication(s) from your surgery?

If no, skip to Q8

If yes, what were they?

### Q8. Your current health

| a) Do you feel recovered from your Graves’ disease? If yes, skip to Q8 (b) | Yes ☐ No ☐ |
|-----------------------------|----------------------------------------------------------|
| If no, why not?             |                                                          |
| b) Do you still have regular contact with the health service for your thyroid? | Yes ☐ No ☐ |

If yes, where and how often?

Thank you for taking the time to complete this questionnaire!