Diversity in the Charcot-Marie-Tooth disease population in the United Kingdom and United States: insights from a digital real-world observational study

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Background

Charcot-Marie-Tooth disease (CMT) is a chronic, progressive, motor and sensory neuropathy that affects the peripheral nervous system, leading to distal muscle weakness, muscle atrophy and sensory loss.[1]

CMT compromises patient lifestyles, everyday activities, careers, and family choices.[2] There is currently no curative treatment, meaning that patients are reliant on supportive care.

CMT is rare, and – until recently – there had been little research into its impact on patients' lives. The collection of real-world data, direct from patients, may therefore provide both new and additional valuable insights.

Objectives

The objectives of this analysis were to examine demographics of UK and US participants enrolled in a real-world observational study of CMT, and to investigate differences between those who had and had not participated in clinical trials.

Methods

Adults with CMT were recruited to an ongoing two-year international study exploring the real-world burden of the condition.

Data were collected via CMT&Me, a 'bring your own device' smartphone app, through which participants were asked questions about demographic characteristics, management of their CMT, and their quality of life.

This interim analysis (data cut 5 August 2019, approximately 9.5 months into the study) examined the demographics of UK and US participants.

Differences between participants who had and had not taken part in clinical trials were explored.

Note: as most surveys in the app were optional and completed independently, different participants may have responded to each survey. Therefore, in this analysis, sample size numbers vary by survey.

Results

Key demographics

Demographic characteristics for the 713 participants who responded to this survey are presented in Table 1.

The proportions of respondents from the UK and US were similar.

Around two thirds of respondents were women.

Respondent age distribution is presented in Figure 1. Respondent age was well-distributed.

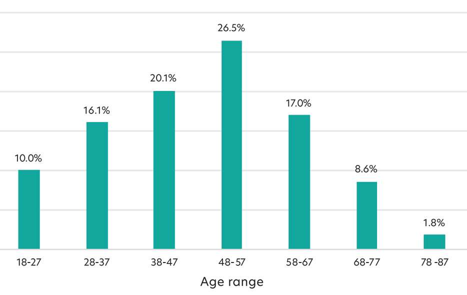
Respondents reported numerous comorbidities, including depression, anxiety, and gastrointestinal problems.

Table 1: Key demographics

Parameter	Value
Country of residence (n,%)	
UK	346 (48.5)
US	367 (51.5)
Sex (n,%)	
Female	486 (68.2)
Male	227 (31.8)
Age (years)	
Median (range)	49.0 (18–82)
Age <50 (n,%)	362 (50.8)
Age ≥50 (n,%)	351 (49.2)
Body mass index (median, range)	27.9 (13.8–89.4)
Comorbidities (n, %)*	
Depression	207 (47.4%)
Anxiety	190 (43.5%)
Other medical condition(s)	141 (32.3%)
Gastrointestinal problems	122 (27.9%)
Respiratory problems	96 (22%)
Thyroid problems	64 (14.6%)
Dermatology problems	47 (10.8%)
Cardiovascular problems	45 (10.3%)
Diabetes	36 (8.2%)
Autoimmune disease	27 (6.2%)
Rheumatoid arthritis	20 (4.5%)
Rheumatology problems	19 (4.3%)
Ehlers-Danlos Syndrome (hyper-mobility)	13 (3%)
Lupus	1 (0.2%)

*Note: only 437 participants responded to this question.

Figure 1: Age distribution



CMT characteristics

CMT subtype distribution for the 560 respondents to this survey is presented in Figure 2. The most commonly reported subtype was CMT1A, followed by CMT2.

Table 2 presents the ages at which respondents experienced CMT onset and diagnosis. On average, respondents first experienced symptoms of CMT as adolescents and were diagnosed as young adults. However, the reported age ranges for onset and diagnosis were extremely wide, with some respondents first experiencing symptoms in infanthood, and others not until late adulthood.

Figure 2: CMT subtype distribution (n=560)

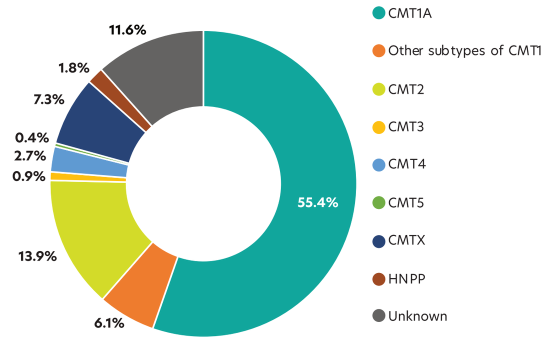


Table 2: CMT onset and diagnosis

Event	Age
CMT symptom onset, years	
Median (range)	12.0 (<1–77)
First seeking care for CMT, years	
Median (range)	24.5 (<1–78)
CMT diagnosis, years	
Median (range)	30.0 (1–78)

Lifestyle

Lifestyle characteristics for the 437 respondents to this survey are presented in Figures 3 to 6.

The majority of participants reported having a reasonably healthy lifestyle – not smoking, exercising regularly, eating a varied diet, and consuming low levels of alcohol.

Figure 3: Smoking status (n=437)

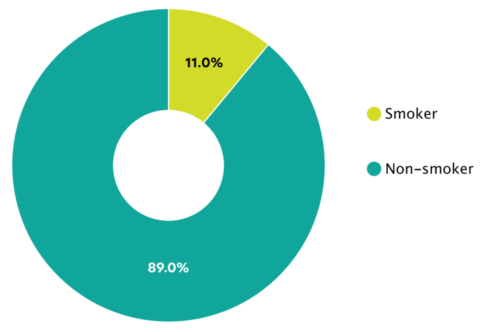


Figure 4: Exercise frequency (n=437)

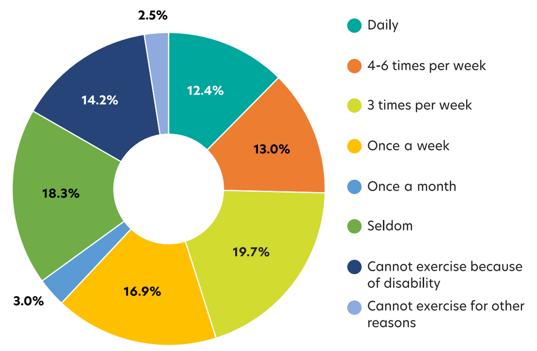


Figure 5: Diet (n=437)

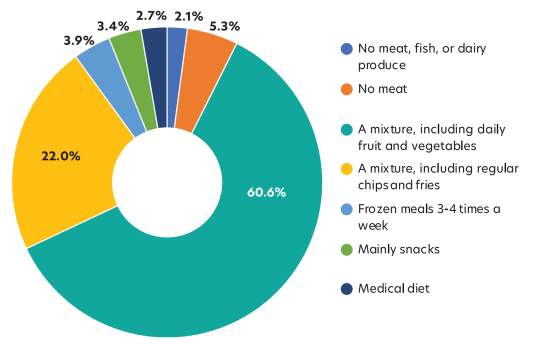
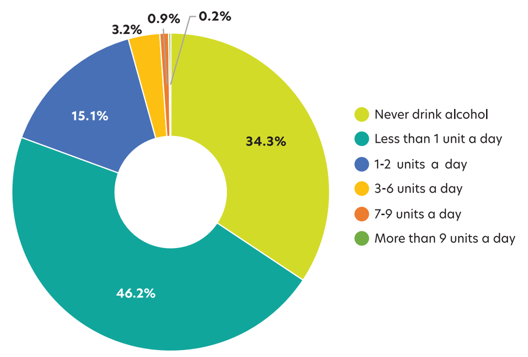


Figure 6: Alcohol intake (n=437)

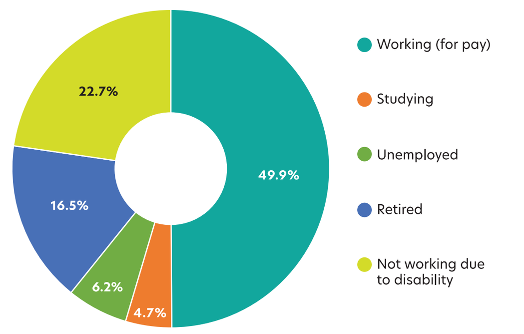


Work/study status

Work/study status for the 449 respondents to this survey is presented in Figure 7.

Just over half of respondents were working for pay or studying. A considerable proportion were not working due to disability.

Figure 7: Work/study status (n=449)



Clinical trial participation

Twenty-six (6.3%) of 415 respondents reported having taken part in a clinical trial for CMT.

A demographic comparison of respondents who had and had not participated in clinical trials is presented in Table 3:

- The proportions of respondents from the UK and US differed slightly between trial participants and non-participants.
- The proportions of women and men were similar.
- The median age of trial participants was similar to that of non-participants, but the proportion of people aged <50 years was slightly lower among trial participants than among non-participants.
- The distribution of CMT subtypes was similar between trial participants and non-participants. CMT1A was the most common subtype in both groups, followed by CMT2.

Table 3: Comparison of clinical trial participants and non-participants

Parameter	Trial participants (n=26*)	Non-participants (n=389*)
Country of residence (n,%)		
UK	15 (57.7)	182 (46.8)
US	11 (42.3)	207 (53.2)
Sex (n,%)		
Female	17 (65.4)	266 (68.4)
Male	9 (34.6)	123 (31.6)
Age (years)		
Median (range)	53.0 (18–80)	49.0 (19–82)
Age <50 (n,%)	10 (38.5)	196 (50.4)
Age ≥50 (n,%)	16 (61.5)	193 (49.6)
CMT subtype (n,%)		
CMT1A	14 (58.3)	185 (51.2)
Other subtypes of CMT1	1 (4.2)	25 (6.9)
CMT2	6 (25.0)	56 (15.5)
CMT3	0 (0.0)	3 (0.8)
CMT4	0 (0.0)	10 (2.8)
CMT5	0 (0.0)	1 (0.3)
CMTX	1 (4.2)	31 (8.6)
HNPP	0 (0.0)	7 (1.9)
Unknown	2 (8.3)	43 (11.9)

Discussion

The high demographic diversity observed in the population of this study suggests that data collected are likely to be representative of, and generalizable to, the wider CMT patient population.

Participants were relatively evenly distributed across countries and age groups.

The proportion of women enrolled was high. As it is generally accepted that the prevalence of CMT is not sex-dependent, apart from a high occurrence of CMTX in men[3,4], this finding may reflect sex-related differences in the likelihood of enrollment, i.e., women may be more willing to participate in this type of research.

The distribution of CMT subtypes was similar to that observed in the literature[5,6], with CMT1A, CMT2, CMTX, and other subtypes of CMT1 being the most common subtypes reported by participants.

On average, CMT onset occurred during adolescence, though the reported age range for symptom onset was wide. This reflects the variation in presentation of the disease reported elsewhere[7].

The majority of participants reported having a reasonably healthy lifestyle – not smoking, exercising regularly, eating a varied diet, and consuming low levels of alcohol. This result may indicate awareness of the positive impact of a healthy lifestyle on CMT symptoms[8], but should be interpreted with caution given that data were self-reported.

Just over half of participants were working or studying. The remainder were retired, unemployed, or not working due to disability. Further investigation of the effect of CMT on work/study status is ongoing as part of this study.

A small proportion of participants had taken part in a clinical trial for CMT. Demographic characteristics of these respondents were generally similar to those of respondents who had not taken part in trials. However, these results must be interpreted with caution given the small sample size of the trial participant group.

Conclusions

The objective of this ongoing observational study is to understand the impact of CMT in the real-world, and in the broad range of patients encountered in clinical practice. The demographic diversity observed in this analysis is therefore promising.

Demographic characteristics appeared similar between those who had and had not participated in clinical trials.

This ongoing study will provide further real-world insights to increase understanding of CMT.

References

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