Current clinical practice of Irish physiotherapists and occupational therapists in the assessment and treatment of spasticity in adults

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Abstract

Purpose – This paper aims to understand the clinical practice of physiotherapists and occupational therapists in the Republic of Ireland in the assessment and treatment of spasticity in adults, to inform and improve spasticity management practice. This study also aims to describe therapists' knowledge, confidence and perceived barriers in the management of spasticity.

Design/methodology/approach – A cross sectional survey design study was completed, and respondents were recruited through an online survey.

Findings – In total, 92 respondents from a wide range of clinical settings revealed there is considerable variation in services available nationally for adults presenting with spasticity. There were significant inconsistencies across all areas of practice. The majority of respondents (94%) did provide intervention to patients with spasticity, yet three quarters did not have access to a specialist spasticity clinic, and the majority (82%) did not feel they were providing sufficient treatment intensity for spasticity.

Originality/value – These findings provide a unique insight into the assessment and treatment practices of Irish physiotherapists and occupational therapists. These results demonstrate the need for further upskilling and specialist high-quality spasticity services nationally.

Keywords Spasticity management, Physiotherapy, Occupational therapy, Assessment, Treatment

Paper type Research paper

Introduction

Spasticity is a common symptom seen in a myriad of neurological disorders such as stroke, traumatic brain injury (TBI), spinal cord injury, cerebral palsy and multiple sclerosis (MS) (Thompson *et al.*, 2005). Spasticity is defined as "resistance of muscle to passive stretch/movement, which is velocity dependent (increases with the rate of stretch)" (Lance, 1980, p. 185). The prevalence of spasticity in acute and chronic neurological conditions is high. Approximately 33% of stroke patients (Mayer and Esquenazi, 2003), 60% of patients with severe MS and 75% of patients with a severe TBI will develop spasticity which will require specific treatment (RCP, 2018). From an Irish perspective, up to 10,000 people will have a stroke in Ireland each year [Irish Heart Foundation and Health Service Executive (HSE), 2016], Acquired Brain Injury (2018) Ireland reports 10,000 people are admitted to hospital annually with a TBI and there are currently up to 9,000 people in Ireland living with MS (Lonergan *et al.*, 2011). These figures demonstrate a potential high prevalence of spasticity in these chronic conditions in Ireland.

Spasticity can have a significant negative impact on the ability of patients to complete everyday tasks (Blanchette *et al.*, 2017) and has a negative effect on quality of life (Zorowitz *et al.*, 2013). If not managed correctly, spasticity can also cause soft tissue shortening and contractures, joint deformities, skin breakdown and pain (Wissel *et al.*, 2015). Therefore,

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Irish Journal of Occupational Therapy
52/1 (2024) 44–51
Emerald Publishing Limited [ISSN 2398-8819]
[DOI 10.1108/IJOT-11-2023-0026]

The authors acknowledge the contributions of Blanchette *et al.* (2017) and Cusick *et al.* (2015) for permission to adapt their surveys. The authors would also like to thank all respondents for participation in this study.

Received 29 November 2023
Revised 29 February 2024
Accepted 8 April 2024

management of spasticity is an important component of neurological rehabilitation.

Effective management of spasticity must be seamless and multidisciplinary (Thompson *et al.*, 2005), however management is challenging because the diversity of presentations and difficulties posed by spasticity (RCP, 2018). There is a wealth of literature available supporting the use of pharmacological and non-pharmacological treatments for spasticity (Kerr *et al.*, 2020). Guidelines have been developed on the use of standardised assessments and intervention approaches (RCOT and ACPIN 2014 and 2018; RCP, 2018). However, treatment for spasticity can vary considerably between services. In the Republic of Ireland, there are no specific recommendations for the management of spasticity.

Physiotherapists and occupational therapists are key members of the multidisciplinary team (MDT) in the assessment and treatment of spasticity. Studies of physiotherapy and occupational therapy practices have been completed elsewhere (Blanchette *et al.*, 2017; Cusick *et al.*, 2015). These studies researched the trends in rehabilitation practices in spasticity management and current therapeutic practice in relation to the use of Botulinum toxin. However, there has been no such review of assessment and treatment practices from an Irish perspective to understand and guide spasticity management services nationally.

Methodology

Aim

The aim of this study was to *explore current* Irish physiotherapy and occupational therapy practice in the assessment and treatment of spasticity in adult neurological conditions.

The specific research objectives are as follows:

- to describe therapists' practice in relation to the assessment and treatment of spasticity;
- to describe the frequency and intensity of service being provided;
- to describe therapists' perceived barriers in assessing and treating spasticity;
- to describe therapists' knowledge and confidence in the assessment and treatment of spasticity; and
- to describe differences in the assessment and management of spasticity in different clinical settings, and using subgroup analysis.

Study design

Methods

We collected data through an online survey designed for Irish physiotherapists and occupational therapists. We used a cross-sectional survey design survey to gain a snapshot of current practice and followed the Consensus-based Checklist for Reporting of Survey Studies(CROSS) (www.equator-network.org/reporting-guidelines/a-consensus-based-checklist-for-reporting-of-survey-studies-cross/).

Participants

We surveyed physiotherapists and occupational therapists. Physiotherapists were members of a clinical interest group of Chartered Physiotherapists in Neurology and Gerontology (CPNG) ($n = 200$) through the professional body, the Irish Society of Chartered Physiotherapists (ISCP) which acted as a gatekeeper. We surveyed members of the neurology advisory group (NAG) of the Association of Occupational Therapists in Ireland (AOTI) ($n = 103$) through the AOTI. The NAG is a branch of national occupational therapists with a common special interest in the area of neurology.

Procedure

The questionnaire was advertised through:

- AOTI and ISCP websites;
- use of social media (Twitter); and
- emails from professional organisations to their members with a link to the online survey.

The research instrument was adapted from similar surveys conducted in Australia and Canada (Cusick *et al.*, 2015; Blanchette *et al.*, 2017) and comprised four sections with 36 questions overall: Section 1: Demographics of respondents – 12 questions; Section 2: Assessment of spasticity – 7 questions; Section 3: Goal setting and spasticity – 5 questions; Section 4: Treatment of spasticity – 12 questions. The questionnaire was administered using Survey Monkey.

Sample size

The potential sample was 303 (CPNG = 200 and NAG $n = 103$). A power calculation was derived for the potential estimated survey sample of 303 participants using Conroy (2021) method and previously published research (Holly, 2010 & Hickey *et al.*, 2012). The planned sample size of 217 has an associated margin of error of ± 5% at 95% confidence interval and a 54% response rate.

Ethical considerations

An application for ethical approval was submitted to the local hospital research ethics committee where the lead researchers (MC and DM) worked in March 2022. Ethical approval was received in June 2022. Participation in the study was voluntary and explicit consent was obtained for participation and data processing before completion of the questionnaire.

Pilot study

Following ethical approval we conducted a pilot study with two physiotherapists and two occupational therapists to determine the clarity of the questions, content validity, time to complete and any changes that are required for the survey. No changes were made to the initial survey and these pilot responses are included in our analysis.

Statistical methods/data analysis.

Anonymous data was downloaded from surveymonkey.com. Analysis of categorical (ordinal and nominal) and numerical data was performed using STATA (version 13) and Microsoft Excel. Basic descriptive statistics on question responses were analysed to provide insight and overview of participant responses and key findings. Subgroup differences will be determined using chi-square and Kruskal–Wallis statistical tests. The variable "clinical setting" was collapsed into three categories:

1 acute care hospital;
2 inpatient rehabilitation unit; and
3 other (which were primarily community and out-patient based settings, see Table 1).

Table 1 Respondents' demographics and practice context

Variable	*N*	%
Clinician		
Physiotherapist	45	48.9
Occupational therapist	47	51.1
Qualification		
Diploma	1	1.1
Bachelors of Science	59	62.8
Masters	32	34
PhD	2	2.1
Years of experience		
1–3 years	14	14.9
4–10 years	36	38.3
>10 years	44	46.8
Proportion of caseload – persons with neurological deficits		
0	3	3.2
<30%	15	16
31%–75%	27	28.7
>75%	49	52.1
Number of patients with spasticity treated per month		
<2	17	18.5
2–5	39	18.5
6–10	23	25
>10	13	14.1
Types of neurological patients		
Acute (<1 week)	29	31.5
Subacute (1week – 3months)	48	52.8
Chronic (>3 months)	66	71.7
Diagnostic group		
Stroke	77	84.6
Traumatic brain injury	60	65.9
Spinal cord injury	31	34.1
Multiple sclerosis	37	40.7
Other progressive neurological disorders	47	51.7
Clinical setting		
Acute	29	32.9
In-patient rehabilitation unit	24	27
Primary care	10	11.2
Out-patient clinic	8	9
Other	6	6.7
Physical and sensory	3	4.5
Spasticity clinic	3	3.8
Early supported discharge	4	3.4
Nursing home	2	2.3
Access to a specialised spasticity clinic:		
Yes	22	23.9
No	70	76.1
(Yes, what professionals involved: Physiotherapist – 88%, OT – 44%, Consultant Physician – 68%, Nurse – 24%, Other – 12%)		
Sector:		
Private	6	6.5
Public	86	93.5

Source: Authors' own work

Results

Demographics

In total, 94 Occupational Therapists and Physiotherapists practicing in Ireland completed the survey. 47 respondents were Occupational Therapists (50%) and 47 respondents were Physiotherapists (50%). Two respondents (2.1%) did not treat adults with spasticity and so were excluded from the analysis. Table 1 presents the full details of demographics of respondents.

Assessment

A majority of assessments were completed as part of the multidisciplinary team (MDT) (69.2%, $n = 63$) with physiotherapists (94.8%, $n = 87$) and occupational Therapists (67.4%, $n = 62$) being identified as the main disciplines for completing the assessment. Other disciplines involved in the assessment were medical professionals (42.4%, $n = 39$) and nurses (1.1%, $n = 4$). Assessments were mainly completed on admission (90.1%, $n = 82$) with 65.9% of respondents repeating assessments at interim of care ($n = 60$). Only 38.5% ($n = 35$) of respondents completed assessments at discharge and only 18.9% ($n = 17$) completed assessment at follow-up reviews. 4.4% ($n = 4$) never completed assessments. 77.2% ($n = 71$) completed standardised assessments with a wide variety of assessment tools being chosen. These are listed in order of preference in Table 2.

There were various responses in relation to consistency of completing standardised assessments. Less than half the respondents reporting using standardised assessments over 75% of the time (42.9%, $n = 39$). 26.4% of respondents ($n = 24$) reported using standardised assessments consistently less than 25% of the time. Only 16.5% ($n = 15$) respondents reported feeling very confident using standardised assessments with 29.7% ($n = 27$) reported not feeling confident at all. 15.4% ($n = 14$) repeated assessments weekly, 24.2% ($n = 22$) monthly, 20.9% ($n = 19$) every six-weeks and 15.4% ($n = 14$) every six-months. 24.2% ($n = 22$) reported never repeating assessments. Repeat assessments were conducted more

Table 2 Standardised assessments used

Variable	*N*	%
Standardised assessment tool		
Range of Motion/goniometry	54	76.1
Modified Ashworth Scale	53	74.7
Pain/Visual Analog Scale	31	43.7
Modified Tardieu Scale	30	42.3
Arm-A	16	22.5
Goal Attainment Scale	10	14.1
Leg-A	9	12.7
Spasticity related quality of life tool	5	7
Associated reaction rating scale	4	5.6
Other-		
MS Spasticity Scale 88	1	1.4
AHA	1	1.4

Note: Percentage total > 100% as respondents ticked more than one option
Source: Authors' own work

frequently in acute hospital and inpatient rehabilitation settings ($\chi^2 = 21.3$, df = 8, $p = 0.006$).

Treatment

The majority of respondents provided intervention to patients with spasticity (93.8%, $n = 86$). Table 3 outlines the types of interventions provided in order of preference. Nearly three quarters of respondents ($n = 65$), had access to a physician or physiotherapist providing botulinum toxin (BoNT) injections to treat spasticity. Of these respondents, only 52.3% ($n = 34$) reported these patients are reviewed by a specialist MDT service as part of their treatment. Confidence in relation to providing treatment and recommendations appeared low with only 20.9% ($n = 19$) reporting to feel very confident and15.4% ($n = 14$) reported not feeling confident at all.

Intensity of intervention varied among the group (see Table 3). Most respondents felt they were not providing sufficient intensity (81.5%, $n = 75$). Reasons for reduced intensity varied with the most prevalent response reported being lack of time and staffing (84.1%, $n = 69$). Other reasons included a lack of or limited service (67.1%, $n = 55$), lack of training (41.2%, $n = 34$) and lack of knowledge and/or confidence (36.6%, $n = 30$). 6.1% ($n = 5$) reported this was not applicable as they were providing sufficient intensity.

Table 3 Interventions provided and intensity

Variable	N	%
Intervention		
Positioning/postural management programme	78	86.7
Education	73	81.1
Task specific training	53	70
Self-management programme	58	64.4
Splinting-Off the shelf	58	64.4
Prolonged muscle stretching	56	62.2
Strengthening exercises	53	58.9
Splinting-Custom Made	45	50
Botulinum toxin	35	38.9
Casting	32	35.6
Sensory level stimulation – Transcutaneous electrical nerve stimulation (TENS)	13	14.4
Vibration	3	3.3
Weight-bearing exercise	2	2.2
Onward Referral	4	4.4
Intrathecal Baclofen Pump	1	1.1
Neuromuscular and muscular electrical stimulation	2	2.2
Prolonged icing	0	0
Intensity of intervention provided		
Daily	25	27.5
Weekly	39	42.7
Monthly	10	11
Every 12 weeks	5	5.5
Every 6 months	7	7.8
Not at all (once-off)	5	5.5

Note: Percentage total > 100% as respondents ticked more than one option
Source: Authors' own work

Respondents particularly commented on the lack of multidisciplinary services and access to other team members resulting in poor coordination of care. Patients' needs were highlighted as the greatest factor in guiding intensity (78.3%, $n = 72$). This was followed by service availability (70.7%, $n = 65$) and best practice guidelines (46.7%, $n = 43$). Intensity of intervention was higher in the acute and inpatient rehab settings ($\chi^2 = 37.8$, df = 10, $p = 0.001$). Length of intervention varied also with half the respondents (50%, $n = 45$) reported being able to provide intervention for as long as was required. 28.9% ($n = 26$) provided intervention in the acute phase between one and six weeks and 21.1% ($n = 19$) provided intervention over a 12-week period. On average 9.3 sessions per month were offered with a median of 5.5 sessions per month.

Limiting factors to assessing and treating spasticity

Respondents were provided with an open text box to feedback information on limiting factors to assessing and treating spasticity effectively. A number of factors emerged and included lack of time (17.2%, $n = 11$), lack of access to BoNT injections (18.8%, $n = 12$), lack of access to specialist MDT (17.2%, $n = 11$), lack of knowledge (14.1%, $n = 9$), lack of training (14.1%, $n = 9$), lack of outpatient/follow-up services (12.5%, $n = 8$), lack of medical team knowledge of management (9.4%, $n = 6$) and lack of knowledge from other health care professionals such as nursing and health care assistants. Other limiting factors highlighted to a lesser extent included caseload demands, skill level because limited consistent exposure to spasticity, limited availability of carers or family to assist with stretching or home exercise programmes and lack of clear MDT guidelines.

Training

Respondents were asked to describe previous training undertaken to support their practice. 16.3% ($n = 13$) of respondents reported completing formal training in splinting/casting, whereas 11.3% ($n = 9$) reported being Bobath/Neurodevelopmental Therapy trained and applying these principles to spasticity management. Only 8.8% ($n = 7$) referenced attending spasticity specific courses, whereas 16.3% ($n = 13$) reported attending general neurological upper limb courses or lectures. 6.3% ($n = 5$) had completed botulinum toxin injecting courses, whereas the same number of participants (6.3%, $n = 5$) had completed masters modules in spasticity and injection therapy. Many participants reported receiving informal training from peers in their work (21.3%, $n = 17$). In total, 13.8% ($n = 11$) reported receiving no training at all. The majority, 96.7% ($n = 88$), reported they would be interested in further training.

Discussion

Statement of principal findings

The survey questionnaire reflects the responses from occupational therapists and physiotherapists managing adults with spasticity in Ireland. The 92 respondents came from a wide range of clinical settings. The majority of participants were working for four years or more, potentially indicating the complexity of spasticity management and the need for it to be managed by experienced and skilled clinicians. The volume of patients with spasticity treated per month were low and this corresponds with the lack of specialist spasticity clinics available in Ireland (less than 4% of participants worked in a specialist spasticity clinic with approximately 23% of participants having access to these). In our survey respondents indicated patients are treated across a broad range of settings including acute, subacute/rehabilitation and community settings. The RCP (2018) highlighted spasticity as a long-term condition with the majority of patients being treated in community settings. This demonstrates the continuum of care and long-term management needs of adults with spasticity.

Assessment

A multidisciplinary approach to the assessment of spasticity is well documented in the literature and supported by national clinical practice guidelines (Turner-Stokes *et al.*, 2018; RCP, 2018). Similar to Blanchette *et al.* (2017) study, there is a multidisciplinary approach to assessment of spasticity in Ireland with Physiotherapists (94% participants) and Occupational Therapists (67% participants) tending to be the disciplines to lead out on this. Despite being key members in the assessment process, confidence in completing assessment is considerably low. This is discouraging since accurate assessment is essential in devising goals and an intervention plan. A lack of specialist services (only 23.91% had access to specialist services) is likely contributing to the low levels of confidence where therapists are not gaining the required level of experience.

Using standardised assessment as outcome measures help to determine if therapeutic outcomes have been successful (Unsworth, 2011). Data must be obtained at two or more points to allow an objective comparison of results. While completion of an initial assessment appeared to be standard practice across all respondents, the prevalence of repeating outcome measures reduced significantly at follow-up and discharge. This results in difficulty for therapists to demonstrate the effectiveness and value of their intervention. Without this evidence, it is difficult to advocate for the need for increased resources and services. This compares to Blanchette *et al.* (2017) who had a higher response rate of therapist's continuing to complete assessments at discharge. Initial assessment of spasticity by respondents may be more prevalent as it is assessed as part of the standard neurological exam on admission. Hugos and Cameron (2019) identified this as the main method of clinical assessment for spasticity in MS patients which included assessment of tone, stretch reflexes, range of motion, strength and functional ability. Assessments were completed more frequently in acute settings in this study and a lack of specialist community/outpatient services for continuation of patient care may contribute to this lack of follow up assessment. Lack of time and caseload demands also negatively impact the consistency of assessments being repeated.

Range of Motion (ROM) and Modified Ashworth Scale (MAS) are the most commonly used standardised assessment tools with the MAS being the preferred scale over the Tardieu scale (TS). This is similar to other research which reports MAS is the most commonly used spasticity outcome measure used (Shu *et al.*, 2021; Marciniak, 2011; Blanchette *et al.*, 2017). This is despite the fact that the validity and reliability of the MAS have been questioned as ratings are subjective and capture passive resistance to stretch only (Hugos and Cameron, 2019; Dehem *et al.*, 2017; Thompson *et al.*, 2005). As mentioned in other studies, this is likely because these scales being easy and quick to use in clinical practice with no specific equipment required. ROM is not a specific spasticity assessment and relates more to the consequence of spasticity (Blanchette *et al.*, 2017).

Less than 20% of participants used scales measuring patients' subjective feedback on the impact of spasticity on function or their quality of life. Spasticity is associated with a worse health status and a systematic review by Milinis *et al.* (2016) strongly recommend patient-reported measures for spasticity as essential in the evaluation of therapeutic interventions. Despite respondents reporting use of standardised assessments in their practice, the consistency and their overall confidence in using these standardised tools were low. Exact reasons for this were not explored in this study however this is discouraging as robust assessment is vital in the assessment of spasticity. It may be linked with reported barriers such as knowledge and training however staffing and workload may be other factors. Further research in this area would be beneficial.

Treatment

It is clear from the findings that a broad range of non-pharmacological interventions are adopted by clinicians. This is unsurprising and corresponds with other literature findings (Khan *et al.*, 2017; Blanchette *et al.*, 2017). Positioning and education are the most commonly used interventions. Task specific training, self-management programmes, splinting and strengthening exercises were also reported by over half of respondents. This is similar to Blanchette *et al.* (2017) who found positioning, prolonged muscle stretching, splinting and motor level stimulation were the most commonly used treatment modalities in their study. Despite the lack of high quality evidence for these interventions (Khan *et al.*, 2017), the National Clinical Guideline for Stroke (2023) advises use of positioning, passive movement, active movement and pain control as simple measures to reduce spasticity. They caution that splinting or casting should only be offered following an individualised assessment from appropriately skilled staff.

A large proportion of clinicians had access to services to refer patients for BoNT injections which is positive given it is the recognised standard of care for focal post-stroke spasticity (Wissel *et al.*, 2009, National Clinical Guideline for Stroke, 2023). Only half of these patients also had access to a MDT, which is recommended to optimise patient results (Francisco *et al.*, 2021; RCP, 2018). This correlates to respondents raising concerns regarding lack of access to specialist teams and poor co-ordination of care. This is having a negative impact on the quality of service provided nationally.

Intensity of intervention varied but tended to be greater in the acute treatment period and reduced significantly in the chronic phase. This highlights the need to consider a review of the resourcing of outpatient and community services available for managing patients with spasticity nationally. A majority did not feel they were providing sufficient intensity with lack of staffing and time being the biggest impeding factors. Lack of knowledge and training were also contributing factors. The National Clinical Guidelines for Stroke (2023) advise that patients with motor recovery goals should receive three hours of therapy a day. Although, there is no specific guidelines regarding the intensity of intervention for spasticity specific goals the median 5.5 sessions per month recommended in the stroke guidelines is a stark contrast to this.

Demands for further training were high and corresponds with the overall consensus of reduced confidence in assessment and treatment of spasticity. Further upskilling is essential in the development of high-quality spasticity services. Respondents detailed a number of limiting factors to assessing and treating spasticity. These were very similar to limiting factors impacting intensity of intervention. These included access to specialist spasticity services such as BoNT, time, lack of knowledge and training, lack of outpatient/follow-up services, lack of knowledge from the medical team or other MDT members and lack of consistent exposure to patients with spasticity. All these factors identified are also likely contributing factors to the levels of confidence expressed by respondents.

Strengths and limitations

This study provides a valuable insight and understanding into the current services available for patients with spasticity. It reflects the opinions of therapists' practicing in Ireland regarding adherence to best practice and challenges to meeting this. This helps provide focus in addressing the improvements needed in spasticity services. There are a number of limitations in the study design. The initial sample size sought was 217 respondents. The study only achieved a 42% response rate and limits the generalisability of the subgroup analysis. This compares with Blanchette *et al.* (2017) study which had 317 respondents. However, our study sample was comparable to the review on the Australian therapy practice (Cusick *et al.*, 2015) which had 128 respondents. It is also likely a reflection of the small number of therapists managing spasticity nationally and the lack of specialist services for these patients. It is difficult to accurately interpret results regarding intensity of intervention as this was self-reported data and so may vary depending on the clinician's understanding and impression of the length of a session and time available across different sites. There is a lack of guidelines regarding intensity of intervention required to manage spasticity to benchmark practice against. This may have led to self-reporting bias and inaccuracies. Similarly, there may have been researcher bias as two of the primary researchers worked in the area and so this may have influenced the study's design and interpretation of data. Adapting the survey from two separate studies helped to minimise this.

Conclusion/clinical implications

The study provides a vast amount of information on the assessment and treatment practices for spasticity management nationally. There were significant inconsistencies in all areas of practice. While therapists acknowledge the need for and use of standardised assessments and best-practice interventions, consistency of their use is extremely variable and overall, low. This proves the lack of standardised practice and equity of service patients receive. Greater and more regular use of standardised assessments by therapists would allow for a clearer understanding of spasticity needs nationally and the positive impact of interventions provided. It would help to support arguments for the development of services.

While it was clear many services are striving for best practice, similar responses arose in all areas preventing the provision of a high-quality service. These included lack of time, staffing, knowledge and skill along with limited access to specialist services or follow-up services. As a result, confidence for managing spasticity was low overall. Therapists are open to ways in improving practices and a majority of respondents wish to engage in further training in this area. Access to further training in the management of spasticity should be prioritised across clinical areas.

However, it is clear that therapists alone cannot succeed in improving services provided. This study highlights and advocates for the need for a greater review of processes of care by policy makers and consideration for funding of more specialised services nationally. This will allow patients with spasticity to be provided the expert care they require.

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