

Understanding Symptoms of Muscle Tightness, Weakness, and Rigidity From a Nursing Perspective

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Abstract

Purpose: This study examined the nature of muscle tightness from nurses' perspectives and explored how the symptoms of muscle tightness are communicated, managed, and differentiated from other conditions, such as muscle rigidity and muscle weakness.

Design: An exploratory, descriptive qualitative design was used.

Methods: Eight rehabilitation nurses described lexicons, care strategies, and communication for muscle tightness, weakness, and rigidity.

Findings: Nurses used conflicting terms to describe muscle tightness, weakness, and rigidity. They identified medications and range of motion as the best strategies to manage muscle conditions. Nurses approach care holistically and do not differentiate care strategies that are based only on a symptoms lens.

Conclusions: Nurses were unable to clearly differentiate between muscle tightness and rigidity.

Clinical Relevance: Nurses influence patients' choice of vocabulary; therefore, they must use simple but precise terminologies to educate their patients. Miscommunication between nurses and patients can lead to errors, which can have negative consequences.

Keywords: Muscle tightness; muscle weakness; muscle rigidity; nursing; qualitative research.

Communication of symptom experiences between patients and nurses is an essential currency that leads to healthcare transactions. The exchange of information between patients and nurses is critical because it guides the formulation of plan of care. During a clinical encounter, nurses receive two different inputs from the patient: signs and symptoms. *Signs* are objective empirical findings, whereas *symptoms* are the patients' lived experiences, as articulated by the person who is experiencing it. Neurorehabilitation nurses care for patients who experience a myriad of overlapping complex symptom clusters—symptoms that patients may describe using ambiguous vocabularies. Clear understanding of patient symptoms and open communication between patients and nurses are vital to optimize safe care. The purpose of this study is to understand the nature of

muscle tightness from the nurses' perspectives and to explore how the symptoms of muscle tightness are communicated, managed, and differentiated from other conditions, such as muscle rigidity and muscle weakness.

In its 1999 publication *To Err Is Human*, the Institute of Medicine reported that at least 98,000 people died each year due to preventable medical error (Kohn, Corrigan, & Donaldson, 1999). This estimate has since been revised upward to 440,000 deaths per year (James, 2013), with medical error now as the third leading cause of death in the United States (Makary & Daniel, 2016).

One source of preventable medical error is miscommunication between patients and clinicians. According to the Joint Commission Center for Transforming Healthcare, 80% of medical errors are due to miscommunication between patients and clinicians or between clinicians (Joint Commission Center for Transforming Healthcare, 2012). Communication errors can lead to incorrect diagnoses and treatments, causing patient harm. Baker, Gallois, Driedger, and Santesso (2011) found that clinicians and patients have their own languages and that they do not accommodate each other's communication patterns.

Muscle tightness is a common symptom treated in outpatient and inpatient rehabilitation settings. Management of muscle tightness is an important clinical care issue because it can affect quality of life (Bhimani, Gaugler, & Skay, 2017). One ubiquitous challenge of managing muscle tightness is

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that the term *muscle tightness* may be used by patients to describe a myriad of conditions, including muscle weakness, spasticity, rigidity, hypertonia, and spasms (Bhimani & Anderson, in press). Healthcare providers and research investigators, too, use the terms muscle tightness, muscle weakness, muscle stiffness, hypertonia, and spasticity interchangeably (Frohlich-Zwahlen, Casartelli, Item-Glatthorn, & Maffiuletti, 2014; Malhotra, Pandyan, Day, Jones, & Hermens, 2009). To ensure delivery of safe, efficient care to improve patient outcomes, it is crucial that patients and nurses have clear and reciprocal understandings of patients' symptoms.

Conceptual Framework

Nurses are at the forefront of symptom management. According to one symptom management model (University of California San Francisco School of Nursing, 2014), symptom management strategies are intimately linked with patient's symptom experiences and functional outcomes. Nurses must first understand, identify, and evaluate symptom status and patient perceptions before developing a plan of care to address functional outcomes (Armstrong, 2003). This exchange of information requires that patients and nurses use a common lexicon to ensure that appropriate treatments are provided in a safe manner. Nurses guide the plan of care, so the terms that they use have distinct meaning for patients, who learn to label their symptoms by listening to their nurses (Bhimani, Peden-McAlpine, Gaugler, & Anderson, 2016). Muscle symptoms (tightness, weakness, rigidity) may be a presenting chief complaint, or they may arise during rehabilitation therapies. Management of muscle symptoms is an important part of patient care, and nurses are required to discriminate between overlapping symptoms to assess status, select interventions, and evaluate intervention effectiveness (Bhimani et al., 2017; Bhimani, McAlpine, & Henly, 2012) over time for continuity of care and insurance purposes.

Review of the Literature

In the National Library of Medicine (NLM) Medical Subject Headings database, *muscle tonus*, *muscle tightness*, and *muscle tone* share a common definition: "The state of activity or tension of a muscle beyond that related to its physical properties, that is, its active resistance to stretch. In skeletal muscle, tonus is dependent upon efferent innervation" (NLM, 2008). In the literature, the symptom muscle tightness is often reported in relation to posture or disease processes, where it can affect any body part, including the pelvis (Morin et al., 2017). Muscle tightness can be induced by a variety of factors—laxity, falls, work-related or athletic injuries, surgeries, motor vehicle accidents, strains,

and sprains (Arab & Nourbakhsh, 2014; Harshbarger, Eppelheimer, Valovich McLeod, & Welch McCarty, 2013; Marcondes, de Jesus, Bryk, de Vasconcelos, & Fukuda, 2013). Although symptoms of muscle tightness have been studied in relation to other conditions, muscle tightness has not been evaluated by itself through a symptoms lens (Bhimani & Anderson, in press). Extremities, lower back, and hip are body parts commonly afflicted by muscle tightness (Endo & Sakamoto, 2014; Takei, 2012; Tennfjord et al., 2015), but the literature lacks reports on the impact of muscle tightness on quality of life and daily functioning. Based on its severity, muscle tightness may be treated using medications, physical and chiropractic therapy, electrical stimulation, heat/cold, and stretching exercises (Landy, Altman, & Xie, 2011; Mohr, Long, & Goad, 2014; Nakano, Yamabayashi, Scott, & Reid, 2012; Yang, Chen, Hsieh, & Lin, 2012).

Muscle tightness can coexist with muscle weakness (Neumann, 2010). The NLM defines muscle weakness as "A vague complaint of debility, fatigue, or exhaustion attributable to weakness of various muscles. The weakness can be characterized as subacute or chronic, often progressive, and is a manifestation of many muscle and neuromuscular diseases" (NLM, 2003). Muscle weakness can affect limbs, lungs, or any other body parts by reducing their functional capacity (Basso-Vanelli et al., 2016; Øiestad, Juhl, Eitzen, & Thorlund, 2015). It can manifest in diseases such as stroke, chronic obstructive pulmonary disease, congestive heart failure, and osteoarthritis, or it may result from deconditioning after prolonged illness (Dinglas et al., 2017; Knarr, Reisman, Binder-Macleod, & Higginson, 2013; Wells, Polkey, & Baker, 2016). Treatments for muscle weakness include electrical stimulation, strength training, and nutrition (Arnold & Bautmans, 2014; Jones et al., 2016; Latronico, Nisoli, & Eikermann, 2013).

Muscle rigidity, another type of increased muscle tone, can be found in disease states such as Parkinson's disease or Rett syndrome (Humphreys & Barrowman, 2016). According to the NLM, muscle rigidity is "continuous involuntary sustained muscle contraction which is often a manifestation of basal ganglia diseases. When an affected muscle is passively stretched, the degree of resistance remains constant regardless of the rate at which the muscle is stretched" (NLM, 2006). It is this constant degree of resistance unaffected by velocity that differentiates muscle rigidity from spasticity, which is velocity dependent (Lance, 1980). Rigidity is commonly seen in Parkinsonian disease processes and is often referred to as "cog wheel rigidity," where tremor is superimposed on the increased muscle tone.

Spasticity and rigidity are challenging to distinguish. According to Stanford University (Stanford Medicine,

2015), unlike spasticity, rigidity is not velocity dependent, and the resistance is felt in all directions, including both flexion and extension. Mullick, Musampa, Feldman, and Levin (2013) used electromyography and biomechanical measure (manipulandum) to measure tonic reflex spatial threshold in patients with stroke and Parkinson's disease to differentiate spasticity and rigidity. Medications such as ketamine and fentanyl may cause muscle rigidity as a serious side effect (Coruh, Tonelli, & Park, 2013; Vien & Chhabra, 2017). Botulinum toxin has been found ineffective in treating muscle rigidity and pain (Dressler & Adib Saberi, 2014). Deep brain stimulation has been found effective in the management of Parkinson's disease associated with rigidity or bradykinesia (Kwon et al., 2014).

Discrimination of muscle conditions is challenging. Discrepancies between patients' and examiners' evaluations of neuromuscular symptom experiences have been reported (Bhimani & Anderson, 2014; Bhimani et al., 2012, 2017; Gravis et al., 2014; Lechner, Frotzler, & Eser, 2006). In the literature, too, confusion exists regarding the terms *muscle tightness* and *spasticity*, with the two terms used simultaneously and interchangeably (Cleveland Clinic, 2017; Saulino et al., 2016). Trompetto et al. (2014) further elaborate that spasticity is a hypertonia that is mediated by stretch reflex, whereas nonreflexive hypertonia, such as muscle tightness, occurs due to soft tissue changes. Few first-person accounts of spasticity or muscle tightness are available (Anwar & Barnes, 2009; Bhimani & Anderson, in press; Bhimani et al., 2012; Mahoney et al., 2007), and the patient perspective on muscle weakness and rigidity is missing from the literature. Likewise, nurses' perspective on how they understand and manage muscle tightness, weakness, or rigidity is also missing from the literature. This study begins to remedy these gaps in the literature.

Method

Design

Nursing communication relies on spoken and unspoken language, whereas symptoms are a lived experience. Thus, qualitative evaluations of symptom communication are appropriate. In addition, the study sought to explore the effectiveness of care strategies; therefore, a descriptive qualitative study design was used.

Sample and Setting

Eight registered nurses with expertise in managing muscle tightness in different clinical settings were recruited for the study from two rehabilitation facility in the large Midwestern metropolis. These rehabilitation facilities cares for patients

with varied diagnosis, including cerebral palsy, spinal cord injury, stroke, multiple sclerosis, and other general rehabilitation needs in the in-patient and outpatient settings.

Inclusion Criteria

This study included nurses who (a) were English-speaking, (b) were 21 years of age or older, (c) had at least 1 year of nursing experience, and (d) cared for patients with muscle tightness in any setting.

Measures

Participants were asked to (a) provide demographic information; (b) participate in an open-ended interview to provide information about their understanding of muscle tightness, muscle weakness, and muscle rigidity; (c) identify the lexicon they used to describe muscle tightness, weakness, and rigidity; and (d) identify care management strategies they have used successfully in clinical practice for muscle tightness, muscle weakness, and muscle rigidity.

Protocol

The focus of this study was to understand communication and management of the symptoms of muscle tightness, weakness, and rigidity from the nursing perspective. First, the researcher informed nurses about the study using e-mail and personal contacts. Eligible nurses were offered a \$50 incentive for participating. Nurses who were interested and agreed to participate in the study signed a consent form. The researcher met with each participant at a mutually agreed upon time and place for the semistructured interview (Table 1). In the interview, the researcher asked the nurses for their perspectives on muscle tightness, weakness, and rigidity without providing them with the background association of disease conditions. Conversations were recorded and transcribed later for analysis.

Data Analysis and Methodology

A general guidance usually is a starting point for qualitative data analysis because there are no strict formats for analyzing qualitative data (Patton, 2002). The qualitative paradigm is inductive in nature and promotes naturalistic inquiry (Van Manen, 1990). Data were collected using semistructured questions, which included descriptors to identify symptoms of muscle tightness, weakness, and rigidity.

Colaizzi guidelines (Colaizzi, 1978; Shosha, 2012) were used for content analysis. Initially, all the transcripts were read and reread by the researcher to get the sense of

Table 1 Interview questions for nurse participants

Order	Question
1	How would you describe your clinical findings of muscle tightness in your patients? What words would you use to describe the symptom of muscle tightness?
2	What care strategies do you use to manage your patients symptoms of muscle tightness? What are the challenges and successes of these care strategies?
3	Please rate different care strategies using numeric rating system on a 0–10 scale (0 = <i>not effective at all</i> to 10 = <i>extremely effective</i>) that have been used in clinical practice for muscle tightness.
4	How would you differentiate symptoms of muscle tightness from muscle weakness and muscle rigidity? What words would you use to describe the symptom of muscle weakness and rigidity?
5	What care strategies do you use to manage your patients symptoms of muscle weakness and rigidity? What are the challenges and successes of these care strategies?
6	Please rate different care strategies using numeric rating system on a 0–10 scale (0 = <i>not effective at all</i> to 10 = <i>extremely effective</i>) that have been used in clinical practice for muscle weakness and rigidity.
7	Anything else you would like to add on this topic?

the whole content. Relevant statements related to muscle tightness, weakness, and rigidity—including care strategies and communication patterns—were extracted from each transcript. Meaning was assigned to these statements, which were further collapsed into higher-order categories based on similar contents. An organizing tree/map based on muscle tightness, weakness, and rigidity was used to organize these categories. Other statements of interest that did not fit into these categories were assigned to the *Other* category. Content analysis for these data continued until discrepancies were resolved and themes emerged that captured the full range of the phenomenon. Lincoln and Guba's (1985) criteria of *credibility*, *dependability*, *confirmability*, and *transferability* guided the rigor in this qualitative study. Credibility was achieved by bracketing and memoing before data collection to minimize professional bias. Field notes were kept to ensure confirmability, which further assisted in maintaining audit trails for content analysis and enhance credibility. Thick descriptions indicated data saturation, achieving transferability. Descriptive statistics were used to understand care strategy patterns.

Ethical Consideration

This study was approved by the University of Minnesota (exempt study # 1512E81322). Informed consent forms were used to ensure that the nurses understood the burden of participating in research and that they were free to withdraw at any time.

Results

Eight nurses participated in the study. They were each assigned a participant number. Selected examples representative of their responses to each category of inquiry are provided here.

Muscle Tightness

Descriptions

Nurses appeared to struggle with the description of muscle tightness and often used diverse terms to describe it (Table 2). They used the words *spasm* and *muscle tightness* interchangeably.

Clinical understanding of muscle tightness would be muscle spasms; another muscle tightness would be contracture. (Participant 60)

I think of that also as spasms, increased tone, rigidity, painfulness and it could be sudden or chronic so we could have patients that have chronic back pain or muscle tightness in their back from sitting in a wheel chair, perhaps, and just not having that range of motion. (Participant 20)

Some nurses questioned the difference between muscle tightness and spasticity, whereas others questioned the difference between muscle tightness and rigidity. About 75% substituted the term *muscle tightness* for *spasticity* and described it in terms of *muscle rigidity*.

I think probably the most common is spasticity or muscle spasms. That's generally where I go, muscle spasticity.... I don't use the words muscle rigidity as much as probably just an overall muscle tightness. (Participant 30)

Hypertonia maybe, flexion extension limitations, joint contractures, muscle/joint pain that's a big one. So I think of someone that has muscle tightness, oftentimes they're uncomfortable. And if they're really tight and they have lots of spasticity and dystonia which is really even fall under the same category. (Participant 70)

Table 2 Nurses' lexicons to describe muscle tightness, weakness, and rigidity

Muscle Tightness	Muscle Weakness	Muscle Rigidity
Sore	Limp	Uncontrolling
Stiff	Flaccid	Tense
Contracture	Weak	Muscle restructure
Spasm	Paralyzed	Inflexibility
Painful	Lack of strength	Spasticity
Spasticity	Muscle wasting	Limited range of motion
Hypertonia	Fatigue	
"Very tight"	Floppy	
Dystonia	Loose	
Flexion limitation		
Rigidity		
Tension		

Some nurses described muscle tightness in terms of spasm, but a small number differentiated between muscle tightness and spasticity and discussed the need to investigate why a patient might be experiencing these symptoms.

One is kind of day-to-day muscle tightness that you and I could have, but other could be some more serious muscle tightness that you really have to slow down and look at “Why?”.... We don’t really refer to it as muscle tightness, we talk about more their tone, the tone of their muscles—like how flaccid if they’re super loose, or if they’re really rigid and tight—things like that. (Participant 20)

Care Strategies

Medications were mentioned often. Nurses identified many medications that are effective in managing muscle tightness.

I think that we’re probably programmed and trained to—well, most nursing school I guess will probably train you to think that medication is your best [option] because you can see there’s so much focus on pulling a pill and look up the side effects and then you’re going to give the pill and then in a certain amount of time you’re going to monitor the effects that it had and then you’re going to say was it useful or not. (Participant 50)

Although they identified medications to be very effective, they were mindful that other modalities must be considered before opting for medications.

I think one of the best treatments is either there’s medication obviously. I personally, you know there’s medications for everything and if there’s another way we could get through that I’d rather go with that option. Less chemicals in the body are going to make you feel better, I think. (Participant 30)

Stretching and range of motion were identified as the most effective care strategies after medications. Nurses reported that although they performed stretching and range of motion for their patients, often they were not able to get to every patient.

Stretching is probably up there, you know.... I would say stretching is one of the main ones, which it’s hard sometimes on the floor being able to do that with a lot of our patients depending on how the morning goes; especially with prior to getting them out into the bed. Some mornings, depending on the patients that I have, some of them might need to be up and ready and in the dining room because I only have a short amount of period to get three or four patients out of bed and up and ready for their therapies whether it be speech, PT, OT, whatnot, and typically they try to schedule the stretching for the patients that need it, but not all of them get it. (Participant 10)

Nurses provide adjunct nursing modalities, such as ice, heat, repositioning, and stretching, but they view physical

therapists as experts in the care management of muscle tightness. They tend to believe that the plan of care must be initiated by the physicians and physical therapists; however, they do modify plan of care based on patient needs.

I’d rate it [stretching/range of motion] really up there because they’re [PT] the ones who know the body way more. They know it in more of a functional way of how people normally move, and they help re-train the body to think that way and work out those muscle tightness. (Participant 80)

As a nurse, you’re going to be doing a lot of referrals—physical therapy, occupational therapy, splinting. A lot of these are going to be MD-driven orders, but pool therapy, warm water pool therapy. (Participant 70)

Use of aroma therapy was a common practice in both organizations and seen as quite effective in managing muscle tightness.

We just came out with a new aromatherapy with different scents that are supposed to help with muscle spasms. We had ones for pain; now we have these ones that are more for spasticity.... I used one over the weekend for a patient that was getting muscle spasms—it would just take his breath away, and he was calling out and moaning. Then I had him smell it. He didn’t believe it, but he was quiet for about 15 minutes after that. And so I thought that was really cool. Even though sometimes they maybe don’t believe it, it’s actually working for them. (Participant 70)

Communication

Nurses commented that they are mindful of the terminologies they use when communicating with their patients because they do not want to interpret their patients’ experiences incorrectly. Others purposely teach a simplified lexicon to their patients because they do not believe that their patients can comprehend medical terminology.

Because depending on the type of pain influences how we’re going to treat it. You might be having a muscle spasm. But I use the words like “Does it feel like it’s pinch?” and if it’s something where they’re truly having pain and it’s not muscle spasm—related, I’ll kind of route my conversation differently. Once they describe that they are having a muscle spasm or muscle tightness, usually we go over and say these are the different treatment options available for you. (Participant 70)

It’s too hard for them to understand. So sometimes you use the words that they are familiar with as you’re interjecting the word that you maybe want them to learn, also. So I just want to make sure you understand that because the use for some people is just really hard. They’re going to say tightness or stiffness, spasticity so I’m just trying to say like

clonus and doctors use the Ashworth scoring with the clonus, and a lot of patients don't know that part.... I try to keep them minimal as can be. (Participant 40)

Muscle Weakness

Description

Nurses were consistent in defining muscle weakness as something limp, flaccid, decrease in muscle tone, and lack of strength. Many references pertained to stroke patients and deconditioning.

So, weakness I generally think of like a decrease in muscle tone or muscle ability from baseline, so potentially from deconditioning, like a decrease in activity. Maybe even like a medical condition itself.... A lot of it, with especially the weakness, I see more in like our stroke patients, especially in the arm on the weaker side or leg. (Participant 10)
I guess I see more muscle weakness in people who have had strokes. Especially the ones who have some sort of movement along those lines. Weakness is, I guess, the inability of the muscle to fully perform at its fullest strength. That's what I would say. (Participant 80)

Care Strategies

Nurses identified many interdisciplinary options, including use of physical therapy (PT) and occupational therapy (OT) to manage this condition, whereas most nurses indicated strengthening and exercise as mainstays. Use of braces and correct positioning were also seen as effective care strategies.

Strength routines in what I've seen, especially in terms of PT and OT, especially when a stroke happens there's neurological—a re-energizing of the nerves and body telling the body “This is what we do.” (Participant 80)

I'd probably go with the braces or like the arm chairs just to make sure it's in the correct position. I think that's probably like a high one. (Participant 10)

Communication

Nurses were cued in educating their patient about muscle weakness by reminding them about body positioning. Because most nurses cared for stroke patients, they identified their communication with patients in very basic terms.

A stroke patient, they don't remember they have neglect and they don't remember they have that side. Just getting them to remember, reminding them, and I like to tell them like, “Bring lefty with—we got to bring lefty,” and I tell them to tell their weak side they did a good job and try to make it like somebody you have to remember. In rehab we give them the assistance they need, but

usually we try not to give them assistance they don't need. (Participant 30)

Muscle Rigidity

Description

Nurses struggled to articulate muscle rigidity, particularly how to differentiate between muscle tightness and rigidity. Some felt muscle tightness and rigidity were the same phenomenon, whereas others felt they were on a continuum.

I guess it is kind of hard to explain.... I don't know how to explain it with rigidity. Kind of like what comes to mind is almost like ataxic person, like having that movement more—not the steady movement—I think of rigidity, if that makes sense. (Participant 30)

We don't really use that term a lot. I kind of feel like it is one in the same [as muscle tightness]. (Participant 40)

Muscle rigidity is a state of how tense or tight or how your muscles are in their natural state versus tightness is almost, you know, has its own spectrum, but is more temporary, and rigidity can increase and decrease, too, I think. So, I have a hard time differentiating this from what the rigidity is, and that's really hard for me. (Participant 50)

Care Strategies

Surgery and braces were identified as common care strategies for muscle rigidity. Some nurses also identified medications and stretching/range of motion as options.

Muscle rigidity—usually it seems like it's either surgery or medication. (Participant 50)

I think if you have a brace that you wear consistently as recommended and... Baclofen or like ITB pumps, that can kind of make a pretty big difference for a lot of patients. (Participant 20)

Communication

Most nurses were unable to differentiate muscle rigidity clearly. They struggled to articulate what it is and how to communicate it. As one participant pointed out,

I don't know if I've heard the provider I work with use that term rigidity. I've heard the words spasticity, clonus, muscle tightness. Maybe I need to re-evaluate the terms I use with patients. But even in my nursing assessment I give to the provider, I use the words “it feels tight.” (Participant 70)

Holistic View

Throughout the interviews as nurses explained their perception of muscle tightness, weakness, and rigidity, they did so with a holistic worldview. They used contextual information in symptom management of muscle tightness, weakness, and rigidity and were often cued in to their

patients' pain responses rather than their motor symptoms (lack of flexibility, change in posture, etc.).

I think it really depends on the person. I think each one of the treatments, going from medication to range of motion/stretching and aromatherapy, I think each one of those has—because every patient is different—you see different results based on that patient. When they're frustrated, they're discouraged, overwhelmed with all this information, and all this stuff—they're thinking about their finances, or their family, or their job—and so I think sometimes it just takes a listening ear to get out those frustrations and concentrate on their therapy. (Participant 30)

You see a lot more pain and stiffness—aching with that if they have an arm brace or a leg brace, foot braces if it was in all those things. Really making sure those are being used the way they're supposed to, asking about their pain along with massage, too. (Participant 10)

Nurses were strong proponents of patient education and alternative therapies and advocated for including them in nursing care strategies, regardless of muscle symptoms.

I think that's where the nurse has to motivate the patient: "Yes, you are having this pain and muscle tightness, but you have to get up and move." Or "We have to stretch you, you need to take this medication because it's going to help you." So I think that education of what's going to help and relieve that pain is really, really important because I don't think the patients always see or know that. (Participant 20)

It's interesting when nursing profession you hear about self-care, and oftentimes medication is the last thing we'll go toward. You're always going toward what other massage, lavender, aromatherapy, stress-relieving techniques, guided imagery. So it's really interesting when nurses experience muscle tension—yoga, it's like we're preached, but when we have patients experience it...I do find it interesting that we just constantly go toward medication. We're not taking our own advice, maybe. I would just like to see more of what they call adjunct therapies be a part of any hospital. (Participant 50)

Discussion

Rehabilitation nurses care for complex patients with a myriad of overlapping neuromuscular conditions. Our results indicate that nurses struggled to clearly delineate between muscle tightness and rigidity. They substituted different terminologies, such as spasms and spasticity, for muscle tightness. This may be troublesome because often patients learn labeling of their symptoms from their clinicians and nurses. Use of incorrect terminologies may

lead to inaccurate diagnosis and treatment options, which may be detrimental for patients.

The shared definition of *muscle tightness* and *muscle tonus* from the NLM is concerning because it articulates the understanding of normal muscle tone that is needed to maintain body posture. Interestingly, this definition also subsumes the terms muscle tension and muscle tightness under the muscle tonus umbrella, adding to the confusion. It is not surprising that nurses often struggled to clearly articulate muscle tightness because even the available definition in the NLM does not capture the essence of the phenomenon: A single definition cannot identify both normal and abnormal conditions as it causes confusion. Nurses also confused muscle tightness with spasticity and used the vocabulary interchangeably. The key characteristic of spasticity is the "stretch reflex" (Lance, 1980), which is neurogenic in nature. However, local trauma and orthopedic injuries can cause muscle tightness, which is myogenic in nature.

Nurses reported using medications, range of motion, stretching, massage, aromatherapy, ice, heat, and repositioning for muscle tightness; and aromatherapy medications, range of motion, braces, and repositioning for rigidity. Muscle weakness, particularly in the stroke population, was managed by education, cueing not to neglect the weak side, and use of braces. They also reported assisting patients in strengthening exercises to improve weak muscles. Nurses were comfortable in identifying different care strategies for muscle tightness, weakness, and rigidity. Although nurses were perplexed by the term *muscle rigidity* and they could not differentiate it from muscle tightness, their care strategies for muscle tightness, weakness, and rigidity were overlapping but somewhat different (Figure 1). This indicates that nurses intuitively know that these are different muscle conditions, but clear crisp delineation of the conditions is challenging in clinical practice. One explanation could be that symptoms of muscle tightness, weakness, and rigidity are similar in appearance, invisible and comingled with other disease processes. This raises the question whether nurses need more training and education in the area of muscle symptom science in the rehabilitation specialty. These conceptual differentiations of muscle conditions are important because different symptoms call for different interventions. Findings in the current study support those of Bhimani and colleagues (Bhimani & Anderson, 2017; Bhimani, McAlpine, & Henly, 2012), indicating that discrepancies exist between patients and clinicians' communication. Clear definitions with concept clarity are needed to define these terms to ensure that miscommunication and medical errors are avoided.

Nurses are holistic and critical thinkers, and they tended to cue in more to their patients' pain responses rather than

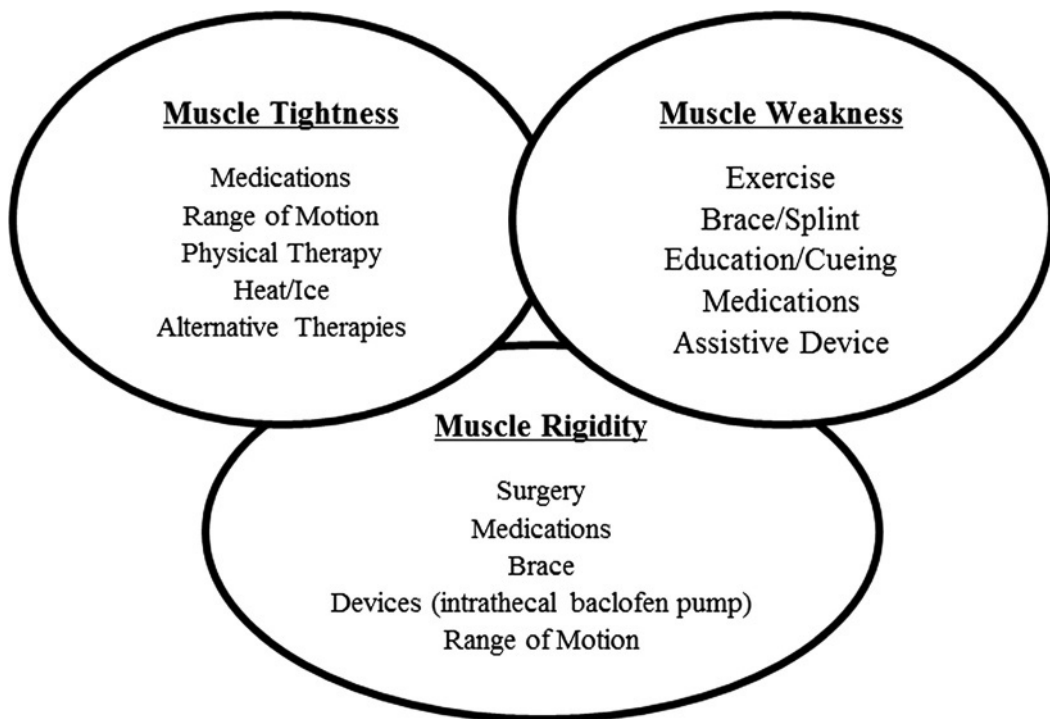


Figure 1. Overlapping care strategies for different muscle conditions.

their motor symptoms (lack of flexibility, etc.). Lack of a symptoms lens makes the differences between muscle tightness, weakness, and rigidity obscure, thereby creating a potential communication barrier between nurses and patients. Nurses influence the choice of patient vocabulary; hence, nurses must be well versed in understanding the differences between various muscle symptoms. Clear definitions that cut across disciplines must be developed for different conditions. Use of aromatherapy in managing muscle tightness requires further research.

Limitations

The qualitative study included eight registered nurses from two rehabilitation organization in similar geography limits transferability. The professional understanding of muscle tightness, weakness, spasticity, and rigidity may have introduced bias. Some of these limitations in the qualitative study were minimized by bracketing prior to the study, reflexive journaling during the study, and personal memoing during the analysis phase (Brink & Wood, 1998; Patton, 2002). Because a clinical nurse researcher analyzed the data initially, a nonclinician researcher followed the audit trail to ensure data analysis and conclusion integrity.

Implications for Nursing Practice

Nurses who are bedside caregivers with specialized knowledge do provide care for patients with movement disorders. Therefore, it becomes imperative that nurses are well versed

in these conditions. It is imperative that nurses minimize their use of medical jargon and educate patients and families about disease processes and care strategies in simple layman's terms. However, the use of precise terms to describe muscle conditions should not be sacrificed in the interest of simplifying the language to educate patients and their families. Incorrect labeling of a muscle condition has the potential for miscommunication between patients and clinicians and between interdisciplinary clinicians, leading to grave consequences. Use of specific and correct terminology has implications for the use of electronic health records, as well. Most electronic health records contain smart sets that associate labeled clinical conditions with specific tests and interventions; the clinical conditions themselves are precisely based on certain terms. Consequently, using incorrect terms may lead to an incorrectly labeled clinical condition that, in turn, may lead to clinician use of a smart set that provides inappropriate treatments. Symptom differentiation must be added to holistic nursing care because specific care strategies are needed to manage muscle tightness, weakness, and rigidity. Identification of symptoms from both motor and pain assessment perspectives is needed for optimal holistic care.

Conclusion

Nurses in our study found the use of different terms to differentiate between muscle conditions confusing. They struggled to identify the differences between muscle tightness and

Key Practice Points

- Nurses influence the choice of patient vocabulary; hence, nurses must be well versed in understanding differences between various muscle conditions and label it accordingly.
- Nurses must minimize their use of medical jargon and educate patients and families about disease processes and care strategies in simple layman's terms without sacrificing precise terminologies.
- Identification of muscle symptoms from both motor and pain assessment perspectives is needed for optimal holistic care.

muscle rigidity. Nurses identified medications and range of motion as the key strategies to manage the symptom of muscle conditions; however, some found aroma therapy to be quite effective in managing muscle tightness. Participants used a holistic view and did not describe their preferred care strategies from a symptom perspective alone. The literature, too, contains a scarcity of knowledge of these muscle conditions from a symptom perspective. Future research should focus on gaining patients' insights and developing consensus definitions that cut across the disciplines and capture the essence of the phenomena.

Conflict of Interest

The authors declare no conflict of interest.

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