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## Mixed Methods Approach to Understanding Determinants of Practice Change in Skilled Nursing Facility Rehabilitation: Adapting to and Sustaining Value with Post-Acute Changes

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### Abstract

**Background and Purpose:** Post-acute care reform is driving physical and occupational therapists in skilled nursing facilities (SNFs) to change how they delivery care to produce better outcomes in less time. However, gaps exist in understanding determinants of practice change, which limits translation of evidence into practice. This study explored what determinants impacted change in care delivery at two SNFs that implemented a high-intensity resistance training intervention.

**Methods:** We used a mixed methods, sequential explanatory design to explain quantitative findings using qualitative methods with a multiple-case study approach. Quantitative data were collected on therapists' attitudes towards evidence-based practice and aspects of intervention implementation. We conducted focus groups with therapists (N=15) at two SNFs, classified as either high- (SNF-H) or low-performing (SNF-L) based on implementation fidelity and sustainability.

**Results and Discussion:** Determinants of SNF rehabilitation practice change included the organizational system, team dynamics, patient and therapist self-efficacy, perceptions of intervention effectiveness, and ability to overcome preconceived notions. A patient-centered system, positive team dynamics, and ability to overcome preconceived notions fostered practice change at SNF-H. While self-efficacy and perception of effectiveness positively impacted change in practice at both SNFs, these determinants were not enough to overcome challenges at SNF-L. To adapt to changes and sustain rehabilitation value, further research must identify the combination of determinants that promote application of evidence-based practice.

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Declaration of Interest

No potential conflict of interest was reported by the authors.

**Conclusions:** This study is the first step in understanding what drives change in SNF rehabilitation practice. As SNF rehabilitation continues to face changes in healthcare delivery and reimbursement, therapists will need to adapt, by changing practice patterns and adopting evidence-based approaches, to demonstrate value in post-acute care.

### Keywords

post-acute care; mixed methods research; rehabilitation; practice patterns; evidence-based practice

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## INTRODUCTION

Recent and forthcoming changes in Skilled Nursing Facility (SNF) reimbursement may dramatically shift physical and occupational therapists' perspectives and incentives to change practice patterns to provide greater value with better patient outcomes in less time. Rehabilitation in the SNF has the strong potential to offer value when considering that post-acute care reform now renders SNFs accountable for outcomes related to function<sup>1</sup> such as community discharge, functional recovery, healthcare utilization, and rehospitalization rates. All of the aforementioned outcomes are correlated to and potentially modifiable through enhanced physical function.<sup>2-4</sup>

However, physical and occupational services are under considerable scrutiny because large datasets and existing literature indicate SNF rehabilitation may not adequately address the functional deficits stemming from hospitalization.<sup>5,6</sup> The Center for Medicare and Medicaid Services has substantially increased spending in SNFs without an observed improvement in community discharge and rehospitalization rates.<sup>5</sup> The discrepancy between spending and outcomes may be attributable to variation in clinical practice patterns.<sup>2-4</sup> Traditionally, part of the challenge to advancing SNF rehabilitation practice is the lack of incentive for high-quality care, leaving providers to prioritize reimbursement-driven over evidence-based practices.<sup>7</sup> However, post-acute care reform will shift this perspective by incentivizing SNF administrators and providers to deliver high-quality, evidence-based care that produces optimal outcomes and, consequently, reflects the appropriate payment for care.<sup>8</sup>

The changes in reimbursement and penalties require the SNF rehabilitation team (therapists and administrators) to transform current approaches to delivery of care for job sustainability and continued value in Physical and Occupational Therapy in an era where optimal patient outcomes need to occur in less time. Evidence demonstrates that high-intensity resistance training has the potential to be more effective in improving physical function in less time,<sup>9,10</sup> which makes it an attractive approach to care in light of reimbursement changes.<sup>8,11</sup> High-intensity resistance training focuses on principles of muscle overload to produce physiologic changes that translate into improved function.<sup>12</sup> With a high-intensity resistance training approach, the quality of function-based interventions is improved while the quantity of rehabilitation remains unchanged. Our research team has established an evidence base for the effectiveness of high-intensity resistance training in post-acute populations with varying degrees of adoption and implementation success in the context of the SNF setting.<sup>10,13</sup>

The barriers and facilitators that determine success or failure of Physical and Occupational Therapy practice change in SNF rehabilitation have not been adequately

studied.<sup>14,15</sup> Therefore, we have limited knowledge regarding how to effectively use tools like implementation strategies to translate evidence-based interventions into the delivery of SNF rehabilitation services through changes in physical and occupational clinical practice. Our research team conducted two studies in two separate SNFs to assess the feasibility and effectiveness of a high-intensity resistance training approach.<sup>10</sup> One SNF demonstrated high-quality and sustained implementation of high-intensity resistance training (SNF-H) compared to one with poor implementation and sustainability (SNF-L). An explanatory mixed methods approach can be used to identify how qualitative data potentially explain variability in quantitative findings at SNF-H and SNF-L.<sup>16</sup> Thus, the purpose of this explanatory, mixed methods case study is to uncover what determinants facilitated or hindered practice change in SNF-H and SNF-L. The findings from this study lead to better understanding of factors that influence SNF practice change and inform implementation targets for future, large-scale dissemination.

## METHODS

### Sample

We conducted a mixed-method study through collection of quantitative and qualitative data from occupational and physical therapy providers at two different SNFs, ultimately classified as either high- (SNF-H) or low-performing (SNF-L). The rehabilitation therapists included Physical Therapists (PTs), Physical Therapist Assistants (PTAs), Occupational Therapists (OTs), certified Occupational Therapy Assistants (COTAs), and directors of rehabilitation (both Speech Language Pathologists). The main difference between sites was the training mode and frequency. Therapists at SNF-H received 4 hours of in-person training, onsite mentorship and coaching (~12 hours per therapist total) and participated in weekly meetings including two large-group problem-solving sessions. As part of an extended modification of the first approach, therapists at SNF-L participated in a two-hour online training, received onsite mentorship and coaching (~4 hours per therapist total), and participated in two large-group problem solving sessions. The use of an online training platform is considered more practical for large scale dissemination because research personnel lack the resources to provide extensive on-site oversight, and therapists generally have limited time for lengthy training due to high productivity standards dictating the majority of their time be applied to billable patient care. We classified the two SNFs as high-performing (SNF-H) and low-performing (SNF-L) based on intervention effectiveness, implementation, and sustainability of practice change. The high-performing SNF-H demonstrated effectiveness of the high-intensity resistance training approach with results showing greater improvements in function and reduced lengths of stay.<sup>10</sup> These results were not replicated in SNF-L. Higher treatment fidelity and more thorough intervention documentation was demonstrated by SNF-H compared to SNF-L. Finally, sustainability of practice change—defined as unchanged adherence to treatment fidelity and continued documentation—was maintained only at SNF-H. This study received ethical approval from Colorado Multiple Institutional Review Board (14–2388). All participants voluntarily provided informed consent to participate in the focus groups.

### High-intensity resistance training intervention and implementation strategy:

Details regarding the high-intensity resistance training intervention are described elsewhere.<sup>10</sup> Briefly, the high-intensity resistance training intervention is a multi-component program based on evidence-based principles of high-intensity, functionally-based exercises that emphasize muscle overload to confer physiologic gains in muscle strength and physical function.<sup>12,17</sup> Therapists were provided a menu of intervention options to tailor treatment to the patient in the following categories: transfers, activities of daily living, neuromotor training (gait and balance), and strengthening. We provided therapists with training and mentorship on modifying the selected intervention to achieve an 8-repetition max, which is muscle overload or failure that occurs on the 9<sup>th</sup> repetition.<sup>10</sup> Failure was defined as the inability to complete the final repetition through the full and available range of motion without significant compensation or the increased need for physical assist.<sup>10</sup> Authors AMG, KJS, CVL, and JSL were involved in aspects of the training and implementation of a high-intensity resistance training intervention at both SNFs. The high-intensity resistance training approach was the same at both SNFs with minor adaptations to processes and workflow to fit the needs of the specific SNF site.

In designing for implementation of high-intensity resistance training in the SNF context, we used the Practical, Robust Implementation and Sustainability Model (PRISM) to better understand the processes of implementation.<sup>18</sup> PRISM is a model designed to guide researchers and health care decision makers on what factors are most relevant to consider when translating evidence into delivery of care.<sup>18</sup> Factors commonly include the organizational perspective, patient perspective, implementation & sustainability infrastructure, recipients, external environment, and implementation outcomes (Reach, Effectiveness, Adoption, Implementation, and Maintenance [RE-AIM]).<sup>19</sup>

### Mixed methods design and analysis:

We used a mixed methods, sequential explanatory design to explain quantitative findings using qualitative methods with multiple case studies.<sup>16,20</sup> Quantitative data were collected first, which informed the qualitative data collection and analysis. We used the quantitative data to identify the high- versus low- performing SNFs and resistance training then conducted focus groups to explore perceptions of the therapists at each site to understand the differences in the complex implementation of high-intensity.

**Quantitative data collection and analyses:** At initiation of the high-intensity resistance training intervention, we collected quantitative data to describe the two SNFs. From the PTs, PTAs, OTs, and COTAs at both SNF-H and SNF-L, we gathered demographic data including sex, discipline, years of experience, and highest degree completed. Therapists completed the Evidence Based Practice Attitude Scale (EBPAS) adapted from Aarons, et al.<sup>21</sup> The 15-item survey has individuals assess agreement on a 5-point Likert scale for questions relating to the intuitive appeal of new evidence-based interventions, the likelihood of adoption given facility or leadership requirements, openness to new approaches, and perceived divergence between current care delivery and evidence-based protocols. We scored each survey using United States national norms of the EBPAS, and then combined each subscale into a facility total scale score for comparison between SNF-H and SNF-L.<sup>21</sup>

EBPAS scores have been shown to be reliable and valid for international use in a variety of clinical contexts and settings, indicating the test is associated with individual provider characteristics.<sup>22,23</sup>

The research team assessed treatment fidelity of high-intensity resistance training using an objective checklist during a minimum of two observed patient treatment sessions per therapist. The objective checklist included appropriate identification of the patient, monitoring key vital signs of blood pressure, heart rate, and oxygen saturation, patient education on muscle soreness, performance of strengthening or activities of daily living (ADLs) and transfers (e.g., sit to stand, supine to sit, toilet transfers) using high-intensity principles, and progression of exercises for the next session. At SNF-L, we did not assess treatment fidelity on PTs and OTs as they provide treatments less than ~33% of their time per week; whereas, PTAs and COTAs spend 100% of their time on treatment sessions per week. At SNF-H, both PTs and OTs were evaluated for treatment fidelity as they spend greater than ~75% of their time on treatment sessions; although PTAs and COTAs still conducted a majority of treatment sessions for patients at SNF-H. At both SNFs, the research team also used documentation audits to quantify intervention fidelity based on the key elements included in the training. Both sites received slightly different instructions and templates for documentation; however, all therapists were instructed to identify progression of exercise and activities for the next session to ensure continuity of care and continued application of high-intensity. At SNF-L, research personnel conducted bi-weekly documentation audits during the first few months of intervention implementation and then monthly (total of six audits). Audits occurred for all trained SNF-L therapists across at least 20 high-intensity treatment sessions per therapist within a weekly period (minimum of ~60% of total treatments per therapists that week). The research team audited 100% of documented sessions at SNF-H, given the smaller therapy team and caseload.

**Qualitative data collection and mixed-method analysis:** A multiple case study approach was used to inform the qualitative data collection and analysis.<sup>24</sup> To adequately report characteristics of the research team, reflexivity, study design, and analysis, we considered all items identified in Malterud's qualitative research standards and guidelines.<sup>25</sup> The PRISM conceptual model and quantitative differences between the two SNF sites informed the development of the focus group interview guide (Table 1).<sup>18,19</sup> We designed the questions to elicit participant responses about their experiences and perspectives during the high-intensity resistance training implementation phase and in the one to three months following the end of intervention implementation (i.e., sustainability phase). One-hour semi-structured focus group discussions with therapy teams were conducted with three research personnel. Data collection was purposeful, and therapists volunteered to participate. We emailed all members of the rehabilitation teams to elicit voluntary participation in the focus group. We targeted to have at least 1 OT, 1 PT, 1PTA, 1 COTA, and 1 administrator in the focus group per site for a representative population. We chose to conduct focus groups to encourage therapists to interact in a way that would present both individual and shared perspectives. The interaction amongst the therapy team is considered a core element of implementation and shift in collective care delivery. Focus groups were audio-recorded, transcribed, and validated for accuracy. One author ((A.M.G.) led the focus groups and two

authors (K.J.S. and J.A.S.) assisted facilitation and collected field notes. Four reviewers (A.M.G., K.J.S., J.A.S., and C.V.L.) independently and manually coded the three focus group transcripts. The reviewers then convened to reconcile the codes through team-based discussion of code definitions and uses, leading to merging and splitting of codes and refinement of code definitions. This process was completed twice before reviewers reached agreement.

Mixed method analysis was undertaken to uncover what qualitative determinants facilitated or hindered the magnitude of change in and sustainability of (quantitative data) a new method of care delivery at SNF-H and SNF-L. Iterative, team-based discussion was used to identify emergent qualitative themes, sub themes, and abstractions between the two SNFs. The iterative mixed method analysis for emergent themes continued until qualitative saturation was achieved and the research team reached consensus. Interpretive rigor (i.e., trustworthiness) of mixed method interpretations was enhanced through triangulation with multiple data sources using a team-based approach. Triangulation occurred through the interpretation of both qualitative and quantitative data to create deeper insight into SNF rehabilitation practice change.<sup>26,27</sup> A team-based approach enhances the trustworthiness of interpretation by using contextualized discussion and debate to build consensus and considers topics that may otherwise be implied.<sup>24,28</sup>

## RESULTS

### Sample characteristics

The high-performing SNF-H was a 20-bed SNF affiliated with the Department of Veterans Affairs (VA). SNF-H had a PT/OT team of four therapists who operated under service-connected (VA) and Medicare reimbursement guidelines. The entire therapy team in SNF-H participated in the focus group. The low-performing SNF-L was an 80-bed facility. The PT/OT team consisted of 20 therapists and primarily treated patients with Medicare or Managed Care plans. Ten therapists did not volunteer to attend the focus groups in SNF-L. Therapist demographics are outlined in Table 2.

### Quantitative results

Overall Evidence Based Practice Attitude Scale (EBPAS) scores differed significantly ( $P=0.04$ ) between SNF-H and SNF-L therapists (Table 3). Therapists at the SNF-L valued experience and current clinical practice over new, evidence-based protocols ( $P=0.001$ ). However, therapists at the SNF-H were more favorable toward interventions that were intuitively appealing ( $P=0.001$ ) and more open to changing their practice ( $P=0.005$ ).

OT/COTAs at SNF-H demonstrated greater treatment fidelity ( $P=0.04$ ), and documentation of OT progression for ADL ( $p=0.05$ ) and transfer ( $P=0.03$ ) interventions compared to SNF-L (Table 3). No differences existed between PT/PTAs at the SNFs for treatment fidelity ( $P=0.21$ ) or documentation fidelity ( $P=0.47$  and  $P=0.38$ ).

### Qualitative results

Four themes emerged from the qualitative data and are outlined in Table 4.



**Theme 1: A reimbursement-driven system hindered practice change whereas a patient-centered system fostered practice change.**—

The primary payer sources at SNF-L included Medicare and Medicare Advantage plans. Under Medicare guidelines the facility is paid based on the patient's resource utilization group, and patients become responsible for payment after 20 SNF days.<sup>29</sup> For patients with Medicare Advantage, the SNFs contract with specific plan providers and are encouraged to minimize SNF length of stay. Medicare Advantage plans pay a per-diem rate based on a contracted rate decided on between the Medicare Advantage plan and the SNF.<sup>30</sup> Medicare Advantage plans use several mechanisms to control costs including case management, utilization review, and limits on the number of hours of therapy as well as length of stay.<sup>31</sup> Thus, SNF-L reported pressures to treat patients based on payer source, as opposed to patient needs.

“Some people get 30-minute sessions, some people get 25 if they have the worst insurance in all three disciplines. And some patients have 60 minutes. It just depends on [the patient's] payer source.” (SNF-L1, SLP & Direct of Rehab, 6–10 years of experience)

In contrast, SNF-H operated largely under Veteran service-connected reimbursement, which is a reimbursement rate per day. A smaller proportion of the patient population received exclusively Medicare benefits as outlined above with SNF-L beneficiaries. The therapy team reported discharge decisions (timing and location) were largely based on patient needs and clinical outcomes, as opposed to reimbursement pressures to maximize length of stay.

“We want to treat all payer sources equal. If you went over a few minutes, or under a few minutes, there's not the penalty of the [resource utilization group] levels.... We know that if we needed an extra 10 minutes, we're not under the gun here to say, to either eat the minutes or not report them.” - SNF-H2, PT, 27 years of experience

**Theme 2: Discordant team dynamics hindered practice change whereas positive team dynamics fostered practice change.**—

For SNF-L, therapists reported instances where other team members did not adopt the high-intensity resistance training intervention to the full extent, resulting in varying degrees of implementation. The therapists indicated gaps in communication and subsequently continuity of care, which hindered the implementation and sustainability of the high-intensity resistance training intervention. Additionally, SNF-L discussed the use of *Pro Re Nata* (PRN) therapists as a barrier they were unable to overcome to ensure continuity of care and full implementation of the intervention.

“So, I'm seeing somebody I've seen four days [ago], we've been working on [the high-intensity resistance training intervention], we progressed. And then the three days I'm gone, why are you using two-pound weights with them? What are you doing? So, that's frustrating.” (SNF-L10, PTA, 0–5 years of experience)

“Sometimes we had a PRN fill in and they weren't aware of how [the high-resistance training intervention] works. They didn't fill out in documentation to communicate to the assistants, or to anybody else, who would see them further in



regards to: were they appropriate or not appropriate?” (SNF-L20, COTA, 0–5 years of experience)

Therapists at SNF-L reported that the external oversight of fidelity by researchers was essential to their implementation, and subsequently a reason a majority did not fully sustain the intervention after the end of research data collection.

“And I think that was the thought process, like oh, [the research team is] gone, we don’t have to do [the high-intensity resistance training intervention] anymore.” (SNF-L7, PT, 20+ years of experience)

Whereas, the entire team of therapists at SNF-H stated they fully adopted the intervention and it now serves as their standard of care, which facilitates continuity of care given the conformity of the rehabilitation team’s approach to care delivery. The team, separate from research oversight, also reported providing on their own time to train PRN therapists, who did not regularly work onsite, to ensure continuity of high-intensity resistance training principles even when the core team members were not working.

“We’ve been able to prove the success of [the high-intensity resistance training intervention]. So, to stop would be, I think, irresponsible, shortchanging the patients. It’s ingrained already.” -SNF-H3, SLP & Director of Rehab, 24 years of experience

“We said, why not just give [the PRN therapists] a little introduction on what we’re doing, what it’s about, and also in hopes that they can bring that to other places that they might be working as well?” -SNF-H1, PTA, 24 years of experience

Both SNF sites identified support from interdisciplinary providers--especially nursing staff--in addition to support from administrators to keep nursing adequately staffed, would augment or facilitate gains in therapy. One difference is SNF-H associated the role of nursing as complementing therapy gains by encouraging patients to walk outside of therapy sessions to promote greater physical activity throughout the day.

“When you’re trying to progress them, and for that to take not just in the therapy session, but out on the floors, out in their neighborhoods, to have the staffing, the nurses, the [Certified Nursing Assistants], other people to realize that we are pushing them farther and for them to push as well and encourage them to do the walking programs outside of [therapy].” -SNF-H1, PTA, 24 years of experience

In contrast, SNF-L distinguished the nursing role as preparing patients for therapy (e.g., bathroom and hygiene care, dressing) to maximize billable therapy time and the potential to implement the intervention.

“From a PT standpoint, if somebody’s bathed, already went to the bathroom and is up, dressed, great, let’s go [...]” (SNF-L9, PTA, 0–5 years of experience)

Differences in the adoption of the high-intensity resistance training intervention by discipline did not emerge in the focus group with SNF-H. However, at SNF-L, therapists on the OT team indicated struggles with how to integrate high-intensity principles into activities of daily living (ADLs) and educating the patient on the rationale for high-intensity ADLs.

“I just finally had faced so much pushback from doing [the high-intensity resistance training intervention], for like a tub transfer, or even in the kitchen or the washer and dryer, that people just kind of got really annoyed.” (SNF-L20, COTA, 0–5 years of experience)

**Theme 3: Patient and therapist self-efficacy as well as therapist perception of effectiveness impacted practice change.**—

Therapists at SNF-H and SNF-L discussed experiencing a learning curve in relation to applying high-intensity resistance training to practice. Additionally, both SNFs acknowledged the intervention had the potential to be, or was, effective in improving patient outcomes. In fact, therapists at both SNFs talked about how the perceived effectiveness has prompted them to change their approach to practice.

**SNF-H:**

“When we first started [the high-intensity resistance training intervention], you really don’t know how to start with the resistance, because forever we’ve been doing three, four, five pounds. But I think within the first couple of weeks, you start to get the feel, just by how they’re functioning as you bring them into the treatment area, where you can load up. And then I got to a point, myself anyways, to be able to get comfortable.” -SNF-H1, PTA, 24 years of experience

**SNF-L:**

“That’s what was surprising for me is the strength is one thing, but the sequencing [with the high-intensity resistance training intervention] was so much better too. I was just really pleasantly surprised how that came together.” (SNF-L8, PTA, 20+ years of experience)

For SNF-L, while therapist and patient self-efficacy in addition to perceived effectiveness of the high-intensity resistance training intervention was present, therapists agreed it was insufficient to overcome system barriers that hindered complete practice change.

“Maybe like a mixture of everything. You’re doing this, you have to do this [high-intensity resistance training intervention], and you have to change documentation [for the intervention], and you have to do [group therapy]. And all that was all at one time.” (SNF-L9, PTA, 0–5 years of experience)

However, therapists at SNF-H perceived an increase in patient self-efficacy with the high-intensity resistance training intervention, which helped them set expectations and provide patient education early in the SNF episode of care. Increased patient self-efficacy driven by therapist’s expectations and patient education helped change practice through successful implementation of the high-intensity resistance training intervention.

“I think the expectation initially, since we’re being aggressive about working them right off, it sets the tone quicker. So their expectations seem to be higher and motivated to getting them home quicker.” - SNF-H2, PT, 27 years of experience

Furthermore, therapists at SNF-L spoke about feeling more stress related to implementation of the high-intensity resistance training intervention in the context of the system pressures.

**SNF-L:**

“But the day-to-day hardest part was, how do I fit my ADLs and do high-intensity training and do all the additional additives that we were having added on with the [group therapy requirements], that I felt like a lot of us became to have like an overwhelmed sandwich.” (SNF-L20, COTA, 0–5 years of experience)

Whereas, the therapy team at SNF-H identified the addition of the high-intensity resistance training intervention an opportunity to learn a new approach to care and advance their own individual and collective clinical practices. They also discussed how they adapted and extrapolated the intervention to different clinical situations to effectively change their clinical practice.

**SNF-H:**

“I don’t know about the stress level. I would think the interest level went up. I kind of like the change. We all get set, like you say, in a routine. And then to get out of your comfort zone and go, oh, yeah, I guess I learned a lot of stuff [from the high-intensity resistance training intervention] that I can implement here, why don’t I try this too?” -SNF-H1, PTA, 24 years of experience

**Theme 4: Difficulties in overcoming preconceived notions hindered practice change whereas flexibility of preconceived notions fostered practice change.**

—Therapists at both SNFs identified specific challenges for working with older adults and implementing high-intensity resistance training. Furthermore, both sites identified strategies to allow for practice change using high-intensity resistance training within the context of patient challenges.

**SNF-H:**

“Some muscle manipulation and heat, just to help [patients] warm them up and try to work out some of that soreness and they were willing to try again.” -SNF-H4, COTA, 27 years of experience

**SNF-L:**

“Like, when you’re walking, ‘okay, let’s stop and do some stepping and some heel raises, some mini squats, and then you walk a little farther.’ You know you’ve got 40 minutes. So, I’m gonna get this in there during that 40 minutes whenever I can.” (SNF-L8, PTA, 20+ years of experience)

In SNF-L, therapists discussed difficulties in overcoming perceptions of patient capabilities to adapt the intervention when patients who were appropriate for the intervention exhibited pain, lower levels of function, and impaired cognition. The therapists talked about struggles with adapting patient education approaches to more difficult patient presentations to attempt, monitor, and adjust application of the high-intensity resistance training intervention to patient populations where there existed preconceived notions about patient responses to high-intensity resistance training in the SNF.

“I think one thing that we struggle with is the fact that this facility is a geriatric population. So, not only are they acute, but they’re also like 95, and probably weren’t doing any exercise at all before they got here. I know in the office, I have gotten a lot of complaints, not specific to [the high-intensity resistance training intervention], ‘your therapists are pushing me too hard and they’re being mean to me.’ You feel that way, I guess, because you haven’t gotten up off the couch in 12 months. But this is how we’re going to get you better and getting them to be on the same page with you is challenging.” (SNF-L1, SLP & Director of Rehab, 6–10 years of experience)

At SNF-H, the therapy team acknowledged that certain patient presentations--such as pain, limited participation, and low levels of function--made it challenging to implement the high-intensity resistance training intervention. However, despite such preconceived notions, the therapy team reported a flexibility and openness to applying high-intensity resistance training, as clinically appropriate, even with initial hesitation regarding whether the patient would respond.

“Because of [the patients’] lifestyle and their predisposition functionally, that you think, ‘well, they may not respond.’ That might be true in some cases. But there were the other cases, they actually have never been challenged that way, and were more motivated than initially thought to have the opportunity to improve themselves physically.” - SNF-H2, PT, 27 years of experience

## DISCUSSION

This explanatory, sequential mixed methods study of SNF rehabilitation therapists’ perceptions provided insight into the determinants of SNF rehabilitation practice change. The interpretation of qualitative data in light of quantitative findings as a mixed methods analysis was necessary to increase our understanding of determinants that influence change in PT/OT practices in two SNFs. Specifically, the quantitative data identified “high versus low” adopters based on effectiveness and extent of implementation, while the qualitative data provided insights into specific barriers and facilitators encountered by the respective SNF teams. Given the multi-level implementation for this study, the themes emerged and were organized at the system-, team-, and individual- levels. The findings suggest determinants of change in care delivery include the organizational system, team dynamics, patient and therapist self-efficacy, therapist perception of intervention effectiveness, and ability to overcome preconceived notions regarding patient response to high-intensity resistance training. A patient-centered system, positive team dynamics, and ability to overcome preconceived notions created a context where practice change could evolve. Self-efficacy (patient’s and therapist’s) and perception of intervention effectiveness positively impacted practice change; however, these determinants did not overcome the challenges in the SNF context (of SNF-L) that existed in a reimbursement-driven system with discordant team dynamics, and challenges with overcoming preconceived notions regarding patient responses to high-intensity resistance training.

For the purpose of this study, practice change occurred based on the degree of implementation of the high-intensity resistance training intervention. Quantitative data

showed treatment fidelity across both SNFs remained high, suggesting that during observed treatment sessions, all therapists can integrate high-intensity resistance training for practice change. However, documentation of exercise progression for the next session was variable across therapists and considerably lower at SNF-L, implying that outside of observed sessions—where most treatment occurred—there may have been less carryover of practice change. These results may indicate therapists did not consider documenting progression a key part to implementing high-intensity resistance training or had difficulty integrating that piece into their usual practice routine. Documentation of high-intensity resistance training was cited by both SNFs to be additional work that was not always compatible with the current electronic documentation systems and expectations for billing. As practice change still occurred despite variable levels of documentation adoption, this may suggest that therapists either received progression information elsewhere (e.g., team meetings, patient report, continuity of sessions between the same therapist and patient) or potentially partially implemented because the information on progression was not available.

Therapist attitudes towards evidence-based practice was higher (i.e., more positive) among the therapists at SNF-H compared to SNF-L, though both sites showed a trend towards positive evidence-based practice attitudes. Jette, et al. showed similar findings based on a large national survey of physical therapists, with 90% indicating they agreed or strongly agreed that evidence-based practice is necessary but citing time (e.g., productivity requirements) as the primary barrier.<sup>32</sup> While attitudes were positive in SNF-L, this was not enough to overcome organizational system requirements. Qualitative research by Ploeg, et al. that explored factors influencing practice change among other healthcare providers has shown lack of practice change is associated with organizational pressures and competing demands.<sup>33</sup> The aforementioned results<sup>33</sup> can be applied to the current study when considering therapist productivity (i.e., organizational pressure) as well as workloads and administrative requirements (i.e., competing demands) hindered practice change at SNF-L. Our qualitative analysis suggested that therapists potentially have attitudes or preconceived notions that may have lowered expectations surrounding the ability of older adults to participate in high-intensity resistance training. These preconceived notions appeared in qualitative data from therapists and leaders at both SNFs. Therapists at SNF-H appeared to overcome these preconceived notions to effectively implement change in care delivery and prescribe high-intensity resistance training to older adults in the SNF. Ageism is present among healthcare professionals across disciplines and associated with lower quality of healthcare services.<sup>34</sup> Future studies need to evaluate the prevalence and impact of ageist beliefs in SNF rehabilitation therapists to identify effective strategies to counteract these beliefs.

The degree of adoption and implementation to induce practice change was also captured through the semi-structured focus groups with SNF rehabilitation therapists. Therapists at SNF-H indicated the practice change, with integration that the high-intensity resistance training intervention was ingrained and did not feel it appropriate to revert to previous practice patterns. Some therapists at SNF-L also indicated that permanent change occurred in their practice in terms of how much resistance or challenge they consider starting with and what types of functional exercises to integrate into the plan of care. However, the therapists at SNF-L consistently mentioned increased stress with competing priorities and pressures

(e.g., productivity, exact number of treatment minutes, group therapy sessions) that hindered their ability to make a complete shift in practice patterns.

We considered hallmarks of true practice change as taking ownership of the intervention by applying principles of high-intensity resistance training to patients outside of the research population and engaging peripheral employees such as PRN therapists in the intervention. First, therapists at SNF-H applied principles of high-intensity resistance training to patient populations excluded from the effectiveness trial;<sup>10</sup> whereas, SNF-L therapists did not mention this phenomenon and instead focused on the patient-specific challenges for patients in the research inclusion criteria. Many of the patient populations excluded for research purposes (e.g., those with acute neurological conditions, presence of neurodegenerative diseases) are appropriate for all or aspects of high-intensity resistance training but were initially excluded for research purposes to homogenize the SNF population and better understand the effectiveness.<sup>10</sup> Second, SNF-H reported training PRN therapists—outside of research oversight and on their own time—to ensure conformity of rehabilitation approaches by all therapists treating any appropriate patients in the facility. Collectively, SNF-H’s team chose to create a culture where high-intensity resistance training was the standard of care and expected any therapist treating patients in the facility to approach care delivery in the same manner for continuity and better outcomes. In contrast, low-performing SNF-L cited PRNs as a disruption that hindered the consistency, conformity, and continuity of intervention implementation.

Overall, the interaction of the organizational structure, individual characteristics (patient and therapist), and potentially unmeasured factors creates a context and culture that will either foster or hinder practice change. A significant challenge of the SNF context is the complex interaction of multiple, diverse stakeholder groups with competing priorities and demands. However, all levels of determinants must be addressed to facilitate rehabilitation practice change in the SNF that translates to improved patient outcomes. Further research is needed to identify the key combination of determinants that can impact practice change. This paper gives us direction on how to refine implementation strategies to address determinants of practice change in the SNF and, consequently, more rapidly translate evidence into practice for sustained rehabilitation value in post-acute care. First, we aim to seek multiple stakeholder inputs (e.g., patients, administrators, other healthcare providers) throughout the implementation to better address concerns with understanding of the proposed practice change, adoption and modification of high-intensity resistance training, and communication barriers.<sup>35</sup> A second implementation strategy is to perform regular check-ins with the therapists and follow-up training sessions, as needed, to enhance self-efficacy to administer evidence-based practice in the SNF. Third, an important implementation strategy is integrating organizational incentives to promote and maintain practice change by combining high-intensity resistance training into new staff training and creating templates for annual staff reviews. Although the training platforms were different, therapists at both sites had high fidelity during observed treatment sessions and did not indicate training was inadequate. As the results suggested, other factors at the system, facility, and individual level were likely impacting the implementation and application of the high-intensity resistance training intervention more than the therapists’ knowledge of the intervention. Finally, while external facilitation of practice change by research personnel was somewhat effective in promoting



practice change during the study phase, future efforts will engage multiple, onsite clinical champions and internal facilitators to provide onsite problem solving and implementation feedback for enhanced engagement and sustainability of practice change.<sup>36</sup>

There are limitations of this study for consideration. First, due to therapist productivity standards and the need to respect their valuable onsite time, the research team was unable to carry out repeat interviews and return the transcripts to the participants for feedback on the findings. Second, since only two SNF sites participated in implementation of a high-intensity resistance training intervention, these results may not be generalizable and, thus, serve to provide direction for future work. Third, while the entire team at SNF-H participated in the focus group, only about half volunteered at SNF-L. Besides the reasons in the results, we were unable to probe why the remaining therapists chose not to participate and, hence, do not have their perspectives on practice change in the context of high-intensity resistance training implementation. This limitation speaks to the need for further research to identify determinants of practice change specific to providers most resistant to or slow to practice change. Finally, the inherent differences between SNF-H and SNF-L in the therapy team size, caseload volume, and delivery of training may have impacted the implementation results and the degree of practice change. While the training modes were different, therapists did not perceive either training mode as inadequate, suggesting the determinants derived from the data played a larger role in effecting practice change than the therapists' perceived level of training on the intervention. To advance this line of research, it was necessary to start with a more controlled setting (smaller team and lighter caseload) to establish effectiveness before taking the next step to impact more challenging SNF settings (larger teams and higher patient volume). As mentioned previously, the use of an online training platform with integrated techniques for long-distance learning is more practical for nationwide dissemination and, thus, was necessary for staging the next phase of impactful research.

## CONCLUSION

This mixed methods, multiple case study revealed determinants of SNF rehabilitation practice change involve the complex interplay between organizational objectives and multiple stakeholders (patient and therapist). Results indicate the organizational system, team dynamics, stakeholder self-efficacy, stakeholder perception of effectiveness, and stakeholder ability to overcome preconceived notions either fostered or hindered practice change. While future research efforts will better identify the combination of determinants needed to induce practice change, this paper is the first step in refining the implementation strategies needed to facilitate translation of evidence into practice. PTs and OTs in the SNF will continue to face changes in healthcare delivery as the system strives to optimize patient outcomes at low cost. As a result, SNF rehabilitation will need to adapt, likely by changing practice patterns and adopting evidence-based approaches, to demonstrate value in post-acute care.

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**Table 1.**

Focus group interview guide.

<b>Focus-Group Questions</b>
1. How was the high-intensity resistance training intervention carried out in your facility?
2. Tell me about the aspects of the intervention that were difficult/ simple to implement? <u>Example Probes:</u> Patient identification of appropriateness and safety for the intervention Documentation and communication across the episode of care Applying high-intensity dosing to rehabilitation interventions: facilitating patient performance of interventions to muscle failure Using the menu of options for intervention choices
3. Describe how this intervention was detrimental/ helpful to patients.
4. What were the patient-specific factors that influenced your ability to use the high-intensity resistance training intervention?
5. What are specific day-to-day challenges you encounter in your work? <u>Example Probes:</u> How do these challenges impact how or if the intervention was carried out? What were day-to-day things that made it so you could do the intervention?

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**Table 2.**

Focus group participant characteristics by site.

	SNF-H	SNF-L
<b>Discipline (N)</b>	PT: 1 PTA: 1 OT: 1 COTA: 1 Rehabilitation Director: 1	PT: 2 PTA:5 OT: 0 COTA: 2 Rehabilitation Director: 1
<b>Sex (Frequency, N)</b>	Male: 60% (3) Female: 40% (2)	Male: 10% (1) Female: 90% (9)
<b>Years of Experience (N)</b>	0–5: 0 6–10: 0 11–15: 0 16–20: 2 20+: 3	0–5: 6 6–10: 1 11–15: 1 16–20: 0 20+: 2
<b>Highest Degree Completed (N)</b>	Associate's: 0 Bachelor's: 2 Master's: 3 Doctorate: 0	Associate's: 2 Bachelor's: 5 Master's: 2 Doctorate: 1

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**Table 3.**

Qualitative themes and exemplar quotes by site.

	SNF-H Mean $\pm$ SD		SNF-L Mean $\pm$ SD		t-test P-Value	
	PT	OT	PT	OT	PT	OT
<b>Evidence-Based Practice Attitudes Survey (N)</b>	3.54 $\pm$ 0.18 (4)		3.24 $\pm$ 0.59 (21)		0.04 *	
<b>Observed Treatment Fidelity<sup>†</sup> (# of sessions)</b>	99 $\pm$ 3% (7) <sup>a</sup>	100 $\pm$ 0% (4) <sup>b</sup>	96 $\pm$ 6% (13) <sup>c</sup>	82 $\pm$ 16% (14) <sup>d</sup>	0.21	0.04 *
<b>Documentation Audits:</b> average strengthening (PT) or ADL (OT) progression indicated <sup>†</sup>	50 $\pm$ 48% <sup>a</sup>	33 $\pm$ 46% <sup>e</sup>	16 $\pm$ 29% <sup>f</sup>	3 $\pm$ 7% <sup>g</sup>	0.47	0.05 *
<b>Documentation Audits:</b> average transfers progression indicated <sup>†</sup>	29 $\pm$ 15% <sup>a</sup>	31 $\pm$ 44% <sup>e</sup>	7 $\pm$ 17% <sup>f</sup>	2 $\pm$ 8% <sup>g</sup>	0.38	0.03 *

<sup>†</sup> Mean of the average across therapists

\* Statistically significant at p&lt;0.05

<sup>a</sup> One PTA and one PT<sup>b</sup> One COTA and one OT<sup>c</sup> Six PTAs<sup>d</sup> Seven COTAs<sup>e</sup> One OT and 1 COTA<sup>f</sup> Six PTAs and three PTs<sup>g</sup> Six COTAs and three OTs

Table 4.

Qualitative themes and exemplar quotes by site.

Theme	SNF-H	SNF-L
<b>Theme 1:</b> Reimbursement-driven system hindered practice change whereas a patient-centered system fostered practice change.	“There are times when [the medical team is] ready to send [the patient home] and we go, “Well, wait.” We need another week, another few days to work on these little areas. And I can’t give any times when they’ve said no.” <i>SNF-H1 (PTA, 20+ years of experience)</i>	“Then you fight whatever insurance is saying. Like if some of our patients have a 20-day limit, then what do we do?” <i>SNF-L20 (COTA, 0–5 years of experience)</i>
<b>Theme 2:</b> Discordant team dynamics hindered care practice change whereas positive team dynamics fostered practice change.	“I think we’re close on the team bit, I think we’re willing to listen to anything.” <i>SNF-H4 (COTA, 20+ years of experience)</i> “With the big F word, the fall word, [nursing staff] are so scared. So, it takes a lot more of our push and education for them, which sometimes falls on deaf ears and sometimes doesn’t.” <i>SNF-H1 (PTA, 20+ years of experience)</i>	“But I at least was hearing a lot more like [groaning], you’re going to make me change what I’m doing? I’ve been doing this for a while. And as far as I know, everybody did adapt certain points [of the high-intensity resistance training intervention], maybe some to a greater extent than others.” <i>SNF-L12 (PT, 0–5 years of experience)</i> “If the [patient’s] needs were taken care of [by nursing staff] prior to our arrival, it would make a huge difference in treatment.” <i>SNF-L2 (COTA, 0–5 years of experience)</i> “I feel like if you guys weren’t here, I probably wouldn’t have done [the high-intensity resistance training intervention] as much.” <i>SNF-L5 (PTA, 0–5 years of experience)</i>
<b>Theme 3:</b> Patient and therapist self-efficacy as well as therapist perception of effectiveness impacted practice change.	“It’s part of our program. So, I mean, it’s not like it’s new and difficult anymore. That’s kind of routine. It would seem irresponsible to me to back off of something that you were getting good results with.” <i>SNF-H1 (PTA, 20+ years of experience)</i> “I wouldn’t call it stressful. It’s just the learning mode, you go through the learning process. I think if you’re open to it, it’s not stressful. It’s interesting.” <i>SNF-H2 (PT, 20+ years of experience)</i> “If you start out with the high expectation, like first day initially you work them hard and they just sort of maintain that level.” <i>SNF-H5 (OT, 20+ years of experience)</i>	“I [used to start patients] off with very low weights, so now I have noticed that I don’t start them at one pound. I’ll start them at maybe like a three or four, or something like that. I’ve caught myself doing that a little more.” <i>SNF-L5 (PTA, 0–5 years of experience)</i> “I said productivity was like a barrier to everything [including the high-intensity resistance training intervention], that’s what we think about when we’re here.” <i>SNF-L9 (PTA, 0–5 years of experience)</i> “[The high-intensity resistance training intervention] increased my stress level a little bit.” <i>SNF-L4 (PT, 11–15 years of experience)</i>
<b>Theme 4:</b> Inability to overcome preconceived notions hindered practice change whereas ability to overcome preconceived notions fostered care delivery change.	“And even though they didn’t fit the initial criteria, when you’re looking for the actual research project, yeah, they’re benefitting from it. And I think now, after it becomes ingrained, you’re not sitting there mechanically thinking about, well, should I do this or that. You just think, ‘hey, I could use this part.’ It could be applicable to their rehab process.” <i>SNF-H2 (PT, 20+ years of experience)</i>	“The ones [with low cognition] who are hard to get to do therapy to begin with, and then trying to push them even harder, and then you try to explain it to them in a way they can understand. I felt like that was definitely a big struggle, ‘cause they’re like, ‘I don’t want to do it, and you’re gonna add more.’” <i>SNF-L5 (PTA, 0–5 years of experience)</i>