

# **Increasing the impact of intradialytic exercise interventions: a qualitative study of a clinical trial**

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**Running title:** Exercise in the unit: a qualitative study

## **Index words**

Hemodialysis; end-stage renal disease (ESRD); exercise; quality of life; qualitative research; implementation; transferability

**Abstract: 282**

**Body: 3,343**

## **Abstract**

**Background:** Randomized controlled trials (RCTs) show that regular exercise is beneficial for hemodialysis patients. Intradialytic exercise (IDE) may have additional benefits, such as amelioration of treatment-related symptoms. However, the factors that influence the implementation of IDE are largely unknown.

**Design, setting, participants, & measurements:** Individual, semi-structured interviews were conducted with a purposive sample of hemodialysis patients who participated in a pilot RCT on IDE and with dialysis staff that worked in the unit during the trial. Interview coding followed an inductive and broad-based approach. Thematic analysis was used to group codes into common themes, first individually and then across staff and patient interviews.

**Results:** Twenty-five patients and 11 staff were interviewed. Three themes common to both groups emerged: support, norms (expected practices) within the dialysis unit, and the role of the dialysis nurse. The support of the kinesiologist enhanced patients' confidence and sense of capability and was a key component of implementation. However, the practice of initiating exercise at the start of the shift was a barrier to staff participation. Staff focused on the technical aspects of their role in IDE while patients viewed encouragement and assistance with IDE as the staff's role. An additional theme of "no time" (for staff to participate in IDE) was influenced by its low priority in their workflow the demands of the unit. The staff's emphasis on patients setting-up their own equipment and enhanced social interaction among participants were additional themes that conveyed the unintended consequences of the intervention.

**Conclusions:** The kinesiologist-patient interactions and staff readiness for IDE were important factors in the implementation of IDE. Understanding how unit workflow and the personal values of staff can influence implementation may improve the design of IDE interventions.

## Introduction

Hemodialysis (HD) treatment is characterized by markedly low quality of life (QoL), with scores comparable to people with metastatic cancer.<sup>1</sup> The association between QoL scores, mortality and hospitalization has been shown in diverse populations with ESRD,<sup>2-4</sup> and finding effective therapies to reduce the physical, social, and psychological impact of kidney disease is a top research priority for people with end-stage renal disease (ESRD).<sup>5</sup>

Randomized controlled trials (RCTs) in people with kidney disease show that regular exercise can improve aspects of QoL<sup>6-8</sup> by targeting the domain most negatively affected in ESRD—physical functioning.<sup>9</sup> In addition, exercise prescribed during dialysis (intradialytic exercise, IDE) may ameliorate treatment-related symptoms (such as restless legs),<sup>10</sup> improve patients' experience of the dialysis treatment<sup>11</sup> and is regarded as safe.<sup>12</sup> Given the paucity of other interventions shown to improve QoL in this population,<sup>13</sup> it is unclear why IDE remains underutilized.

Previous qualitative studies in people with ESRD have identified post-HD fatigue and low motivation<sup>14,15</sup> as patient barriers to exercise participation. However, few studies have explored the perspectives of dialysis staff<sup>15,16</sup> or the contextual factors that may influence IDE uptake.<sup>17</sup> Understanding the perspectives of both those delivering and receiving IDE can improve the design and implementation of interventions.<sup>18</sup> In addition, the context of IDE implementation is complex with variable resources, expertise, and organizational readiness for IDE; therefore, what may facilitate implementation in one setting may not work in another. To develop more effective IDE interventions, more detailed information is needed on the intervention, the context of the dialysis unit, and the interaction between these factors<sup>19</sup>. These aspects of IDE may be difficult to identify with quantitative methods alone.

In this qualitative interpretive descriptive study, we conducted interviews with participants of a pilot RCT on IDE and the dialysis staff that worked in the unit during the trial. The overarching aim was to describe perceptions of IDE, and specifically its key components and unintended consequences. Key components are those aspects of the intervention beyond the exercise itself that are critical to enhancing effectiveness.<sup>20</sup> To determine whether aspects of the IDE intervention required adjustment prior to scaling up,<sup>21</sup> we also aimed to understand the unintended consequences, (positive or negative) of implementing IDE.

## **Materials and methods**

### *Design and Setting*

This qualitative interpretive descriptive study was carried-out in three phases coinciding with a single-center, pilot RCT (registration number NCT02234232). The primary aim of the RCT was to evaluate the feasibility of two types of IDE, cycling and weights, each compared to control. The setting was a satellite outpatient dialysis unit servicing approximately 110 patients and employing 35 unit staff, in a tertiary hospital in Edmonton, Canada. The interviews were conducted three phases (Figure 1). A kinesiologist supervised the majority of all exercise sessions. Staff were in-serviced on how to assist with exercise equipment set-up and how to complete trial documentation. After the trial, participants could continue IDE with ongoing assistance from the kinesiologist and from staff.

Our methodological approach was interpretive description (ID).<sup>22,23</sup> ID was developed for answering questions in health care, where the aim is to generate recommendations for clinical practice. This approach provides a systematic and inductive framework for identifying common

patterns from a range of individual experiences and aims to explain these patterns in the relevant social context.

### *Participants*

Participants were purposively selected from those most impacted by IDE: renal program administration, patients in the study unit, trial participants, and dialysis staff. This manuscript presents findings from interviews with staff and trial participants (phases two and three). Staff were eligible to participate if the IDE intervention affected their workflow (RN, LPN, technician, service worker) and if they had worked in the unit during the trial. This study was conducted in a satellite dialysis unit where nephrologists are not generally present, and therefore nephrologists were not interviewed. All trial participants were eligible to participate if they were capable of sharing their experiences. After trial participation was complete, patients were approached for interviews by an investigator (ST); participation was voluntary. The Health Research Ethics Board at the University of Alberta approved this study and all participants gave informed consent.

### *Data collection*

Dialysis staff participants were interviewed by telephone by an experienced qualitative researcher who was not involved with the trial. Staff interviews lasted 10-20 minutes. Patient interviews took place either face-to-face at the hospital site or by telephone, according to individual preference. Patient interviews ranged from 15 to 45 minutes and were conducted by ST, who had established a relationship with the participants during the trial. The interviews followed a semi-structured format (Appendix Table1). All interviews were audio recorded and

professionally transcribed verbatim. The content of the audio recordings was verified with the transcripts. Field notes were made after each interview.

### *Data analysis*

Data collection and analysis were conducted concurrently so that new concepts could be explored in the remaining interviews. ST is a nephrologist who was not involved in the clinical care of the patient participants. ST's orientation to the dialysis unit's social structure and culture provided understanding of contextual factors.

ST independently coded the interviews using a broad-based coding scheme (open coding). Codes were revised and reviewed for each individual interview and then grouped into common themes. Themes were then compared across staff and patient interviews, with discussion of emerging relationships and categories between ST and AM. Codes were annotated to show the inductive reasoning process. To confirm that the beginning conceptualizations were consistent with participants' experiences, preliminary themes were distributed to the participants (separately for staff and patient participants). Several of the staff and approximately half of the patients responded and agreed with our thematic conceptualizations were consistent with their experiences. Theoretical saturation was reached for patient and staff interviews.

## **Results**

We interviewed 11 staff in phase 2, and 25 of the 31 trial participants in phase three (Figure 1). Staffs' ages ranged from 28 to 54 years (mean 41, SD 10). Staff were primarily Caucasian women and registered nurses (table 1). Patients' ages ranged from 33 to 83 years (mean 59, SD

14). Patient participants were predominantly Caucasian males; 88% had hypertension, 52% had diabetes.

### Interview themes and subthemes

Three main themes were common to staff and patient interviews: support; the role of the dialysis nurse; and norms within the unit. “No time” (to support IDE) and patients getting their own exercise equipment were unique themes in the staff interviews. Social interaction was an additional theme from the patient interviews. Themes with associated subthemes and exemplar quotes are shown in Tables 2-7.

### **Support**

Based on hearing the benefits of IDE from their patients, staff agreed that the exercise program was valuable for patients (Q1). However, systemic factors may have influenced staff perspectives of IDE. Changes to staffing ratios on the unit were announced to take effect in several months, unrelated to IDE per se but coinciding with the start of the clinical exercise program. The knowledge that staffing was going to be “*cut back*” conveyed a lack of support from management (Q2). Several staff expressed uncertainty about why these changes were necessary and expressed concern over how workflow in the unit might be affected (Q3). One staff suggested that these upcoming changes could be detrimental to patient care overall and expressed doubt in their capacity to consistently participate in IDE delivery (Q4).

Participants identified the staff and the kinesiologist as the main sources of support during the study. Several patients expressed that the staff had encouraged their participation in IDE and this was typically conveyed through simple words of encouragement (Q5, 6). One participant could



not define how support had been conveyed to her but expressed that the staff's reaction to IDE had imparted in her a sense of esteem (Q7).

It was more common however, for patients to comment on the inconsistency of the staff's involvement. Many participants described a lack of support in the form of inconsistent help with the exercise equipment (Q8); several participants attributed this variability to the nurse (rather than situational factors) (Q9). For some patients, the staff were perceived as inaccessible for help (Q10). Another participant expressed frustration with the staff's lack of accountability and explained that asking for equipment from particular staff members was such a "*struggle*" that he did not participate in IDE when those staff were working (Q11).

Patients commonly viewed the kinesiologist as the primary source of support for IDE. Some participants perceived support from the kinesiologist in the form of her technical instruction and expressed their trust in her expertise and knowledge (Q12). Yet, for most patients, the kinesiologist's technical instruction was interpreted as having emotional meaning. Patients expressed that they gained confidence in their physical capabilities from training with the kinesiologist. The caring and esteem conveyed in the technical actions of the exercise specialist functioned to enhance patients' body confidence, sense of capability, and feeling like an individual (Q13-15).

### **The role of the dialysis nurse**

Although staff recognized the benefits of IDE, staff commonly expressed that assisting with IDE was not a nursing responsibility. One staff member indicated that it was the exercise (rather than assisting with a study) that was inconsistent with their role (Q16). Another staff member explained that tasks, such as IDE, were simply left to them by default (Q17). Although staff did

not express safety concerns with IDE; one staff member expressed concern as to whether patients were *'doing it [the exercises] right'* and expressed that staff could not monitor this (Q18).

Staff frequently described their involvement in IDE in technical and procedural terms (getting equipment, documentation) and their role in encouraging patients was not commonly discussed. In the single interview where encouragement was discussed, the staff member commented that patients would find the encouragement to exercise more effective if it came from a physician, suggesting that some staff may not appreciate their role in patients' decision to exercise (Q19). Staff's understanding of IDE could have also influenced their interaction with patients. Several staff were surprised that the elderly patients had the physical capacity to perform and enjoy IDE—while other patients that were perceived as more suitable, were not interested (Q20). One staff member expressed that many patients in the unit were too immobile and sick to participate in IDE (Q21).

As patients commonly viewed IDE as beneficial (data not shown), many expressed that staff involvement in IDE was consistent with their role as carer and advocate (Q22). Patients described the staff's role in defined terms: providing encouragement and assistance with the equipment (Q22, 23). Most patients were aware that the staff did not see provision of IDE as their role but as *"extra work;"* however, many patients believed that staff participation in IDE was feasible (Q23, 24). One patient expressed resignation about the situation as he viewed systemic factors as a limitation to their involvement (Q25) while other patients viewed staff involvement as nurse dependent (Q26). Several patients viewed the more physically active staff as more interested in participating in IDE (Q27).

### **Norms within the dialysis unit**

Many of the staff expected that prior to asking for help with IDE, patients would wait until the dialysis-related tasks at the start of the shift were complete (Q28). Several staff expressed initiating IDE at the start of the shift was challenging and some staff expressed frustration about how to effectively communicate with patients about the timing of exercise during the dialysis treatment (Q29, 30). One staff member indicated that negotiating aspects of HD delivery with patients was a pre-existing issue suggesting that IDE may have been viewed as an additional source of pressure (Q31).

Patients described aspects of the unit's social structure that were barriers to receiving assistance from staff with IDE. Some participants were concerned that asking for help with IDE would disrupt the "*routine*" of the dialysis unit (Q32). The existing processes for obtaining help from staff (ringing the bell) was viewed as inappropriate for IDE (Q33). One patient expressed concern that using the bell for help with exercise could have negative consequences for when help was urgently needed. For one patient, not being a "*bother*" by asking for things was important for maintaining the role of the "good patient" (Q34).

### **"No Time"**

Many staff commented that there was "no time" to assist patients with IDE. The expectation that staff had the time to participate may have negatively influenced some staff's attitudes toward IDE (Q35). For some staff "no time" also meant that IDE was a low priority in their workflow and comments that IDE was "*extra work*" were common. One staff member questioned the appropriateness of exercise for the dialysis unit (Q36). One staff attributed their lack of time to the unpredictability of staffing ratios and patient acuity. Staff often expressed that due to the demands of the unit, the situation was irremediable (Q37).

### **Patients getting their own equipment**

There was agreement among dialysis staff that IDE would be more sustainable if patients set up their own exercise equipment (which was located in the unit) prior to commencing treatment.

Although several staff expressed they could help frailer patients with their equipment, other staff commented that this would not be feasible (Q38). Getting one's own equipment was valued from a practical perspective for "*saving [staff] time.*" More commonly however, this task was valued as a sign of the patient taking responsibility for his or her own care (Q39).

### **Social interaction**

Many participants described enhanced social interactions with other IDE participants. Several of the male patients discussed instances where they were competing with other trial participants during IDE. These interactions were perceived as positive and served to promote a sense of camaraderie and normalcy within the unit (Q40, 41). One participant said that IDE was a positive topic for patients outside of the unit and that she thought it had improved others' spirits. (Q42). Another participant explained that IDE fostered a more positive common identity (Q43).

### **Discussion**

Despite the promising results of RCTs, IDE remains underutilized in clinical practice. By identifying the key components and unintended consequences of IDE, we address an important research gap on the transferability of research findings to practice. Our study provides insight into what aspects of IDE enhance its effectiveness and should be maintained when adapted to different contexts.<sup>24</sup> Detecting positive unintended consequences of IDE could increase perceptions of its value. It is also important to identify the negative consequences of IDE prior to scaling it up.

Although the importance of staff and exercise professional support in sustaining an IDE program has been recognized,<sup>25,26</sup> how support functions to enhance the effectiveness of IDE and what may be required from those delivering IDE is unknown. We identified the support of the kinesiologist as a key component of IDE implementation. Functional social support is a multi-dimensional concept that includes emotional support (the communication of empathy and esteem) and instrumental support (the offering of assistance and information).<sup>27</sup> Previous publications have emphasized the technical role of the exercise specialist in IDE,<sup>25,26</sup> consistent with providing instrumental support. However, it was the emotional interpretation of this technical support that appeared critical to enhancing perceptions of the intervention's effectiveness and facilitated high acceptability of IDE. In one study in people with ESRD, higher levels of perceived social support, regardless of domain, predicted improved outcomes, such as QoL.<sup>28</sup> However, consistent with other research,<sup>27</sup> we found that the emotional aspect was the most effective component of social support.

Maintaining norms within the dialysis unit was another key component in IDE delivery and the kinesiologist's practice of initiating exercise at the busiest time of the shift was a barrier to staff participation. Although patients viewed IDE as consistent with the staff's role as carer and advocate, the reluctance of some individuals to ask staff for help suggests that exercise was not an expected aspect of the dialysis treatment. We are aware of one other study<sup>29</sup> where patients perceived IDE as potential burden to staff; however, staff perceptions were not explored.

We found that IDE promoted social interaction among trial participants and functioned to promote camaraderie and normalcy. Given that HD patients rate the quality of their social interactions as low,<sup>30</sup> greater social interaction could be a means of promoting the uptake of IDE. As social interaction with other dialysis patients is a positive aspects of in-center HD,<sup>31</sup> IDE

could improve patient reported outcomes, such as satisfaction with care. For staff, IDE was an opportunity for patients to increase responsibility in their care by getting their own exercise equipment. To what extent this view was grounded in the values of patient self-care, or was simply more about ‘pitching in,’ warrants further exploration. Framing IDE within unit priorities, such as promoting self-care may facilitate IDE uptake whereas an emphasis on pitching in may exclude frailer patients who need more help.

Emphasis on the technical aspects of the dialysis nursing role is not unique to participation in IDE and has been explored in other studies.<sup>32</sup> In one study,<sup>33</sup> the increased workload in the unit and the resistance to take on new roles were factors contributing to their technology-focused care. In our study, staff participants discussed several systemic factors that may have influenced their perception of their role in IDE. First, there was a perceived a lack of support from management—expressed as a lack of adequate staffing. Second, and consistent with findings from other qualitative studies on IDE,<sup>15,34</sup> staff frequently mentioned there was “no time” to assist with IDE. Given the high value placed on ‘busyness’ and doing in acute care nursing,<sup>35</sup> the assumption that the staff could accommodate IDE in their workflow may have negatively influenced its acceptability. The staff’s view that dealing with acute issues superseded their capacity to take a consistent role in IDE also reflects the values of an acute care culture, where what is urgent frequently takes precedence over whatever else may also be important.

Reconciling this acute care mentality with the competing priorities of chronic disease management is particularly germane for in-center HD units.

Consistent with previous research, despite the staff’s perspective that exercise was beneficial for patients,<sup>34,36</sup> there was a lack of readiness for IDE.<sup>34,37</sup> Our results extend these findings by identifying important considerations in the implementation of IDE. First, it is important to

recognize that structure of work and perceived value of tasks is grounded in organizational culture.<sup>38</sup> Therefore, for staff to prioritize IDE, management's support of IDE must be evident to staff. In this context, support could be conveyed to staff by ensuring that adequate time is created in the staff's workflow to accommodate participation in IDE. Second, at the individual level, increasing the staff's knowledge of who can perform and benefit from IDE may improve acceptability. However, prior to implementing formalized education on IDE, it is necessary to increase staff's motivation to engage with IDE. Some patients perceived that the more physically active staff were more involved in IDE, suggesting the role of the nurse in IDE is influenced by personal values about exercise. As exercise is a socially desirable behavior, initiatives that concurrently encourage exercise among staff may promote staff engagement in IDE.

Although the qualitative approach does not aim to generalize results, our findings should be considered in light of our study's limitations. The specific context of the unit, including readiness for IDE, physician and administrator involvement, and organizational culture may influence findings and therefore the transferability of findings to other centers, particularly those with different models of care, may be limited. Second, although it is possible that participants provided socially desirable responses in interviews, the candid responses from participants suggest they were able to speak openly. Third, due to the lack of diversity in the demographics our study population, we did not analyze our findings according to these characteristics.

We identified important areas for future study. It would be useful to explore what characteristics of exercise specialists and the specialist-patient interaction are associated with improved effectiveness of IDE. Our results expand our understanding of the decisional influences on patient participation in IDE beyond individual factors to include those that exist at the contextual

level. Future studies should consider how such contextual factors may affect adherence to IDE, rather than simply attributing poor adherence to lack of patient motivation.



**Acknowledgements:**

This work was supported through Alberta Innovates Health Solutions. The funders had no role in the design, collection, analysis, interpretation, writing or submission of the manuscript.

**Disclosures:**

None.

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Figure 1: Interview participants and timeline. RCT (randomized controlled trial). Phase 3: 25 of the 31 RCT participants participated in interviews.

**Table 1: Characteristics of staff and patient participants**

<b>Dialysis staff (n=11)</b>		<b>Patients (n=25)</b>	
<b>Age, y<sup>1</sup></b>	41.2 (10)	<b>Age, y<sup>1</sup></b>	59.0 (14.4)
<b>Female</b>	10 (91)	<b>Male</b>	19 (76)
<b>Ethnicity</b>	Caucasian=7 (64) Asian=3 (27) Southeast Asian=1 (1)	<b>Ethnicity</b>	Caucasian= 16 (64) Aboriginal=3 (12) Indian= 3 (12) African= 2 (8) Hispanic=1 (4)
<b>Years of experience<sup>1</sup></b>	10.5 (5.8)	<b>Years on hemodialysis<sup>1</sup></b>	3.4 (2.4)
<b>Position</b>	RN=8 (73) LPN=2 (18) Tech=1 (9)	<b>Hypertension</b>	22 (88)
		<b>Diabetes</b>	13 (52)
		<b>Stroke</b>	6 (24)
		<b>Coronary artery disease</b>	2 (7)

<sup>1</sup>Mean (standard deviation), otherwise N (%)

Table 2: Exemplar quotes from staff and patients on the theme of support.

Support	Quote
<p><u>Dialysis staff</u></p> <p><i>Support and recognition of the benefits of IDE</i></p> <p><i>A lack of support from management</i></p> <p><i>Doubt in their capacity to assist with IDE</i></p>	<p><i>“No, I think it’s a really great program and I’ve had a lot of really positive feedback from the patients saying they have better energy levels, that they’re feeling healthier. So I’m very much about implementing the program on a more regular basis for dialysis patients” Q1</i></p> <p><i>“Right now is okay, but the only thing is I think also there is going to be some transitional—we’re going to have some changes on the staffing ratio on our unit, and they’re going to cut back on us, so it’s going to be some time during the day that they’re going to cut back; like, now we have nine staff, and they’re going to cut it back down to six staff...” Q2</i></p> <p><i>“...So I don’t know how well, how much it will be affecting the [exercise] program, is going to be permanent for our patients. Because they don’t want that many—well, management has a reason to cut the staff, but we still have to wait and see what’s going to happen...” Q3</i></p> <p><i>“Well, things are changing for our unit and how the unit is run, so we’re going to be doing, like, different times and team nursing and everything, so we’re not going to have a lot of extra time to be helping patients with this [IDE], and it’s going to—we’re going to be short-staffed—they’re going to take some staff ratios away. So it’s really going to affect us as well as the patients...” Q4</i></p>
<p><u>Patients</u></p> <p><i>Encouragement from dialysis staff</i></p>	<p><i>No, not really, other than the fact that—well, the nurses actually encouraged then [when the study staff were not there]; they were the ones that said, “Go faster _____!” ..So just the encouragement, probably....it was really good; it was helpful.” Q5</i></p> <p><i>“...they were cheering us along—well, really, I can speak for me—they would be cheering me along and giving me compliments and just encouraging me, telling me how well I’m doing, and telling me they see a change in me. “Q6</i></p> <p><i>“I think—I felt that the nurses were impressed; that’s one feeling that I got. I don’t know for sure, but that’s one feeling that I got, that they were impressed that we were doing this.”Q7</i></p>

<p><i>Inconsistent help from dialysis staff</i></p>	<p><i>“I know the nurses don’t like doing it. They don’t ask you and they don’t remind you, “Are you going to do your exercises?” Some do, some don’t.” Q8</i></p> <p><i>“It depends on the nurse you have. Some days it will be problematic [getting help with the equipment], other days, it’ll be just fine. Depends on who your nurse is that day.” Q9</i></p> <p><i>“Well, unless you’re willing to ring the emergency bell and get them to come over just to ask for your exercise equipment, you’re practically waiting for one of them to walk around.” Q10</i></p> <p><i>“Oh, I was totally motivated, but again, it was the struggle of, “Oh, well, you know, I guess maybe I won’t be doing it because I just don’t feel like asking this particular nurse. Then I don’t want to ask, let’s say, [person D], who’s not my nurse, “Can you get it for me?” You know what I mean? ‘Cause the first reaction is, “Well, who’s your nurse? How come you didn’t ask her?” (Q11).</i></p>
<p><i>Increased body confidence and sense of capability through technical instruction</i></p>	<p><i>“She, you know, puts everything on and makes sure that I’m doing it properly. And that’s good, too, because you can hurt yourself if you don’t do it properly.” Q12</i></p> <p><i>“I’m going to continue on my own, because you [the exercise program] already gave me the tools to work with and I already could see what it does to my life and to my personal life, my personal self, my health life—I see what it does for me.” Q13</i></p> <p><i>“She was so encouraging that it makes you want to do it. I found I could do more than I thought I could.” Q14</i></p> <p><i>“She helped me with what level I should go to and what I could handle, and that way, I felt very good about that.” Q15</i></p>



Table 3: Exemplar quotes from staff and patients on the theme of the role of the dialysis nurse

The role of the nurse	Quote
<p>Dialysis staff</p> <p><i>IDE is not the nurse's role</i></p> <p><i>Awareness of their role in IDE</i></p> <p><i>Knowledge about IDE</i></p>	<p><i>“Well, it’s some extra work, to be honest. Yeah. At first, it was kind of—well, we have a couple of studies ongoing, besides the ones that we have to do as a nurse for our patients and then answering alarms.” Q16</i></p> <p><i>“Yeah, pretty much it’s the staff who will be doing it hands-on, like, because I don’t know if they’re [the study staff] going to be here for, let’s say, the whole time for that study or not, it just falls to the nurses who’s also doing the things that they have to do. Know what I mean?” Q17</i></p> <p><i>“So that’s the hard part, I find, like, with patients who don’t know as well as others know, what they have to do. I think we have to do some minor adjustments on the bikes; seems to be a little bit more tension, just a little bit less tension, that’s something it’s quickly, we can do that and walk away; they’ll carry on with whatever they are doing. But some patients, like I said, who are not—I can’t say with it, but not as comfortable maybe doing the exercises as others, it’s a little harder to—for us to monitor whatever they do is proper. I don’t know, it’s maybe they need a bit more education or its maybe they are not good people for the study.” Q18</i></p> <p><i>“No. I think it’s just who it comes from is definitely the importance. They tend to put a lot of trust in the doctors, so I believe if it [encouragement] comes from a doctor, then it would affect their thinking a little bit more than if it was to come from a nurse or somebody that does exercise and is promoting the exercise. I think if it came from a doctor, the importance of it, then it probably would be more important to them.” Q19</i></p> <p><i>“Yeah. It’s actually pretty surprising. Some patients that you wouldn’t think would have the stamina really enjoyed it and really did the bike for, like, 45 minutes.” ... and some patients you would think that would appreciate doing it didn’t want to become involved.” ....some of the patients, like, in their 70s, 80s, really enjoyed it.” Q20</i></p> <p><i>“I think they’re [study staff] limited to the number of patients that they have on there, just because of our patients—the patients that we have there...their mobility is decreased already, they’re sick.” Q21</i></p>

Patients

*IDE is the nurse's role*

*"But I was also kind of disappointed that they weren't more enthusiastic about having the patients maybe do a task, enjoy their task, occupy their time more, and to have a benefit to the patient... That's what—that kind of wasn't—didn't sit well with me necessarily, that that they should be willing to do everything for the patient..." Q22*

*"I mean, even if I'm done my leg exercises and I'm sitting there with 5 pounds of weight on each ankle, I still need someone to undo that, get the bike, get it set up and ready to go for the next thing. And you're busy or [person A]'s busy—whoever's there—so the nurses could handle that job quite easily." Q23*

*"It's one more job for them. I've heard from other nurses that, "Oh, this is—why do we have to do this?" Q24*

*"I think that they should realize that exercise is important for us people, and that they should maybe show a little more enthusiasm towards us doing some exercise. But I know that they're overworked and understaffed, so what can you say?" Q25*

*The influence of personal values about exercise*

*"It depends on the nurse you have. Some days, it'll be problematic, other days, it'll be just fine. Depends on who is your nurse that day." Q26*

*"...she [the nurse] would stop and chat about the stuff and she'd get a rubber band and do some exercises, too... You know, because she exercises a lot herself, right?" Q27*

Table 4: Exemplar quotes from staff and patients on the theme of norms in the dialysis unit

Norms within the dialysis unit	Quote
<p><u>Dialysis staff</u></p> <p><u>Knowing to wait</u></p> <p><u>IDE as an additional source of pressure</u></p>	<p><i>“Oh, it [IDE] hasn’t been bad at all. As long as the patients are understanding that I can’t do it, like, right now, ‘cause I still have somebody else to put on, and most of them were pretty good about that.”Q28</i></p> <p><i>“..But for us, sometimes we still have other patients to take care of, put patients on, and so sometimes we don’t get there until an hour or even 2 hours later.”Q29</i></p> <p><i>“They’re quite—they have quite negative comments if we can’t get to them in the time that they want. So unfortunately then the discussion of “Well, there is only two hands,” blah blah blah blah. So that’s a bit of the unfortunate thing.”Q30</i></p> <p><i>“Well, we have 18 patients and sometimes our patients are late or we’re short-staffed, and we have patients that are quite demanding; they’re, like, “We have to do it now.” And we know they don’t, but sometimes it’s just hard, you just don’t want to argue with your patients.”Q31</i></p>
<p><u>Patients</u></p> <p><u>Keeping the routine</u></p> <p><u>Don’t be a bother</u></p>	<p><i>“...if we want something to do with the equipment, we would have to push the red button, which somebody up front’s got to answer the red button, and it disturbs—then it would disturb everybody’s routine.”Q32</i></p> <p><i>“They’re never just convenient to wave down. You know, you’ve got to ring your bell, and then if you start ringing your bell for frivolous things, then they start ignoring you later when you really need them to come when you ring the bell.”Q33</i></p> <p><i>“I don’t like asking them for anything. I’m just not that kind of person. I’ve never asked for help in my whole life. I’m just a person that goes and do stuff. But I suppose I could. I mean, like, when I want my cup of tea, I usually wait until one of them will come, and then I’ll ask—although this morning, I didn’t; I had to call them. But I don’t like to bother them, because they’re busy, and so I try and bother them as little as possible, and I think they appreciate that.”Q34</i></p>

Table 5: Exemplar quotes from staff on the theme of “no time” to assist with IDE

<p>“No time” to assist with IDE</p>	<p>Quotes</p>
<p><i>IDE as a low priority</i></p>    <p><i>High demands on the unit</i></p>	<p><i>“I do know before the actual program started, I believe there was talk of the nurses taking on the role, and I don’t know if that was true... a lot of the nurses were not impressed, and they discussed that, that there’s just not time for that.” Q35</i></p> <p><i>“[Do the exercise] Before they start dialysis, because it really is, like, here sometimes we have people come late or whatever, we’re busy, because something is seriously wrong with one of the patients, you just don’t have time; actually, you just don’t have time to do it. There’s already stuff that we’re supposed to do that we don’t have time to do.” Q36</i></p> <p><i>“No, because even though if we are so-called satellite unit, people sometimes they feel sick and then they couldn’t do it and then we are busy, then we couldn’t help out with having the exercise done, and then we just have to leave it for [the kinesiologist] to come. If they don’t come that day, they just have to skip the exercise. Yeah, ‘cause, still, that is not the priority, is to help our patient’s safety, right? If they don’t feel good and some other emergency—that we have to deal with an emergency instead of helping them out with the exercise.” Q37</i></p>

Table 6: Exemplar quotes from staff on the theme of patients getting their own equipment

Patients getting their own equipment	Quotes
<p><i>What is practical for staff to do</i></p> <p><i>Patients should take responsibility</i></p>	<p><i>“Well, my thing is not that I would not want patients to not do the exercise program, but again, if they were going to be taking away the kinesiologist and they would want to just implement the program in general, I would really cater it more to the independent patient that could grab their supplies for themselves and record their own blood pressures and things like that for further study, versus that being the nurse’s job, because sometimes if there’s an acute situation, again, the patients are stuck in the chair and there’s nothing they can do, but whereas if they come in and got their own supplies, there are still things that they can do, regardless of whether the nurse is there.” Q38</i></p> <p><i>“Good patient education. I think that that would be number one [for the sustainability of the program], is really strong patient education, that they are doing this for their benefit, that this is what benefits them, and that they are responsible to at least make an effort in getting their own supplies, like the weights or the bikes, and if they need help, to ask us. But I think number one is it’s just so key that it’s patient education, that they understand it’s their responsibility.” Q39</i></p>

Table 7: Exemplar quotes from patients on the theme of social interaction

Social interaction	Quotes
<p><i>Camaraderie and normalcy in the unit</i></p> <p><i>Fostering a positive common identity</i></p>	<p><i>“Yeah, it’s positive. And especially guys, guys enjoy that. If you’ve been around guys, sports guys and things like that, that’s the thing to do. And it makes the dialysis environment a lot more pleasant...There’s more excuse now to yell across the room.” Q40</i></p> <p><i>“I’ll raise the bar. Maybe somebody else will want to—when I was cycling the other day there, my neighbour, he said, “Maybe I should have a race with you.” I says, “Well, bring it on, bring it on.” Q41</i></p> <p><i>“Like, we’re really, really close, we’re kind of like a little family, and we’re all down—like, we all meet downstairs...they would say things as, “Oh”—they liked it [IDE], they really looked forward to it, they looked forward to it when they come here. One of them down there, he—I asked him if he was going to continue once the program was done, and—but I just found him to be a little—I thought he was maybe a little older, a little tired, but no, he was—he says he notices how even his spirits—and even when we go downstairs, like, he’s just all chirpy and happy about it” Q42</i></p> <p><i>“Like, you can ask us dialysis patients when we’re sitting waiting around for each other or when we’re dialyzing beside one another, it’s just something—another exciting thing that, yes, we have dialysis in common, but now this is a positive thing we have in common that we can talk to each other about and encourage each other with.” Q43</i></p>

**Appendix Table 1: Semi-structured interview questions for dialysis staff and trial participants.**

