VIRTUAL REALITY EXERCISE DURING HEMODIALYSIS TO IMPROVE HEALTH-RELATED QUALITY OF LIFE: RANDOMIZED CONTROLLED TRIAL

Segura-Ortí E, Martínez-Olmos FJ, Ortega-Pérez de Villar L, Gómez-Conesa A, Amer-Cuenca JJ, Valtueña-Gimeno N, Meléndez-Oliva E, Martínez-Gramage J, Garcia- Testal A, Montañez-Aguilera FJ, Arguisuelas-Martínez MD, Benavent-Caballer V, Salvador-Coloma P, Ferrer-Sargues FJ, Biviá-Roig G, Ferrer-Salvá A, Gil-Gómez JA

EDTNA-ERCA Spring Virtual Seminar
23-24 April 2021

INTRODUCTION

- CKD *per se* affects patients' HRQoL, association between severity of CKD and HRQoL
- Low HRQoL associated with frequent hospitalization and decreased survival.
- HRQoL, important OUTCOME in CKD

Segura-Ortí et al. 2021

REVIEW

Anabolic Effect of Exercise Training in People with End-Stage Renal Disease on Hemodialysis: A Systematic Review with Meta-analysis

Anuradha Sawant, PT PhD (c);*† Andrew A. House, MD;‡ Tom J. Overend, PT, PhD§

Review Article

Physical Exercise and Patients with Chronic Renal Failure: A Meta-Analysis

Zhenzhen Qiu,[1] Kai Zheng,[2] Haoxiang Zhang,[3] Ji Feng,[4] Lizhi Wang,[5] and Hao Zhou[6]

Nephrology

Patient-Oriented, Translational Research: Revie

Am J Nephrol 2019;50:240–254
DOI: 10.1159/000502447

Exercise Training and Outcomes in Hemodialysis Patients: Systematic Review and Meta-Analysis

Mei Huang[a] Aili Lv[a] Jing Wang[a] Na Xu[a] Gairong Ma[a] Zhonghui Zhai[a] Bin Zhang[a] Julin Gao[b] Chunping Ni[c]

KI REPORTS
KIReports.org
CLINICAL RESEARCH

Exercise Training in Elderly People Undergoing Hemodialysis: A Systematic Review and Meta-analysis

Ryota Matsuzawa[1], Keika Hoshi[2], Kei Yoneki[3], Manae Harada[3], Takaaki Watanabe[3], Takahiro Shimoda[3], Shuhei Yamamoto[4] and Atsuhiko Matsunaga[3]

KARGER

Virtual Reality for RHB

Received: 15 May 2018 | Revised: 8 August 2018 | Accepted: 14 September 2018
DOI: 10.1111/sms.13304

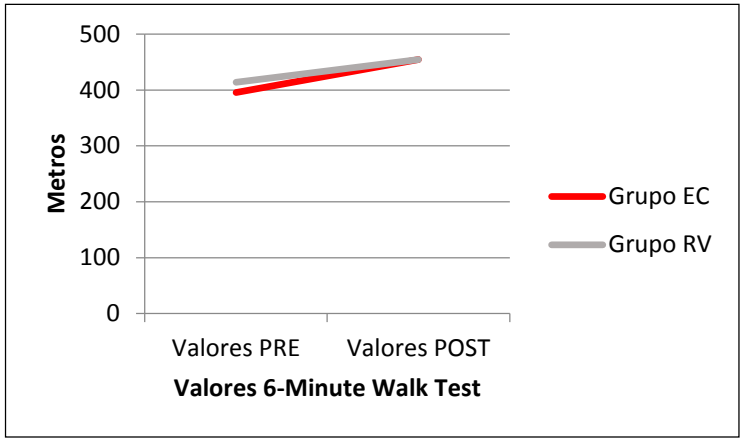
ORIGINAL ARTICLE

WILEY

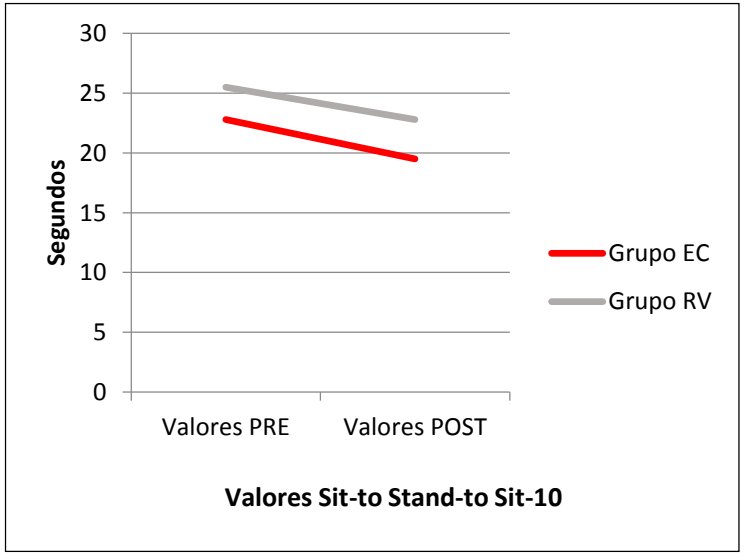
Virtual reality exercise intradialysis to improve physical function: A feasibility randomized trial

Eva Segura-Ortí[1] | Borja Pérez-Domínguez[1] | Lucía Ortega-Pérez de Villar[1] | Erika Meléndez-Oliva[1] | Javier Martínez-Gramage[1] | Rafael García-Maset[2] | José Antonio Gil-Gómez[3]

6-Minute Walk Test (6MWT)



Sit-to Stand-to Sit 10 (STS-10)

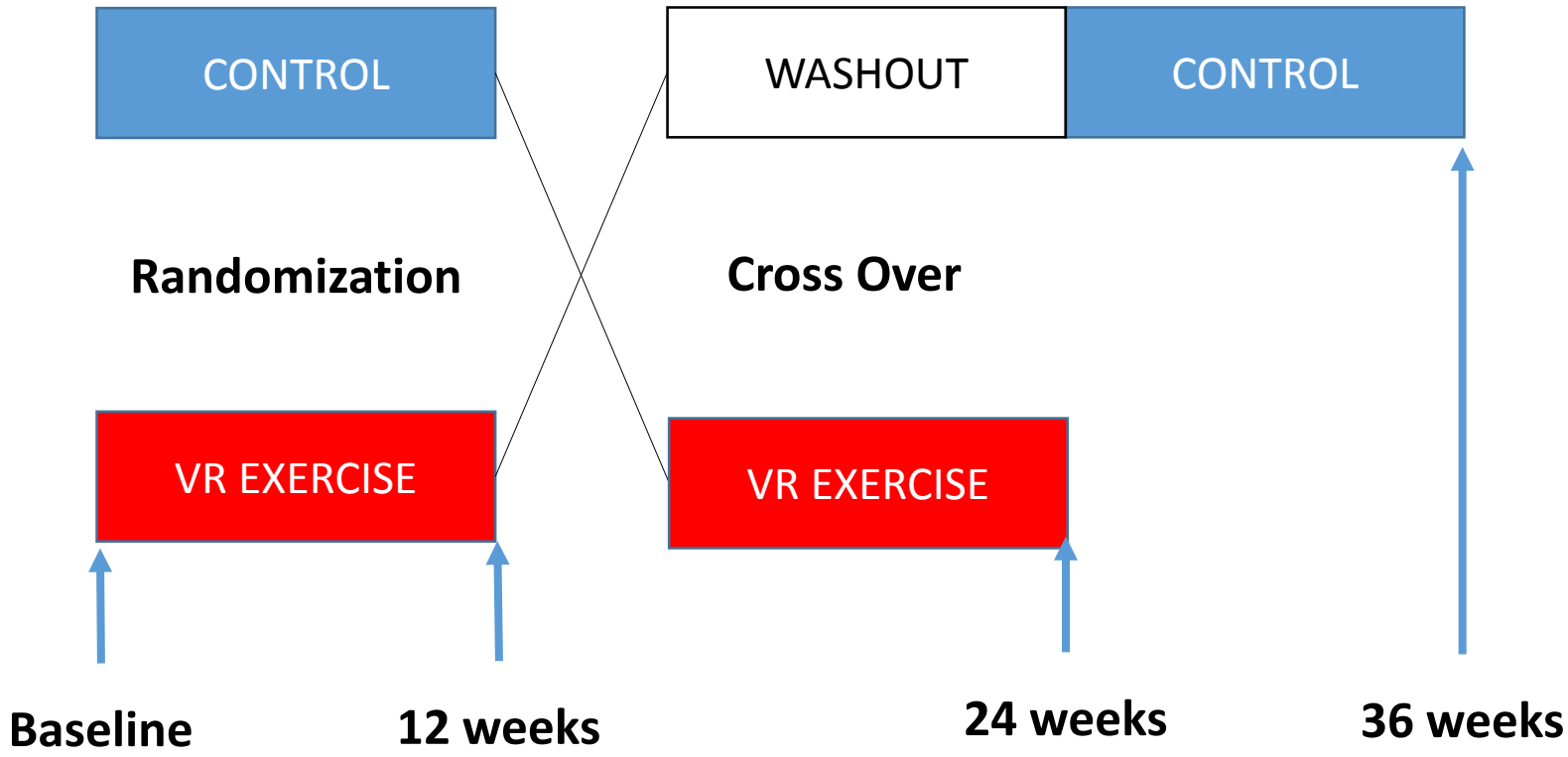


- PRIMARY AIM to investigate if a 12-weeks non-immersive Virtual Reality exercise program intradialysis improves health-related quality of life (HRQoL)

HIPOTHESIS

A Virtual reality exercise program will result in improvement in HRQoL.

Randomized crossover dessign



Cuestionario de Salud SF-36

Nombre_____

_____

Fecha de registro_____

Instrucciones y normas de aplicación:

Las siguientes preguntas se refieren a lo que usted piensa sobre su salud. Sus respuestas permitirán saber cómo se encuentra usted y hasta qué punto es capaz de hacer sus actividades habituales de la vida diaria.

Conteste cada pregunta tal como se indica, ajustándose a las posibles respuestas. Si no está seguro de cómo responder a una pregunta, por favor conteste lo que le parezca más cierto.

Interpretación:

Transformar la puntuación a escala 0 a 100 (siendo lo mejor 100)

Por ejemplo, pregunta de 3 categorías se puntúa: 0 – 50 – 100; con 5 categorías se puntúa: 0 – 25 – 50 – 75 – 100; con 6 categorías se puntúa: 0 – 20 – 40 – 60 – 80 – 100.

Luego, las puntuaciones de los ítems de la misma dimensión se promedian y se crea una puntuación para cada dimensión.

Dimensiones:

-**Función Física** (10 ítems) 3, 4, 5, 6, 7, 8, 9, 10, 11,12.

-**Rol Físico** (4 ítems) 13, 14, 15,16.

-**Dolor Corporal** (2 ítems) 21, 22.

-**Salud General** (5 ítems) 1, 33, 34, 35, 36.

-**Vitalidad** (4 ítems) 23, 27, 29, 31.

-**Función Social** (2 ítems) 20, 32.

-**Rol Emocional** (3 ítems) 17, 18, 19.

-**Salud Mental** (5 ítems) 24, 25, 26, 28, 30.

-**Transición de Salud** (1) 2.

Health-related quality of life HRQoL

SF-36. *Physical Functioning*

SF-36. *Role Physical*

SF-36. *Bodily Pain*

SF-36. *General Health*

SF-36. *Vitality*

SF-36. *Social Functioning*

SF-36. *Role Emotional*

SF-36. *Mental Health*

SF-36. *Physical Component Scale*

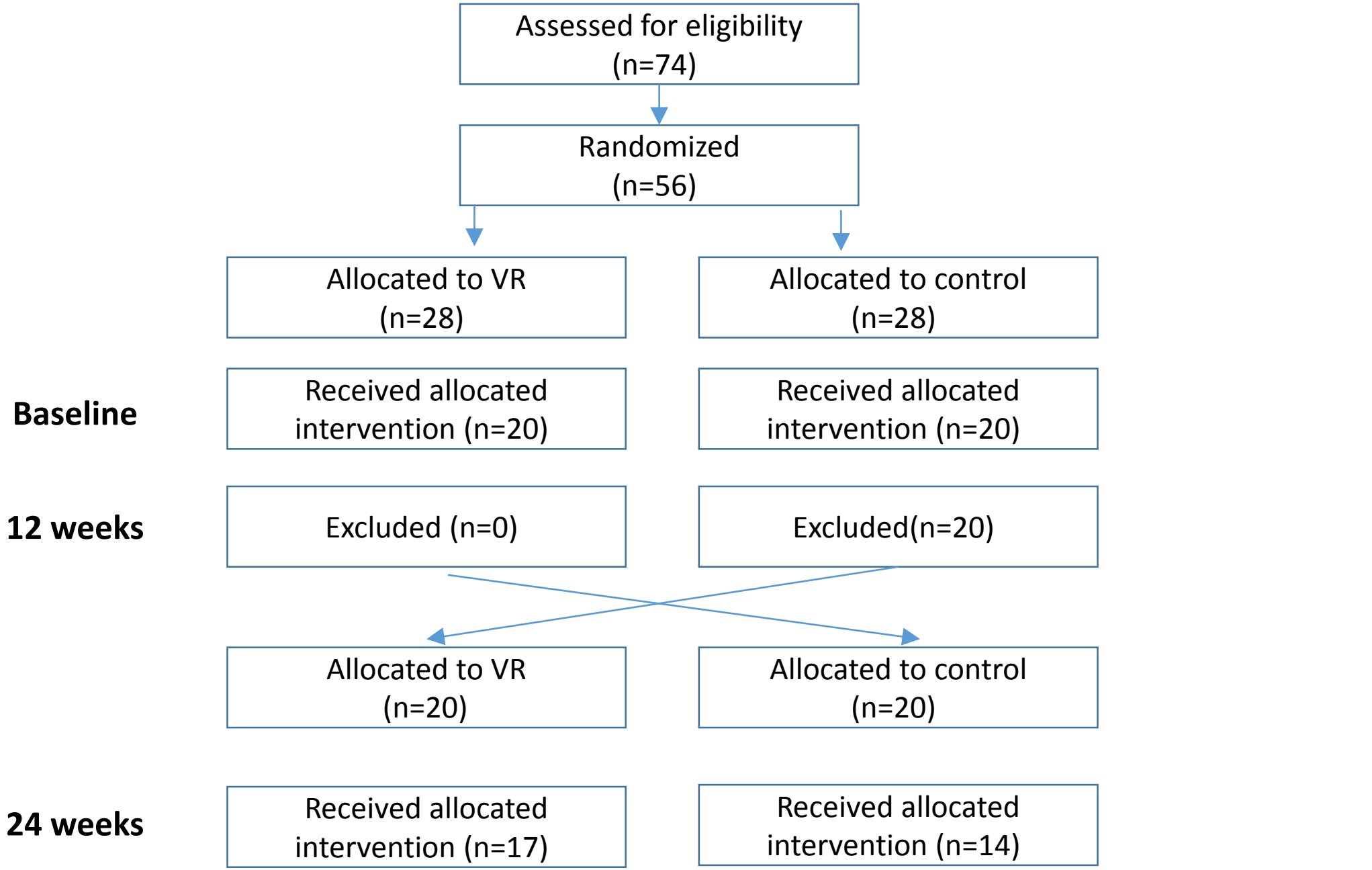
SF-36. *Mental Component Scale*

METHODS Exercise program

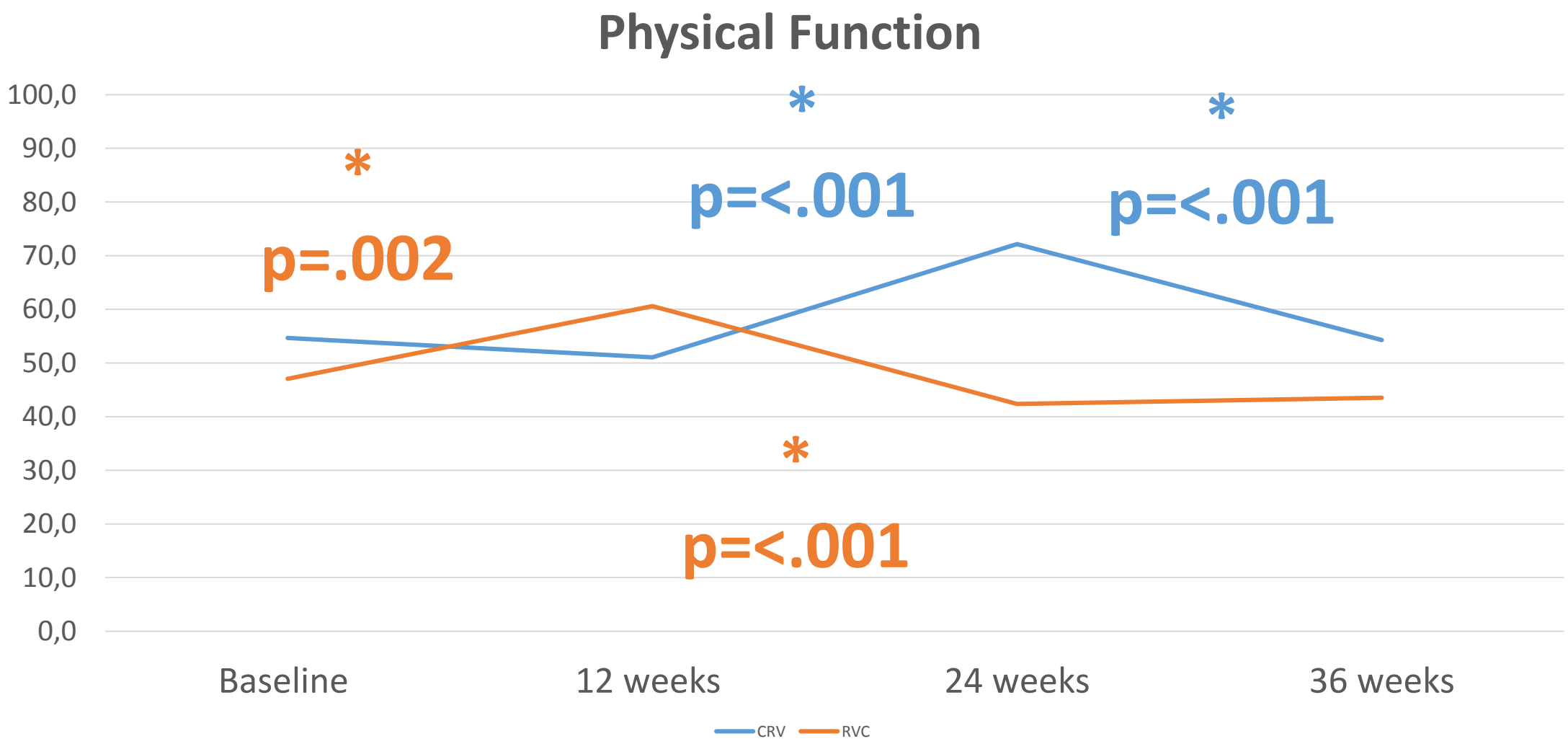
- Non-immersive VR game adapted to dialysis:
  - Treasure Hunting (TH)
  - The patient must catch some objectives avoiding obstacles by moving the lower limbs

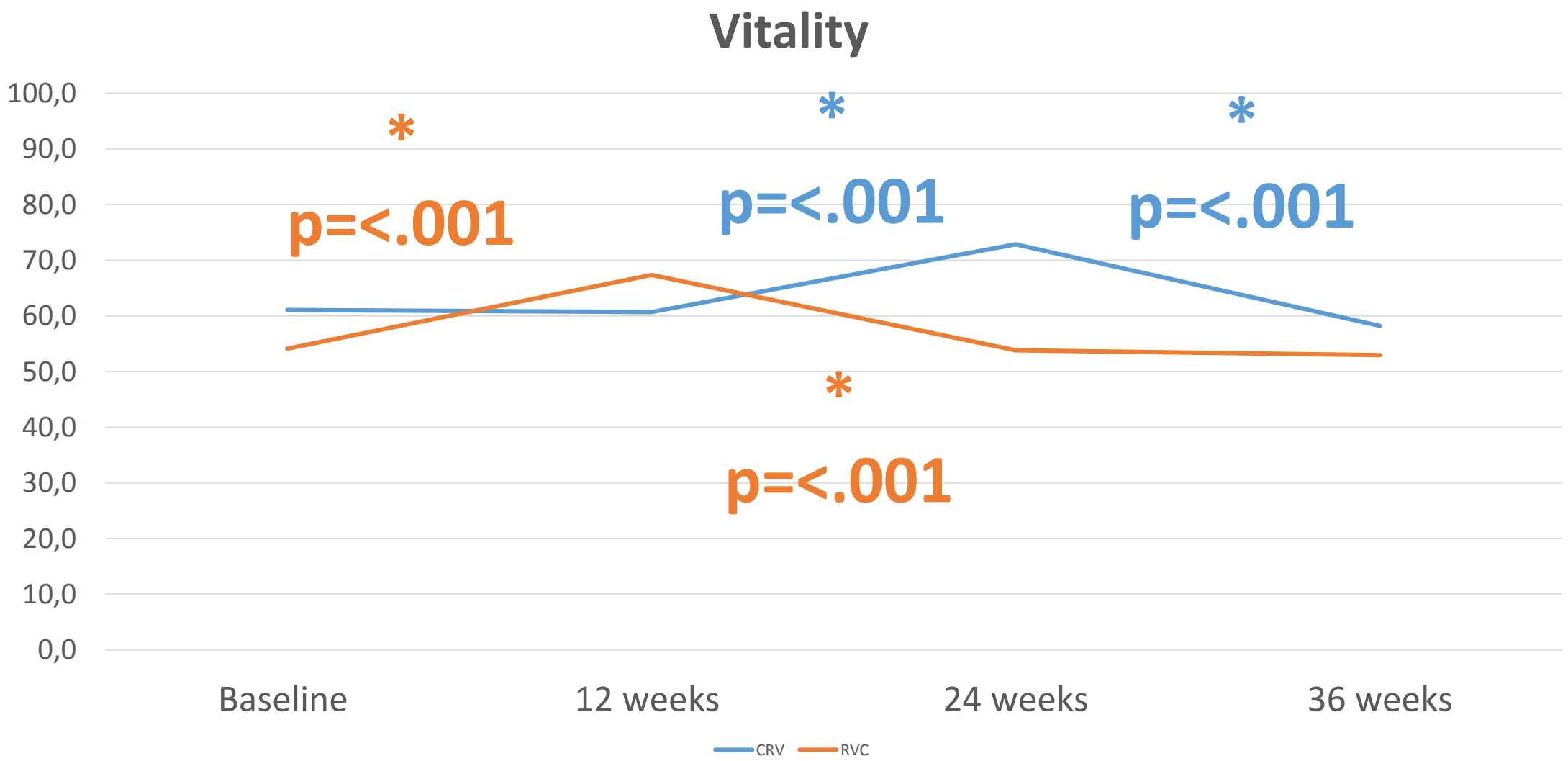
- Total exercise time progression
  - 3 to 42 minuntes
  - Number of subsets (1 to 6)
  - Time per subset (3 to 6 min)
  - Rest between subsets (1 min)
- Rate of perceived exertion 12 to 15

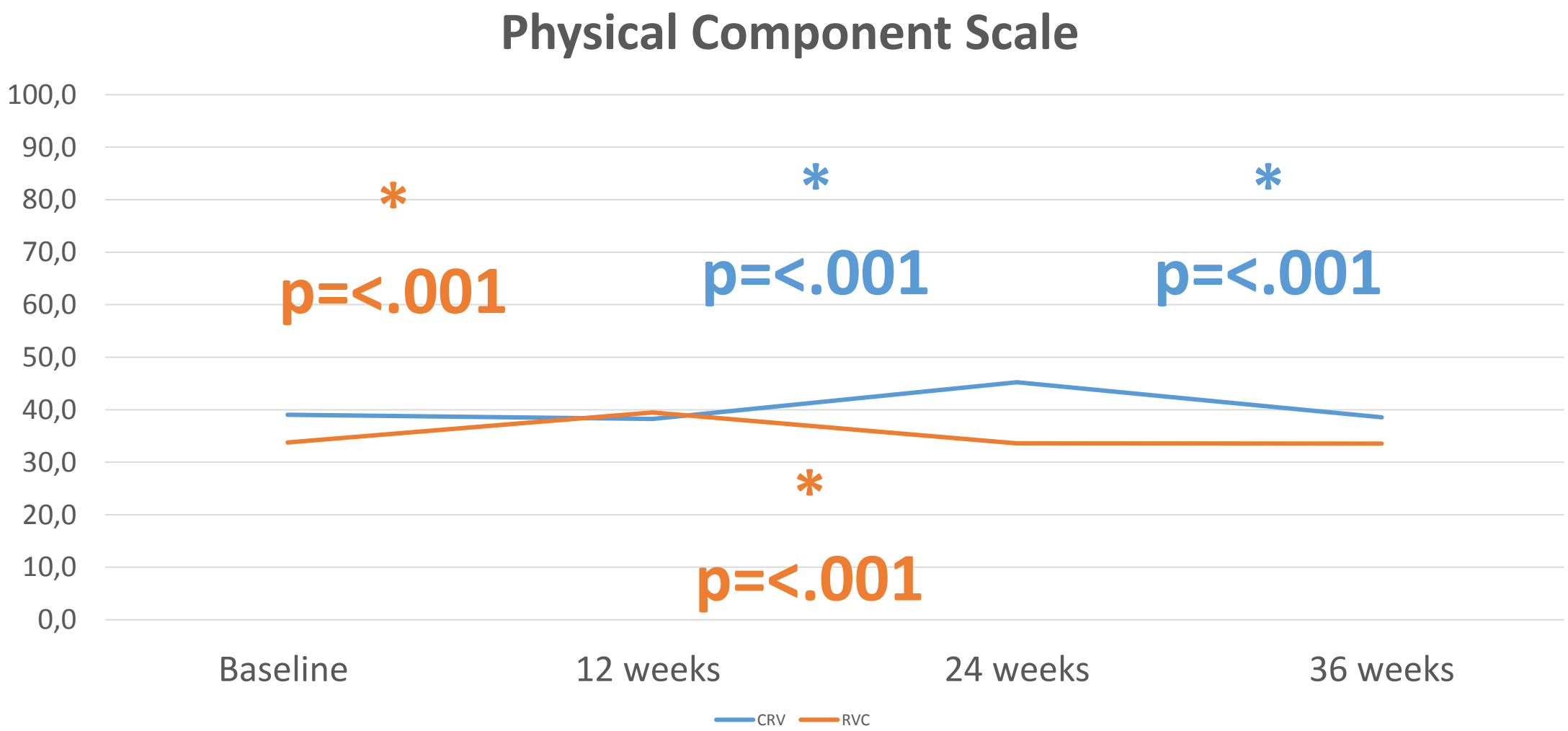
RESULTS Flow chart



	RVC (N=17) Median (min-max)	CRV (N=14) Median (min-max)
Age (years) Median	72 (48-85)	75 (41-83)
Men/Women	10/7	9/5
Body Mass Index (Kg/m2)	24.8 (20.3-41.0)	27.2 (21.3-36.0)
Albumine (mg/dL)	3.9 (3.3-4.3)	3.8 (3.3-4.3)
Hemoglobine (g/dL)	12.2 (9.3-13.4)	11.1 (8.5-13)
Charlson Index	6 (2-12)	7.5 (1-12)


Physical Function
100,0
90,0
80,0
70,0
60,0
50,0
40,0
30,0
20,0
10,0
0,0
*
p=.002
*
p=<.001
*
p=<.001
*
p=<.001
Baseline
12 weeks
24 weeks
36 weeks
CRV
RVC


Vitality
100,0
90,0
80,0
70,0
60,0
50,0
40,0
30,0
20,0
10,0
0,0
*
*
*
*
p=<.001
p=<.001
p=<.001
p=<.001
Baseline
12 weeks
24 weeks
36 weeks
CRV
RVC


Physical Component Scale
100,0
90,0
80,0
70,0
60,0
50,0
40,0
30,0
20,0
10,0
0,0
*
p=<.001
*
p=<.001
*
p=<.001
*
p=<.001
Baseline
12 weeks
24 weeks
36 weeks
CRV
RVC

ROLE PHYSICAL	Baseline	12 weeks	24 weeks	36 weeks
CRV	73.2	73.2	91.1	73.2
RVC	64.7	77.9	60.3	61.8

BODY PAIN	Baseline	12 weeks	24 weeks	36 weeks
CRV	72.4	73.4	84.1	71.4
RVC	56.9	73.3	59.4	55.1

GENERAL HEALTH	Baseline	12 weeks	24 weeks	36 weeks
CRV	40.0	38.8	47.6	35.6
RVC	28.6	36.8	31.0	33.4

MENTAL HEALTH	Baseline	12 weeks	24 weeks	36 weeks
CRV	73.4	74.6	82.6	70.9
RVC	75.8	82.1	71.5	72.9

Health-related quality of life HRQoL

Medical Outcome Short Form Survey 36 (SF-36)

- No improvement
- Improvement ID
- Improvement HB
- Improvement both

SF-36. *Physical Functioning*	SF-36. *Role Physical*
SF-36. *Bodily Pain*	SF-36. *General Health*
SF-36. *Vitality*	SF-36. *Social Functioning*
SF-36. *Role Emotional*	SF-36. *Mental Health*
SF-36. *Physical Component Scale*	SF-36. *Mental Component Scale*

Pérez-Domínguez et al. (under review)

Adherence (Sessions attended/offered)

Virtual reality-Control 84%
Control-Virtual reality 69.2% (U Mann Whitney p=.002)

	PHYSIOTHERAPIST	NURSING STAFF	PHYSIOTHERAPIST
	80.2%	50%	81.2%
	53 %	45 %	70 %

Ortega et al. 2020

Pérez-Domínguez et al. (under review)

Segura-Ortí et al. 2018

GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA E INNOVACIÓN
AGENCIA ESTATAL DE INVESTIGACIÓN
Co-funded by the Erasmus+ Programme of the European Union

REVID

PHYSICAL ACTIVITY /EXERCISE

+

NUTRITION

GoodRENal

PHYSICAL ACTIVITY /EXERCISE

+

NUTRITION

+

PSYCHOLOGICAL WELLBEING

LIMITATIONS

1. Small sample
2. Short exercise program
3. Not a clear definition of which type of exercise is VR. RPE within the limits of strength training.
4. Scientific community percepction is that is ‘freak’ and difficult to apply, but it is the opposite
5. Future studies with longer programs should check if greater improvement can be achieved.

CONCLUSION

1. 12 weeks of VR exercise intradialysis results in improved health-related quality of life (physical function, vitality, physical component scale).
2. Adherence to this type of exercise is high

THANK YOU
Questions?

esegura@uchceu.es

#Goodrenal

www.goodrenal.com

CEU
Universidad
Cardenal Herrera