

INFLUENCE OF A STRENGTH AND INTRADIALYTIC RESISTANCE PROGRAM IN A VERY LOW-INCOME POPULATION RECEIVING HEMODIALYSIS

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INTRODUCTION

Patients in hemodialysis often have malnutrition and systemic inflammation that increases protein catabolism and other complications that reduces their physical capacity, and these effects are more pronounced in low-income population with no access to renal standard of care. Aerobic and strength training in hemodialysis patients have positive effects on the maintenance of muscle strength, and some studies have shown beneficial effects to decrease inflammation and improve the cardiovascular condition; however, there are no studies about the effects of an exercise program in low income population receiving hemodialysis.

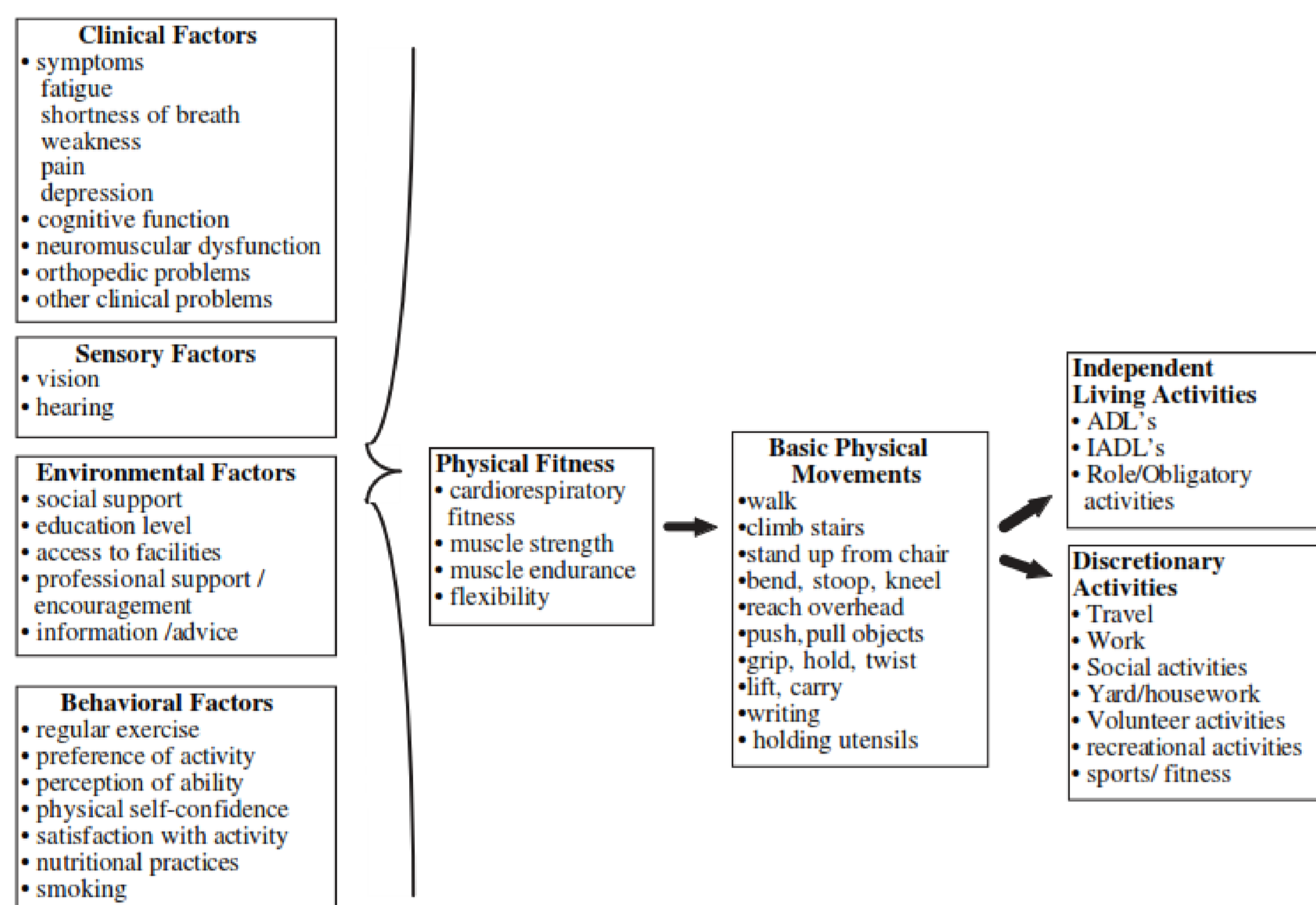


Figure 1. Determinants of Physical Function (from Painter & Stewart ref 8).

OBJECTIVE

Analyze the influence of an intra-dialysis exercise and training program on inflammatory markers (CRP) and muscle strength.

METHODS

This study was done at the hemodialysis unit of the Queretaro General Hospital that receives low-income patients (monthly income USD\$100) with no access to other social security institutions. The center receive 48 patients and 29 patients accept to participate in this program. Inclusion criteria were signature of the informed consent, blood pressure and other vital signs stables during sessions and no active infectious disease. Most of patients receive a media of 2 sessions per week. The training program was implemented twice a week in the first hours of the HD session, lasting 40 minutes, with the use of gaiters, balls, weights and elastic resistance leagues. The patient should report an effort perception of 6 - 7 on Borg scale (moderate to strong). The number of repetitions increased according to the patient's time and tolerance. Each month, laboratory studies were carried out in which serum values of CRP and albumin were extracted, as well as the muscular outflow using a manual dynamometer. A questionnaire was completed with sociodemographic and pathological data of each participant. A database was made with the information collected for its processing.

CONCLUSIONS

An intra-dialysis strength and resistance program in low-income population receiving HD increases muscle strength, which can counteract the muscular atrophy and energy-protein wasting. At three-month follow up there was significant changes when compared with non-exercise patients.

OXYGEN TRANSPORT

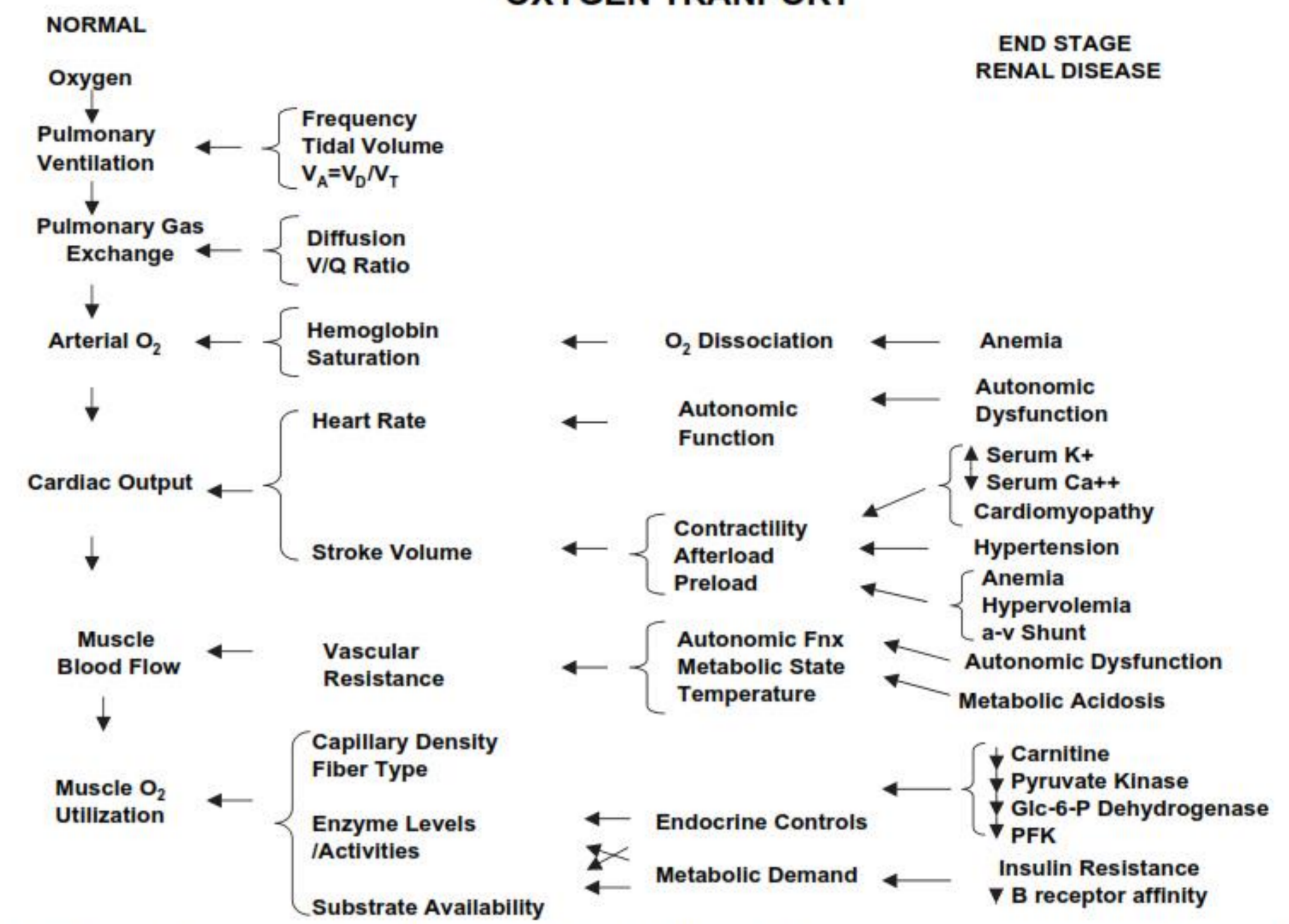


Figure 2. Oxygen Transport from the atmosphere to the working muscles in normals and possible systems affected by ESRD (Painter, 1988, ref 13).

RESULTS

There were 16 men and 12 women enrolled in this program, aged 20 to 76 years (median age 29). Time on HD was 32.33 months. The cause of renal failure was unknown in 42% of patients, and 39% had diabetic nephropathy.

Muscle strength increased significantly at the end of the study ($P < .0008$). Serial Values of CPR decrease during the three-month program 28% of the initial value.

Serum levels of albumin did not change significantly but were maintained at a mean of 3.9 g/dl, significantly higher than in the population that did not receive the strength program (3.4 mg/dl).

Median strength in dynamometer increase 18% in this population compared with -2% in patients that did not receive the program.

Table 1: Laboratory Characteristics of the Subjects Included in the Study

	MALE	FEMALE	P
Hb (mg/dl)	8.0 ± 2.1	7.5 ± 1.9	0.06
Hcto	25.4 ± 6	23 ± 6.5	NS
Glucose (mg/dl)	107 ± 52	99 ± 47	NS
Creatinine (mg/dl)	13.3 ± 5	10.8 ± 3	0.04
Urea (mg/dl)	190 ± 64	154 ± 42	NS
Na (mg/dl)	136 ± 5	136 ± 3	NS
K (mg/dl)	5.7 ± 1	5.8 ± 1.6	NS
P (mg/dl)	6.1 ± 2.2	5.6 ± 1.9	0.05
Ca (mg/dl)	8.8 ± 2.6	8.8 ± 1	NS