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PULMONARY GAS EXCHANGE AND QUALITY OF LIFE IN PATIENTS WITH LEFT VENTRICULAR FAILURE

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Thesis

Submitted in Partial Fulfillment for the Requirements
of the Master Degree in Physical Therapy

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Dedication

I would like to dedicate this piece of work to my parents, my wife and my children Aia, Yousof and Hagar for their patience and encouragement to continue and finish this work

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Abstract

This study was designed to find the relationship between pulmonary gas exchange and quality of life in left ventricular failure (LVF). The study was conducted on sixty male patients with LVF, NYHA class II&III, selected from National Heart Institute. The mean age (57.24 ± 4.45) years and the mean of LVEF ($38.91 \pm 2.69\%$). Patients underwent cardiopulmonary exercise testing and completed the MLHFQ over a 1-year period. The mean duration of left ventricular failure (9.33 ± 4.67 months). The mean of VO_{2max} (11.9 ± 1.07 ml/kg/min). The mean of VE/VCO_2 slope (39.98 ± 14.26). The mean of MLHFQ overall scores (63.3 ± 21.73). The mean of MLHFQ physical sub-scores (21.7 ± 7.34) and the mean of MLHFQ psychosocial /symptomatology sub- score (41.6 ± 14.44). The results revealed that VO_{2max} had a strong, negative correlation with MLHFQ ($r = -0.73$ & $P=0.001$, $r = -0.74$ & $P=0.001$, and $r = -0.70$ & $p=0.001$) overall the patients' groups. VE/VCO_2 slope had a strong, positive correlation with MLHFQ ($r=0.87$ & $P=0.001$, $r=0.86$ & $P=0.001$ and $r=0.87$ & $P=0.001$) overall the patients' groups. Also, VO_{2max} had a strong negative correlation with VE/VCO_2 slope ($r = -0.74$ & $P=0.001$) overall the patients' groups.

Key words: Ventilatory efficiency, maximal oxygen consumption, quality of life, MLHFQ, LVF, left ventricular systolic dysfunction, CHF.

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List of abbreviations

| | |
|-------------------------|---|
| ACE | : Angotensin Convering Enzyme |
| ACTH | : Adrenocorticotrophic hormone |
| ANP | : Atrial natriuretic peptide |
| AT | : Anarobic threshold |
| ATP | : Adenosine triphosphate |
| Ca | : Calcium |
| CAD | : Coronary artery disease |
| C (a – v)O ₂ | : arterio-venous oxygen content difference |
| CHF | : Chronic heart failure |
| CM | : Cardiomyopathy |
| CO | : Cardiac output |
| CO ₂ | : Carbon dioxide |
| CPX | : Cardiopulmonary exercise stress testing |
| CR | : Cardiac rehablitation |
| CVD | : Cardiovascular disease |
| ECG | : Electrocardiography |
| EDV | : End-diastolic volume |
| EF | : Ejection fraction |
| ERV | : Expiratory reserve volume |
| ESV | : End systolic volume |
| ET | : Endothelin |
| FVC | : Forced Vital Capacity |
| HF | : Heart failure |
| HR | : Heart rate |
| LVF | : Left ventricular failure |
| LVH | : Left ventricular hypertrophy |
| LVEDP | : Left ventricular end diastolic pressure |
| LVSD | : Left ventricular systolic dysfunction |
| METs | : Metabolic equivalent |
| MI | : Myocardial infarction |
| MLHFQ | : Minnesota Living with Heart Failure Questionnaire |
| Na | : Sodium |
| NE | : Norepinephrine |
| NO | : Nitric oxide |
| NYHA | : New York Heart Association |
| O ₂ | : Oxygen |
| PCO ₂ | : Carbon dioxide pressure |

| | |
|----------------------------------|--|
| PCWP | : Pulmonary Capillary Wedge Pressure |
| PO ₂ | : Oxygen pressure |
| PVO ₂ | : Peak oxygen consumption |
| QoL | : Quality of life |
| RAS | : Renin-angiotensin system |
| RER | : Respiratory exchange ratio (V_{CO_2} / V_{O_2}) |
| SHF | : Severe heart failure |
| SOLVD | : Studies of left ventricular failure |
| SV | : Stroke volume |
| THR | : Target heart rate |
| Va / Q | : Ventilation perfusion ratio, Va (alveolar ventilation), Q (blood flow) |
| VCO ₂ | : Carbon dioxide production |
| VD/VT | : Dead space / Tidal volume |
| V _d | : Physiologic dead space volume |
| V _E | : Minute ventilation |
| V _E /VCO ₂ | : Ventilatory efficiency |
| VO ₂ | : Oxygen consumption |
| VO _{2max} | : Maximum Oxygen consumption |
| V _T | : Tidal volume |

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