Exercise testing and intervention: Translation into a low resource community

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Background

• Rainbow nation
  – Non-communicable disease escalation
  – Variable resources in communities
  – Exercise physiology, aka Biokinetics
  – Development of a public health system

• Simple tools for health measurement
  – SF-8
  – Step-test
  – Actiheart
Method

• Ikageng, Kenneth Kaunda district
  – Representativeness: age, sex, income, education, occupation, BMI, BP, disease profile.
• Study 1: Setswana SF-8.
  – Face validity, test-retest reliability, internal consistency.
• Study 2: 8 minute Step-test protocol.
  – Metronome or music?
  – Individually or with friends?
• Study 3: Preferred physical activity
• Study 4: Short exercise trial in the community.
  – Actiheart, waist circumference, adherence, reasons for drop out.
Results: Study 1

• 60 participants (M=26, F=34)
• SF-8 translation and back-translation showed preservation of meaning.
• Use in the community demonstrated face validity.
• Internal consistency: Cronbach’s alpha 0.87.
• Test-retest reliability over 4-week washout
  – Spearman’s rho: moderately correlated
  – Wilcoxon sign-rank test: not significantly different
<table>
<thead>
<tr>
<th>Question</th>
<th>Translated Setswana Version</th>
<th>SA Standard English Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wilcoxon sign-rank (p)</td>
<td>Spearman’s rho</td>
</tr>
<tr>
<td></td>
<td>Wilcoxon sign-rank (p)</td>
<td>Spearman’s rho</td>
</tr>
<tr>
<td>Q1-General health</td>
<td>0.55</td>
<td>0.42</td>
</tr>
<tr>
<td>Q2-Physical functioning</td>
<td>0.69</td>
<td>0.41</td>
</tr>
<tr>
<td>Q3-Role-physical</td>
<td>0.40</td>
<td>0.43</td>
</tr>
<tr>
<td>Q4-Bodily pain</td>
<td>0.86</td>
<td>0.43</td>
</tr>
<tr>
<td>Q5-Vitality</td>
<td>0.50</td>
<td>0.38</td>
</tr>
<tr>
<td>Q6-Social functioning</td>
<td>0.21</td>
<td>0.56</td>
</tr>
<tr>
<td>Q7-Role-emotional</td>
<td>0.12</td>
<td>0.50</td>
</tr>
<tr>
<td>Q8-Mental health</td>
<td>0.50</td>
<td>0.60</td>
</tr>
<tr>
<td>PCS</td>
<td>0.83</td>
<td>0.45</td>
</tr>
<tr>
<td>MCS</td>
<td>0.52</td>
<td>0.50</td>
</tr>
</tbody>
</table>
Results: Study 2

• 52 participants (M=27, F=25)
• Standardised protocol for step test
  – 5 min seated baseline, 8 minute test, 15 cycles (60 beats)/min to 33 cycles (132 beats)/min, 2 min seated recovery.
  – Predict VO2 peak from Actiheart data
Completers of Tests

![Bar chart showing completions of tests for MTI, MUI, MTG, and MUG. The chart includes bars for M complete, M incomplete, F complete, and F incomplete.]
Results: Study 3

- 150 participants:
  - 20 pilot draft questionnaire,
  - 130 complete final questionnaire.
- Preferred Physical Activity (PPA-Q)
  - English and Tswana
  - Six items, self-administered or completed by a research on behalf of illiterate participants
  - Current PA, and perceived exertion during PA, as well as PA preferences
  - Internal consistency: Cronbach’s alpha 0.86
• Participants in main study
  – 100% black, 50 men, 80 women.
  – Mean age 46 years (SD 9 years)
    • 38% unemployed
    • 38% employed full time
  – 57% earned R1000-5000 per month
    • Compare with SA mean R27,600 and median R20,000
    • Typical wages for cleaning, housekeeping, pet care
      • 25% < R1000 pm, 19% > R5000 pm.
  – 72% live in “brick” homes, 28% informal dwellings
• Walking. Dancing. Soccer.
• Mornings!
Results: Study 4

- 76 participants (26 male, 50 female)
- 4 week intervention, pre-post design
  - Combined aerobic and resistance training
  - 70% heart rate reserve (Actiheart)
  - SF-8 (South African Setswana version)
  - Exercise benefits and barriers scale (EBBS; English)
  - Mother-tongue interviews with completers (9) and non-completers (6)
- 54 completers (15 male, 39 female)
<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th></th>
<th>P-value</th>
<th>Women</th>
<th></th>
<th>P-value</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>N Baseline</td>
<td>End</td>
<td></td>
<td>N Baseline</td>
<td>End</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>15 39.6±4.59</td>
<td>39 42.6±7.44</td>
<td>0.41ª</td>
<td>39 1.58±0.06</td>
<td>1.58±0.06</td>
<td>0.12ª</td>
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<tr>
<td>Height (m)</td>
<td>15 1.73±0.10</td>
<td>1.73±0.10</td>
<td>0.41ª</td>
<td>39 1.58±0.06</td>
<td>1.58±0.06</td>
<td>0.12ª</td>
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<tr>
<td>Body Mass (kg)</td>
<td>15 80.9±23.9</td>
<td>79.9±23.8</td>
<td>0.02ᵇ</td>
<td>39 80.4±19.0</td>
<td>79.5±19.4</td>
<td>0.00ª</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>15 26.2±7.06</td>
<td>26.3±7.10</td>
<td>0.41ª</td>
<td>39 31.6±7.82</td>
<td>31.9±8.05</td>
<td>0.003ª</td>
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<tr>
<td>WHR</td>
<td>15 0.87±0.07</td>
<td>0.86±0.67</td>
<td>0.17ª</td>
<td>39 0.79±0.07</td>
<td>0.78±0.08</td>
<td>0.15ª</td>
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<tr>
<td>SBP (mmHg)</td>
<td>15 129.6±15.8</td>
<td>126.8±12.2</td>
<td>0.25ª</td>
<td>39 126.7±13.1</td>
<td>123.5±15.2</td>
<td>0.05ª</td>
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<td>DBP (mmHg)</td>
<td>15 85.4±17.5</td>
<td>82.8±14.9</td>
<td>0.23ᵇ</td>
<td>39 83.4±9.88</td>
<td>83.9±9.83</td>
<td>0.73ª</td>
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<tr>
<td>RHR (bpm)</td>
<td>15 74.6±10.6</td>
<td>75.2±14.4</td>
<td>0.83ª</td>
<td>39 77.5±10.0</td>
<td>77.7±11.7</td>
<td>0.89ª</td>
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<tr>
<td>FBG (mmol.L)</td>
<td>15 4.88±0.79</td>
<td>5.21±1.85</td>
<td>0.53ª</td>
<td>39 5.20±1.84</td>
<td>4.75±1.85</td>
<td>0.04ᵇ</td>
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<tr>
<td>FTC (mmol.L)</td>
<td>15 4.70±0.81</td>
<td>4.69±0.93</td>
<td>0.77ᵇ</td>
<td>39 4.57±0.52</td>
<td>4.84±0.86</td>
<td>0.07ᵇ</td>
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<tr>
<td>PVO2max (ml.kg⁻¹.min⁻¹)</td>
<td>15 33.5±5.11</td>
<td>32.2±5.62</td>
<td>0.19ᵃ</td>
<td>39 25.9±3.72</td>
<td>28.0±3.64</td>
<td>0.003ᵃ</td>
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<td>RPE</td>
<td>15 3.53±0.91</td>
<td>3.06±0.96</td>
<td>0.03ᵃ</td>
<td>39 3.94±0.85</td>
<td>3.43±0.82</td>
<td>0.00ᵇ</td>
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<tr>
<td>PCS</td>
<td>15 54.4±6.59</td>
<td>55.8±3.41</td>
<td>0.36ᵃ</td>
<td>39 48.1±8.96</td>
<td>55.7±4.38</td>
<td>0.00ᵇ</td>
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<tr>
<td>MCS</td>
<td>15 48.7±9.26</td>
<td>55.9±4.19</td>
<td>0.003ᵇ</td>
<td>39 50.9±8.81</td>
<td>55.1±4.95</td>
<td>0.00ᵇ</td>
</tr>
</tbody>
</table>
Benefits

• Health improvement
• Knowledge of health status
• Fitness
• Combat disease
• Lose Weight
• Reduce tiredness
• Reduce disease
• Reduce stress
• Age gracefully

Barriers

• Lack of time
• Lack of interest
• Illness / disease
• Job
• Unreadiness