A RANDOMIZED CONTROLLED FIELD TRIAL ON BEHAVIORAL MODIFICATION INTERVENTION AMONGST ADOLESCENTS FOR CARDIOVASCULAR DISEASE PREVENTION IN ZAHEDAN, IRAN

Fatemeh Khoshkhou, Lekhraj Rampal, Bahaman B Abu Samah, Hejar Binti Abd. Rahman, Sharmili Vidyadaran

Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia
Cardiovascular disease (CVD) is the number one cause of death globally and is projected to remain as the leading cause of death (WHO, 2007).

18.1 million people died from CVD in 2010, representing 30.8% of all global deaths (WHO, 2010).

The increasing global epidemic relates closely to respective changes in lifestyles mainly in tobacco use, physical inactivity and unhealthy diet (WHO, 2010).
In 2005, 30% deaths were related to CVD globally, whereby 80% of these deaths were due to CVD in developing countries (WHO, 2009).
Upstream interventions

Policies/ lack of it in other sectors

Treating individuals with CVD

Instead of working on public health approach they work on clinical approach
In Iran, CVD has been the cause of 38% of all deaths, and every year 70000 people die due to CVD (Bagheri Lanakarani, 2009).

In 2004, the leading cause of mortality was due to CVD (46 %) (Samavat, 2008).

Studies also show that during the 1971 to 1986 period, rate of CVD increased by 100% in Iran (Samavat, 2008).

The admission to hospital due to CVD is 2940 per day in Iran (Talebizadeh et al., 2009).
➢ Risk factors for coronary artery disease and stroke begin in childhood and tend to persist through adulthood. (Harrell, 1999 and Jolliffe, 2006).

➢ Schools have a great influence on the health status of young people and health education programs have existed in schools for many years (Lynagh et al, 1997).

➢ Focus group discussions (FGD) are a valuable method to obtain Information and explore attitudes, feelings and views on a subject of research, especially when existing knowledge of the subject is inadequate (Powell et al., 1996).
Figure 5. Cardiovascular Risk Factors

- Hypertension
- Unhealthy Diet
- Obesity
- Cigarette Smoking
- Physical Inactivity
- Psychological Factors
- Alcohol
- Diabetes
- High Triglyceride
- High Cholesterol
- Age
- Race
- Non-Modifiable Risk factors
- Family History
- Gender

Pearson et al., 2002
General Objective:

➢ To develop, implement and evaluate the effectiveness of school-based intervention on behavioural risk factors for cardiovascular diseases amongst the high school student in Zahedan, Iran.

Specific Objectives:

➢ To identify and determine the intervention strategies for the development of a behavioural intervention programme through FGD.

➢ To develop a CVD intervention programme to modify behaviour amongst the high school students.

➢ To implement a CVD intervention programme amongst the high school student.

➢ To evaluate the intervention programme on CVD risk factors (smoking, physical inactivity, unhealthy diet, hypertension, obesity and lack of CVD knowledge) at baseline and after 3 months among the high school student.
Figure 6. Conceptual Framework

**Socio-demographic factors**
- Gender
- Religion
- Family Income
- Monthly Pocket Money
- Father’s Education
- Mother’s Education
- Types of Living
- Number of Family Members

**CVD Risk Factors**
- Physical Inactivity
- Unhealthy Diet
- Smoking
- Obesity
- Hypertension
- Lack of CVD Knowledge

**Outcomes**
- Increase knowledge of CVD and its risk factors
- Increase physical activity
- Improve dietary practice (healthy eating)
- Reduce prevalence of smoking (avoid cigarette smoking)
- Maintain ideal body weight
- Achieve optimal BP

**Family Demographic Factors**
- Family Smoking
- Family History of CVD
METHODOLOGY
Study Location:

- Iran
  
  Vast country in Central Eurasia and Western Asia.
  72 million population.

- Zahedan
  
  Capital of Sistan and Baluchistan. South-eastern Iran.
  620,113 population.
  10,000 students.

- Schools
  
  - Primary school (Standard 1 to 5)
  - Middle school (Form 1 to 3)
  - High school (Form 4 to 6)
Figure 7. Study Design

Randomized controlled field trial (RCT)

- Needs assessment (FGD)
- Analyze outcome of FGD
- Design the intervention programme
- Sample Population (Randomization)
  - Intervention group
  - Control group
    - Baseline Data Collection
    - Exposure To CVD programme
    - Regular programme
      - Follow Up Three Months
        - Post Test

Contents
- Introduction
- Methodology
- Results
- Discussion
- Conclusion
- References
➢ **Study Population:** High school students of form one to form three

➢ **Sampling Frame:**

First stage: The whole list of public high schools in 2 districts of Zahedan.
Second stage: The list of male and female public schools that are located in each district.

➢ **Sampling Unit:** A public high school student

➢ **Data collection:**

**First step: FGD**
27\(^{th}\) to 30\(^{th}\) of April 2009

**Second step: Intervention program**
10\(^{th}\) September to 10\(^{th}\) of December 2009
Instrument and Data Collection

First step: FGD

- Questionnaire
- Discussion
- Anthropometric measurement
- Sphygmomanometer

Second step: Intervention

- Questionnaire
- Anthropometric measurement
- Sphygmomanometer
Figure 8. Sampling Methods
Stratified Random Sampling Method

Total Number of students
1600
(74 schools)

District 1
800
(35 schools)

By random

2 female schools (400)
(18 schools)

2 male schools (400)
(17 schools)

By random

Control 200
Intervention 200
Control 200
Intervention 200

District 2
800
(39 schools)

By random

2 female schools (400)
(20 schools)

2 male schools (400)
(19 schools)

By random

Control 200
Intervention 200
Control 200
Intervention 200

16
Data Collection

i. **First Step:** Focus Group Discussion

ii. **Second Step:** Development of the Module

iii. **Third Step:** Implementation of the Module

iv. **Fourth Step:** Evaluation of the Module
FOCUS GROUP DISCUSSION
Focus Group Discussion

**Location:**
Public high schools
(2 male schools and 2 female schools)
Using Simple Random sampling

**Sample Size:**
214 students, teachers, parents and canteen providers

- Weight, height and blood pressure were measured by facilitators
- Discussions were managed and scribed by scribes and facilitators.
- Six focus group discussions, each with 8-10 participants, were formed in each school during 4 days.
INTERVENTION
Intervention

- **Main intervention programs**
  - Six theoretical sessions
  - Intervention box
  - Two fruit programmes
  - One outside the school programme
  - Two sports matches between schools
  - A workshop.
RESULTS
Results

FGD Result
- Socio-demographic of Respondents in FGD
- Appropriate times, days for intervention
- Interests in the kinds of intervention programme
- Summary of Discussion
- Conclusion

Intervention Module
- Forming, Developing and Maintaining (FDM) Module
- The summary of the FDM intervention
- The content summary of the educational classes

Effect of the intervention
- Socio-demographic Background of the Respondents in the Study
- Comparison of CVD Risk Factors and Knowledge in the Pre and post test
- The Effect of Size of the CVD Programme on the Intervention Group
A total of 24 focus group discussions were conducted involving 214 participants from 4 schools.

<table>
<thead>
<tr>
<th>Respondent categories</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>157</td>
<td>73.36</td>
</tr>
<tr>
<td>Teachers</td>
<td>26</td>
<td>12.15</td>
</tr>
<tr>
<td>Parents</td>
<td>29</td>
<td>13.55</td>
</tr>
<tr>
<td>Canteen providers</td>
<td>2</td>
<td>0.94</td>
</tr>
<tr>
<td>Total</td>
<td>214</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1. Distribution of respondents in the FGD by category
Figure 9. Appropriate times, days and places for conducting the intervention Programme for the students in FGD

Day

<table>
<thead>
<tr>
<th>Day</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturday</td>
<td>25.5</td>
</tr>
<tr>
<td>Sunday</td>
<td>6.4</td>
</tr>
<tr>
<td>Monday</td>
<td>15.9</td>
</tr>
<tr>
<td>Tuesday</td>
<td>8.3</td>
</tr>
<tr>
<td>Wednesday</td>
<td>15.3</td>
</tr>
<tr>
<td>Thursday</td>
<td>26.1</td>
</tr>
<tr>
<td>Friday</td>
<td>36.3</td>
</tr>
</tbody>
</table>

Place

<table>
<thead>
<tr>
<th>Place</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside school</td>
<td>12.7</td>
</tr>
<tr>
<td>Outside school</td>
<td>17.2</td>
</tr>
</tbody>
</table>

Time

<table>
<thead>
<tr>
<th>Time</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>22.9</td>
</tr>
<tr>
<td>Afternoon</td>
<td>41.4</td>
</tr>
<tr>
<td>Evening</td>
<td>19.7</td>
</tr>
<tr>
<td>During school hours</td>
<td>16.6</td>
</tr>
<tr>
<td>Out of school hours</td>
<td>29.9</td>
</tr>
</tbody>
</table>
## Table 3. Interests in the kinds of intervention programs in FGD

<table>
<thead>
<tr>
<th>Kind of intervention</th>
<th>High interest</th>
<th>Some interest</th>
<th>No interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy life classes</td>
<td>26.8</td>
<td>51.6</td>
<td>21.7</td>
</tr>
<tr>
<td>Special day programs such as walking from home to school</td>
<td>46.5</td>
<td>35.0</td>
<td>18.5</td>
</tr>
<tr>
<td>CVD’s workshop (such as: How to cook healthy food)</td>
<td>33.1</td>
<td>34.4</td>
<td>32.5</td>
</tr>
<tr>
<td>CVD’s poster exhibition</td>
<td>35.0</td>
<td>36.9</td>
<td>28.0</td>
</tr>
<tr>
<td>CVD’s congress</td>
<td>28.0</td>
<td>33.8</td>
<td>38.2</td>
</tr>
<tr>
<td>Participating in sports competition</td>
<td>52.2</td>
<td>31.2</td>
<td>16.6</td>
</tr>
<tr>
<td>Non-competition sports</td>
<td>38.2</td>
<td>46.5</td>
<td>15.3</td>
</tr>
<tr>
<td>Working team</td>
<td>36.3</td>
<td>36.3</td>
<td>27.4</td>
</tr>
<tr>
<td>Theoretical classes (PowerPoint, demonstration movie, etc.)</td>
<td>38.2</td>
<td>36.9</td>
<td>24.8</td>
</tr>
<tr>
<td>Rewarding programs</td>
<td>37.6</td>
<td>39.5</td>
<td>22.9</td>
</tr>
<tr>
<td>Healthy eating program (vegetable, fruit…)</td>
<td>38.9</td>
<td>38.2</td>
<td>22.9</td>
</tr>
<tr>
<td>Prevention and stop smoking program</td>
<td>31.8</td>
<td>33.1</td>
<td>35.0</td>
</tr>
<tr>
<td>Physical activity program</td>
<td>31.8</td>
<td>42.7</td>
<td>25.5</td>
</tr>
<tr>
<td>Weight control programs</td>
<td>36.9</td>
<td>38.2</td>
<td>24.8</td>
</tr>
<tr>
<td>Blood pressure control program</td>
<td>40.1</td>
<td>37.6</td>
<td>22.3</td>
</tr>
<tr>
<td>Short physical activities during class hours</td>
<td>21.0</td>
<td>52.9</td>
<td>26.1</td>
</tr>
<tr>
<td>Short physical activities in the morning</td>
<td>26.8</td>
<td>40.1</td>
<td>33.1</td>
</tr>
<tr>
<td>Extracurricular physical activity programs, such as mountain climbing</td>
<td>83.4</td>
<td>15.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Involving your parents in the program</td>
<td>35.7</td>
<td>45.2</td>
<td>19.1</td>
</tr>
<tr>
<td>Involving your teachers in the program</td>
<td>26.1</td>
<td>51.0</td>
<td>22.9</td>
</tr>
<tr>
<td>Involving your classmates in the program</td>
<td>43.3</td>
<td>42.7</td>
<td>14.0</td>
</tr>
</tbody>
</table>
Conclusion of FGD

- The information gathered from the Focus Group Discussions determined the attitudes, barriers, challenges, needs, current information, feelings and views on this research study.

- The FGD results helped to design a target and relevant CVD behavioural intervention programme in high school students in Zahedan, Iran.

- It was found that FGD led to the development of a suitable and relevant intervention programme for the target group.
Development of the Module
Getting Public Cooperation Via Newspaper
Summary of the FDM Module

First month
Formation
- Consent form
- Exclusion criteria
- Medical check-up
- Anthropometric measurement
- Handing out Questioner
- Theoretical class
- Intervention box

Second month
Development
- Two times of fruit programme
- One outside school programme
- Two sports matches between schools (Special prizes)
  - Healthy message

Third month
Maintenance
- Workshop
- Putting healthy message
- Continue physical activity by students
IMPLEMENTATION OF THE MODULE
Measuring Weight, Height, Blood pressure
Measuring Weight, Height, Blood pressure
Delivering Intervention Box in the first session
Delivering Intervention Box in the first session
Fruit Programs
Fruit Programs
Physical activity program
Physical activity program
Physical activity program
Physical activity program
Anti Smoking Message via Badge Distribution
EVALUATION OF THE MODULE
Figure 11.
Pre and post values of the CVD knowledge categorise in the intervention and control groups

*Intervention Group*

**Pre**
- Good: 27% (13.2% Low)
- Moderate: 59.8%

**Three Months**
- Good: 24.2%
- Low: 15.2%
- Moderate: 60.6%

*Control Group*

**Pre**
- Good: 27% (13.2% Low)
- Moderate: 60.6%

**Three Months**
- Good: 23.8%
- Low: 14.8%
- Moderate: 61.4%

**Post**
- Low: 4.4%
- Moderate: 29%
- Good: 66.6%

*P*=0.001
This study was able to identify that; even short-term intervention for improving knowledge can result in positive changes with the implementation of an appropriate intervention.
It could be concluded that, this programme might be effective to be used in preventing students from becoming obese.
In general, the CVD programme had small positive changes in BMI indicator. Maybe, the long-term intervention can show the power of the present CVD programme.

Increasing healthy diet intake, having good diet behaviour and increasing physical activities in the results might be the reasons for the decreasing BMI and overweight in the intervention group.
Perhaps, the key for improving physical activity in present study is that the physical activity programme was based on students’ interests, which the author found via FGC.
It could be concluded that, this programme might be effective to be used in preventing students from being in stages 1 and 2 of hypertensions.
The increasing of diastolic blood pressure might due to the respondents who were still at their growing stage of life, or the CVD programme had a negative influence on the diastolic blood pressure.
It could be concluded that, this CVD programme could improve diet behaviour and knowledge.
It could be concluded that, this CVD programme might encourage the students to not start taking unhealthy diet and to increase taking of healthy food.
In general, it can be concluded that the CVD programme in this study might be effective in preventing the students from starting to smoke. This small reduction might be due to the short-term CVD programme.
Table 6. The effect size of CVD programs on CVD risk factors and knowledge in the intervention group

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean±SD</th>
<th>t</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BMI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>607</td>
<td>20.29±3.33</td>
<td>4.19</td>
<td>0.16</td>
</tr>
<tr>
<td>post</td>
<td>607</td>
<td>20.23±3.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Systolic Blood pressure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>607</td>
<td>110.20±10.47</td>
<td>1.11</td>
<td>0.04</td>
</tr>
<tr>
<td>post</td>
<td>607</td>
<td>109.93±8.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diastolic Blood pressure</strong></td>
<td></td>
<td></td>
<td>-7.31</td>
<td>0.28</td>
</tr>
<tr>
<td>Pre</td>
<td>607</td>
<td>67.40±7.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>post</td>
<td>607</td>
<td>69.37±7.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physical Activity (Score)</strong></td>
<td></td>
<td></td>
<td>-7.50</td>
<td>0.29</td>
</tr>
<tr>
<td>Pre</td>
<td>607</td>
<td>27.25±9.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>post</td>
<td>607</td>
<td>29.69±9.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Healthy Diet</strong></td>
<td></td>
<td></td>
<td>-10.86</td>
<td>0.40</td>
</tr>
<tr>
<td>Pre</td>
<td>607</td>
<td>29.50±5.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>post</td>
<td>607</td>
<td>32.04±6.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unhealthy Diet</strong></td>
<td></td>
<td></td>
<td>4.57</td>
<td>0.18</td>
</tr>
<tr>
<td>Pre</td>
<td>607</td>
<td>15.71±3.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>post</td>
<td>607</td>
<td>15.24±3.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diet behaviour</strong></td>
<td></td>
<td></td>
<td>-11.60</td>
<td>0.42</td>
</tr>
<tr>
<td>Pre</td>
<td>604</td>
<td>3.48±1.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>post</td>
<td>604</td>
<td>4.18±1.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diet Knowledge</strong></td>
<td></td>
<td></td>
<td>-11.55</td>
<td>0.42</td>
</tr>
<tr>
<td>Pre</td>
<td>604</td>
<td>4.69±0.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>post</td>
<td>606</td>
<td>5.10±1.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>knowledge</strong></td>
<td></td>
<td></td>
<td>-22.34</td>
<td>0.67</td>
</tr>
<tr>
<td>Pre</td>
<td>607</td>
<td>12.47±4.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>post</td>
<td>607</td>
<td>16.64±4.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current smoker, n (%)</strong></td>
<td></td>
<td></td>
<td>-1.00</td>
<td>0.04</td>
</tr>
<tr>
<td>Pre</td>
<td>607</td>
<td>14(2.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>post</td>
<td>607</td>
<td>13(2.1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CONCLUSION
The school-based intervention module developed had a positive influence on the CVD knowledge, physical activities, diet knowledge and behaviour, and the consumption of healthy and unhealthy food among the subjects.

Primary prevention and intervention through risk factor modification can be effective in adolescent.
Strengths of the Study

- Focus Group Discussion
- Sample adequate
- Randomization

Limitations of the Study

- Time and financial constraint
- Short-term intervention
- Focusing only on five risk factors

Recommendations for Future Research

- Applying long-term interventions instead of short intervention
- Involving parents


Cardiovascular Health Education family: The Importance of School-Based Prevention Strategies. ARYA Atherosclerosis Journal; 2(3): 142-146.


Thanks For Attention
-
Questions Welcome