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# Designing a Proposed Circuit Training Program for Female College Students

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## Abstract

The decreasing rate in the physical activity of young people, which contributes to the prevalence of obesity, is becoming an alarming trend in the Philippines. One intervention that is proven to promote physical activity and improve physical fitness is circuit training. The purpose of the study was to design a circuit training program for female college students. The respondents were 84 female college students and 8 experts in the field of physical education. The student respondents underwent physical fitness tests. Results of the physical fitness tests and Kravitz's guide in designing a circuit training program were used in designing of the proposed circuit program. The program was evaluated as excellent by experts from the field of physical education and fitness. This study produced a proposed circuit training program for female college students which may be a viable tool that could promote physical activity and improve their physical fitness.

**Key words:** Physical fitness, circuit training, college, adolescent

## Introduction

The world is facing epidemic rates in the cases of obesity which some evidence suggests that inactivity is a major contributor[1,2]. In particular, researchers have reported a considerable decrease in the levels of physical activity in young people[3, 4] which is also becoming an alarming trend in the Philippines[5,6]. One intervention that is proven to improve physical fitness is circuit training[7, 8].

Circuit training is a good choice as alternating exercises allows for maximum recovery of muscle groups. Increased rests between stations are essential, as this phase of training should not be too intense. By keeping rest intervals in a minimum cardiovascular element is developed and by alternating exercises and muscle groups, more exercises can be completed for a longer period. Circuit aerobics may offer you benefits such as improved cardiovascular fitness, increased calorie expenditure to lose body fat, improved muscular strength and endurance, and increased muscle tone in body areas not normally stressed by aerobic exercise alone. Circuit training uses a series of exercise stations that consists of various combinations of resistance training, flexibility, and brief aerobic exercises. Circuits may be designed to achieve many different fitness goals. With circuit training, you move rapidly from one station to the next and perform whatever exercise is to be done at that station within a specified time period. A circuit would commonly consist of eight to twelve stations, and the entire circuit would be repeated three times[9, 10].

Circuit training has been proven to improve both cardiovascular fitness[11] and muscular strength endurance[12]. There is some evidence to suggest that school-based circuit training leads to positive changes in the physical fitness of adolescents[13, 7, 8]. Therefore, based on the aforementioned facts, it is the purpose of this study to design a proposed circuit training program for female college students. Specifically, it sought to answer the following questions:

1. What is the physical fitness performance of the respondents?
2. What is the design of the proposed circuit-training program?
3. What is the evaluation of the designed circuit-training program according to experts?

## Method

### Research design

This study used the descriptive method of research. It is descriptive in nature as it described the physical fitness level of the 1st year college nursing students. Based on the results of the description, a circuit-training program was designed and was validated by 8 experts. The respondents of the study were the 84 female 1st year nursing students of Angeles University Foundation, Philippines taking P.E. 01: physical fitness and gymnastics. The researchers conducted selected health related physical fitness tests that were used as the main research instrument to describe the respondents' physical fitness level. After the physical fitness tests, gathered data were used as basis in designing a circuit-training program for the respondents. Kravitz's[9] guide in designing a circuit training program was employed. Physical education teachers and fitness experts who were considered experts in the field of physical fitness evaluated the proposed circuit-training program. However, implementation of the designed program was not part of the study.

### Analysis of data

The gathered data were classified, tabulated, analyzed and interpreted using frequency distribution, percentage and weighted mean.

## Results and discussion

### 1. The Description of the respondents' physical fitness

### A. Respondents' Flexibility Fitness

Figure 1 illustrates the respondents' flexibility fitness (sit and reach). As shown, out of 84 total respondents, 16 or 19.05% are excellent, 19 or 22.62% are very good, 22 or 26.19% are good, 16 or 19.05 are poor, and 11 or 13.10% are very poor. A big number of the respondents fall in the good and below flexibility level.

### B. Respondents' muscular strength fitness

Figure 2 shows the respondents' muscular strength fitness (push-up). As shown, out of 84 total respondents, 9 or 10.71% are excellent, 10 or 11.90% are very good, 24 or 28.57% are good, 18 or 21.43% are poor, and 23 or 27.38% are very poor. Data disclose that a big number of the respondents belong to good and below muscular strength level.

### C. Respondents' muscular endurance fitness

Figure 3 presents the respondents' muscular endurance fitness (curl up). As shown, out of 84 total respondents, 9 or 10.71% are excellent, 12 or 14.29% are very good, 20 or 23.81% are good, 19 or 22.62% are poor, and 24 or 28.51% are very poor. Data disclose that a big number of the respondents belong to the below average in terms of muscular endurance.

### B. Respondents' cardiovascular endurance fitness

Figure 4 shows the respondents' muscular endurance fitness (step up). As shown, out of 84 total respondents, 8 or 9.52% are excellent, 15 or 17.86% are very good, 24 or 28.57% are good, 19 or 22.62% are poor, and 18 or 21.43% are very poor. Data disclose that a big number of the respondents belong to the good and below cardiovascular endurance level.

Generally, based from the selected health related physical fitness test data, there is a need to improve the respondents' physical fitness.

## 2. Design of the proposed circuit-training program

The proposed circuit-training program was designed based from the description of the respondents' physical fitness level and the Kravitz's [9] guide in designing a circuit training. It was designed following a frequency of 3 times a week for 4 weeks to complete the 12 series of the Circuit Training Program. The program was focused on the Health related physical fitness that develops the cardio-respiratory endurance, muscular endurance, strength, and flexibility of the students. For the first two weeks, calisthenics (Isotonic and Isometric) exercises that develop the strength and flexibility will be performed while the next two weeks; aerobic dance exercises that develop the cardio-respiratory endurance and muscular endurance will be executed. A sequence of exercises to perform for one minute each station, 45 seconds to perform the next station and 2 minutes between the 1st and 2nd round and 2 minutes between the 2nd and 3rd round will be done. Before doing the Circuit Training Program by station, limbering, which is more on stretching and warm-ups for 3 to 5 minutes should be done. The workout will consume 35 to 45 minutes and lastly 5 minutes cooling down exercises is a requirement. Table 1 and 2 presents the outline of the circuit training program.

## 3. Validation of the proposed circuit training program

### A. Physical fitness level suitability

Table 3 presents the validation of the proposed circuit-training program in terms of its suitability to the physical fitness level of the respondents. As shown, item 1 which states, "The exercises suit the fitness level of the students." obtained a weighted mean of 4.56 which is given a descriptive interpretation of excellent, item 2 which states, "The exercises in each phase of the program matches the physiological readiness of the students." obtained a weighted mean of 4.78 which is given a descriptive interpretation of excellent, item 3 which states, "The exercises in the program is ideal for the general age and sex of the respondents." obtained a weighted mean of 4.44 which is given a descriptive interpretation of very good, and item 4 which states, "The frequency, intensity and duration of the program suits the fitness level of the respondents." obtained a weighted mean of 4.56 which is given a descriptive interpretation of excellent. A general weighted mean of 4.58 was obtained which is interpreted as excellent. Gathered data show that the proposed circuit-training program in terms of the physical fitness level of the respondents is excellent. This means that the program was specifically designed to the physical fitness level of the respondents.

### B. Sequence of exercises

Table 4 presents the validation of the proposed circuit-training program in terms of the sequence of exercises. As shown, item 1 which states, "The sequence of the exercises in the program followed the warm-up, work-out and cool-down format. " obtained a weighted mean of 5.00 which is given a descriptive interpretation of excellent, item 2 which states, "The intensity, duration and frequency of the exercises is from easy to difficult, short to long, and seldom to always. " obtained a weighted mean of 4.33 which is given a descriptive interpretation of very good, item 3 which states, "The duration followed the short to long duration." obtained a weighted mean of 4.56 which is given a descriptive interpretation of very good, and item 4 which states, "The sequence of the exercises is logical such as muscular strength conversion to muscular endurance. " obtained a weighted mean of 4.44 which is given a descriptive interpretation of excellent. A general weighted mean of 4.58 was obtained which is interpreted as excellent. Gathered data show that the proposed circuit-training program

in terms of the sequence of exercises is excellent. This means that the program was scientifically designed to achieve the desired improvement.

### C. Target physical fitness components improvement

Table 5 presents the validation of the proposed circuit-training program in terms of the target physical fitness components improvement. As shown, item 1 which states, "There is a priority target component per phase." obtained a weighted mean of 5.00 which is given a descriptive interpretation of excellent, item 2 which states, "The exercises are aimed toward health related physical fitness." obtained a weighted mean of 4.89 which is given a descriptive interpretation of very good, and item 3 which states, "The phases are logically sequenced to achieved the desired improvement." obtained a weighted mean of 4.56 which is given a descriptive interpretation of very good. A general weighted mean of 4.81 was obtained which is interpreted as excellent. Gathered data show that the proposed circuit-training program in terms of the target physical fitness components is excellent. This means that the program was scientifically and logically designed to improve the health related physical fitness of the respondents.

## Conclusion

The following conclusions were drawn based on the findings of the study:

1. Respondents' current physical fitness level

- A big number of the respondents fall in the good and below flexibility fitness.
- A big number of the respondents belong to good and below in terms of muscular strength fitness.
- A big number of the respondents belong to below average in terms of muscular endurance fitness.
- A big number of the respondents belong to good and below in terms of cardiovascular endurance fitness.

2. Design of the proposed circuit-training program

The proposed circuit-training program was designed based from the description of the respondents' physical fitness level and Kravitz's[9] guide in designing a circuit program. It was designed following a frequency of 3 times a week for 4 weeks to complete the 12 series of the Circuit Training Program. The program was focused on the selected health related physical fitness that develops the cardio-respiratory endurance, muscular endurance, strength, and flexibility of the students.

3. Validation of the proposed circuit training program

The proposed circuit-training program was evaluated as excellent in terms of suitability to the physical fitness level of the respondents, sequence of exercises, and target physical fitness components improvement.

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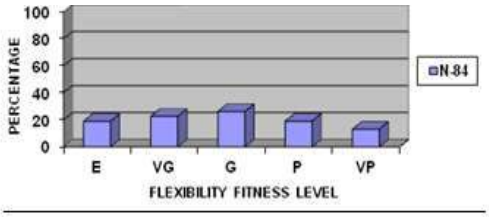


Figure 1. The respondents' flexibility fitness.*E=excellent; VG=very good; G=good; P=poor; VP=very poor

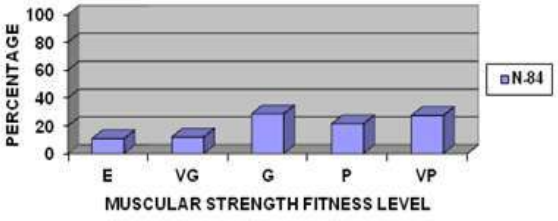


Figure 2. The respondents' muscular strength fitness.*E=excellent; VG=very good; G=good; P=poor; VP=very poor

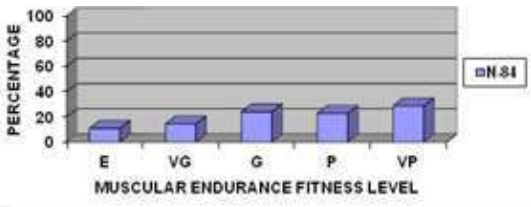


Figure 3. The respondents' muscular endurance fitness.*E=excellent; VG=very good; G=good; P=poor; VP=very poor

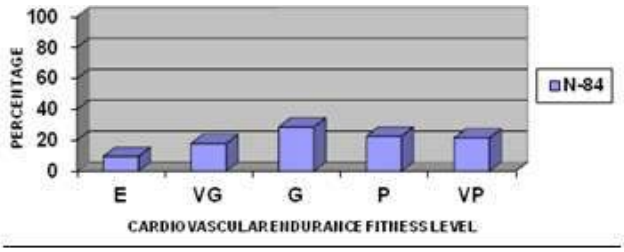


Figure 4. The respondents' cardiovascular endurance fitness.*E=excellent; VG=very good; G=good; P=poor; VP=very poor

Table 1. The proposed circuit training program (Muscular Strength and Flexibility fitness components) for female college students

| **Muscular Strength and Flexibility** |
|---|
| 1st and 2nd Week (3x a week)<br>Resting only 45 seconds between exercises |
| o Station 1- back arm stretch (standing)<br>o Station 2- arm push-up, chin on floor (dog position)<br>o Station 3- body bend forward, toe touching (stride long sitting position)<br>o Station 4- bend trunk forward to stretch leg (hurdle sitting position)<br>o Station 5- sit-up and touch toes, arms overhead (supine lying position)<br>o Station 6- raise both legs 8 counts upward and 8 counts downward (supine lying position)<br>o Station 7- arch back (prone lying position)<br>o Rest 2 minutes then repeat two more times |

Table 2. The proposed circuit training program (Muscular Strength and Flexibility fitness components) for female college students

| **Cardio-Respiratory Endurance and Muscular Endurance** |
|---|
| 3rd and 4th Week (3x a week)<br>Resting only 45 seconds between exercises |
| o Station 1- grapevine R and 4 walking forward, 2 scoop and 2 backward diagonal walking<br>o Station 2- 2 squat R and L, 2 single knee-ups R and L, 1 double knee-up R<br>o Station 3- 2 push to R and 2 push to l, 4 jumping backward and 2 jumping jacks<br>o Station 4- 4 step knee raise forward and backward with arms forward and sideward, lunge sideward R and L single double R lunge<br>o Station 5- grapevine R and turn, step close R and L, knee-ups L, V-step back<br>o Station 6- chicken moving backward and turn R and repeat V-step R forward and turn, repeat V-step R forward<br>o Station 7- 4 scoop R and L, 4 pony R and L, leg curls single (2x) R and L and double R, box step or cross step, Aiza (chicken)<br>o Station 8- 4 step knee raise, alternate R and L with clapping, 4 walking diagonal backward R and L, jumping jack, push (front and back), squat and clap 2x<br>o Rest 2 minutes then repeat two more times |

Table 3. Evaluation of the proposed circuit training program in terms of physical fitness suitability to the respondents

| ITEMS | E | | VG | | G | | P | | VP | | T | WM | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | | 4 | | 3 | | 2 | | 1 | | | | |
| | F | % | F | % | F | % | F | % | F | % | | | |
| 1. The kinds of exercises suit the fitness level of the students. | 6 | 66.67 | 2 | 22.22 | 1 | 11.11 | | 0.00 | | 0.00 | 9 | 4.56 | E |
| 2. The exercises in each phase of the program matches the physiological readiness of the students. | 7 | 77.78 | 2 | 22.22 | | 0.00 | | 0.00 | | 0.00 | 9 | 4.78 | E |
| 3. The exercises in the program is ideal for the general age and sex of the respondents. | 6 | 66.67 | 1 | 11.11 | 2 | 22.22 | | 0.00 | | 0.00 | 9 | 4.44 | VG |
| 4. The frequency, intensity and duration of the program suits the fitness level of the respondents. | 6 | 66.67 | 2 | 22.22 | 1 | 11.11 | | 0.00 | | 0.00 | 9 | 4.56 | E |

Table 4 Evaluation of the proposed circuit training program in terms of exercise sequence

| ITEMS | E | | VG | | G | | P | | VP | | T | WM | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | | 4 | | 3 | | 2 | | 1 | | | | |
| | F | % | F | % | F | % | F | % | F | % | | | |
| 1. The sequence of the exercises in the program followed the warm-up, work-out and cool-down format. | 9 | 100.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | 9 | 5.00 | E |
| 2. The intensity, duration and frequency of the exercises is from easy to difficult, short to long, and seldom to always. | 5 | 55.56 | 2 | 22.22 | 2 | 22.22 | | 0.00 | | 0.00 | 9 | 4.33 | VG |
| 3. The duration followed the short to long duration. | 6 | 66.67 | 2 | 22.22 | 1 | 11.11 | | 0.00 | | 0.00 | 9 | 4.56 | E |
| 4. The sequence of the exercises is logical such as muscular strength convertion to muscular endurance. | 6 | 66.67 | 1 | 11.11 | 2 | 22.22 | | 0.00 | | 0.00 | 9 | 4.44 | VG |
| GENERAL WEIGTHED MEAN | | | | | | | | | | | | 4.58 | E |

Table 5 Evaluation of the proposed circuit training program in terms of target physical fitness components improvement

| ITEMS | E | | VG | | G | | P | | VP | | T | WM | DR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | | 4 | | 3 | | 2 | | 1 | | | | |
| | F | % | F | % | F | % | F | % | F | % | | | |
| 1. There is a priority target component per phase. | 9 | 100.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | 9 | 5.00 | E |
| 2. The exercises are aimed toward health related physical fitness. | 8 | 88.89 | 1 | 11.11 | | 0.00 | | 0.00 | | 0.00 | 9 | 4.89 | E |
| 3. The phases are logically sequence to achieved the desired improvement. | 6 | 66.67 | 2 | 22.22 | 1 | 11.11 | | 0.00 | | 0.00 | 9 | 4.56 | E |