

# Changes of perceived self-esteem dimension using archery as a weekly exercise regime in sedentary youth

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**Abstract:** *the study aimed to evaluate self-esteem following 12 weeks of intervention and detraining from an archery activity among sedentary youth.*

*The study sample consisted of 34 male youth who were chosen randomly, and allocated into archery and control group. The Rosenberg Self-Esteem Score was used, consisting 10 items to measure merely on self-esteem. The measurement was taken three times; baseline, week 12 and week 24 along the intervention course.*

*The results shown that the self-esteem among the archery group was significantly higher following 12 weeks of intervention compared to baseline. However, at week 24 (after detraining), the score was reduced compared to week 12. The level of self-esteem among control group was similar at baseline, post-intervention and detraining.*

*Archery intervention provides good improvement on self-esteem especially among sedentary youth. Withdrawal from archery intervention leads to reduction of self-esteem score.*

**Keyword:** *self-efficacy, adolescence, exercise, arrow, bow*

## 1. Introduction

One every four Malaysian adults is currently had involved with sedentary lifestyle [1]. This figure was considered high despite Malaysia is unlisted as a top rank. For East and South-East Asia region, Philippines was reported as the highest prevalence of insufficient physical activity (39.7%) while Cambodia was the lowest at 10.5% [2]. Various studies specified that prolong sitting and higher time on a screen were frequently named as the main activities performed than other sedentary behaviours [3]–[6]. In addition, several predictors as age, occupational status and physical activity were positively related to sedentary lifestyle [1], [7].

Number of articles were consistent in their findings regarding the association between duration of sedentary behaviour and negative impact on health [8]–[10]. Few evidence related the sedentary lifestyle to increase bodyweight, emotional disturbance and lower self-esteem [11]–[13]. However, attention to self-esteem aspect which associated with sedentary lifestyle

is still low [14]. Moreover, development of self-esteem following some intervention on physical activity also less reported.

Following increase in time spend on sedentary behaviours, intervention programs targeting youth population have been suggested. General recommendation suggested that physical activities (PA) improves self-esteem, however important criteria such as intensity, frequency and type of PA were unclearly described [10], [15]. Therefore, the interventions were difficult to duplicate and monitored. Besides specific exercises regimen, sport is a good method to minimize sedentary behaviours by offering the positive motivation. No specific protocol required in term of frequency, repetition and intensity. Similar to other sports, efficacy of archery on psychology had been investigated previously. Few studies found that experienced archers had greater ability to control emotion and stress compared to junior archers or beginners [16], [17]. The results suggested that archery is potentially provides good vibes to who those play it frequently. Unfortunately, review on the latest articles shows that lack of self-esteem element has been explored. The self-esteem is considered as an important component because it also found lower in sedentary people who attended for psychology assessment [13], [14]. In the other hand, archery also improved physical and health [18], [19]. It is important to note that archery as culturally meaningful and has got a potential to operate as an effective tool for the prevention or reduction of sedentary behaviour and enhancement of perceived psychological status of youth.

Thus, the aim of this interventional study was to examine the effect of a 3-month archery intervention program on self-esteem (positive and negative elements) of sedentary youth. It was hypothesized that a regular PA in an archery intervention program has the potential to improve the self-esteem status of sedentary youth.

## **2. Material and methods**

Thirty-four sedentary youth, male and 18 to 30 years old were randomly allocated equally to two groups; an archery group (AG) and control group (CG). All participants had no or less 150 minutes of moderate-vigorous physical activity (MVPA) in a week. The sample size obtained using the G\*Power software 3.0.10. Hypothesizing an effect size of 0.8, power of 95% at  $p < 0.05$ , a sample size of at least fifteen in each group was required.

Participants under medication or diagnosed with medical conditions (e.g. cardiovascular disease, diabetes, recent fracture, and muscular pain) that would limit ability to perform activities or attended a structured exercise for at least 1 year were excluded. The study had obtained ethics approval from Faculty of Medicine and Health Sciences of the Universiti Sains Islam Malaysia (USIM).

All participant were underwent 24 weeks of intervention duration. The archery group (AG) was assigned with 12 weeks of archery intervention (42 shots/session; 3 sessions/week). The equipment used were traditional recurve bow with draw weight at 35 pound and carbon arrows. The distance of shooting was within 10 meters. Participants were allowed to rest between shots and sessions. The total shots along 12 weeks of intervention were 1512. For CG, no specific intervention provided and they were advised to maintain their lifestyle indeed. No dropped out of participants along 12 weeks. After 12 weeks of intervention, all participants were excluded from the intervention till week 24.

Height, weight and body mass were measured using InBody™ Body Analyser® (model: 270; InBody, US), and digital stadiometer (InBody, US). In this study, BMI was followed the Asian cut-edge classification. The equipment was a self-calibrated machine.

The level of physical activity (PA) was assessed using Short Questionnaire to Assess Health-enhancing physical activity (SQUASH). From four domains, duration of PA in leisure time and sport activities were calculated. All participants should obtained PA duration less than 150 minutes cumulatively. Then, Rosenberg Self-Esteem Scale (RSES) Questionnaire was distributed to participants few times; baseline, week 12 and week 24.

The self-esteem score was analysed using one way ANOVA repeated-measures. The significance level in all analysis was set at 0.05. The analysis were conducted using SPSS version 23.0 (IBM Corp., Armonk, New York, USA).

### 3. Results

The anthropometric, body composition, at baseline are shown in Table 1. The age for AG and CG showed no significant ( $p = 0.07$ ), the anthropometry (height, weight and BMI) and body composition also reported no significant ( $p > 0.05$ ). The duration spent on sitting and MVPA were similar ( $p > 0.05$ ).

Table 1: Demographic data for archery and control group

	AG (n=17)	CG (n=17)	<i>P value</i> *
Age (years)	21.4 ±1.3	22.3 ±1.6	0.07
Height, (cm)	165.7 ±5.2	167.2 ±5.8	0.42
Weight, (kg)	81.1 ±16.3	86.29 ±22.0	0.44
BMI (kg/m <sup>2</sup> )	29.5 ±5.4	30.8±6.8	0.55
Percentage of body fat (%)	33.4 ±9.2	33.8 ±9.8	0.89
Skeletal muscle mass (kg)	29.7 ±4.5	31.1 ±4.2	0.36
Total body water (kg)	38.7 ±5.6	40.4 ±5.2	0.36
Body fat mass (kg)	27.9 ±12.4	31.1 ±15.8	0.53
Sitting (min/week)	1118.8 ±249.2	1111.8 ±383.1	0.95
Physical Activity (min/week)	93.8 ±103.5	97.06 ±91.6	0.92

\*Independent *t* test for difference mean, significant value was set at < .05

The mean with standard deviation of RSES scale is summarised in Table 2. The intervention was effective over time ( $p < 0.05$ ). Further analysis using pairwise showed the significant difference was reported occurred between baseline score and week 12 ( $p < 0.05$ ) but not in week 24.

Table 2. Self-esteem between archery and control group

Parameters	Baseline	Week 12	Week 24	<i>p</i> (partial ETA square)		
				Time Effect	Group Effect	Intervention Effect
Self-esteem						
Archery	26.76±2.88 <sup>Y</sup>	28.82±2.68 <sup>Y</sup>	28.41±2.79	0.006 (0.18)*	0.535 (0.01)	0.237 (0.01)
Control	27.06±2.86	27.82±2.35	27.65±2.03			

\*  $p < .05$  – significant difference using repeated measures ANOVA

<sup>Y</sup>  $p < .05$  – pairwise comparison significant difference between baseline and Week 12

The breakdown to individual group analysis found that archery group obtained significant improvement in self-esteem score between baseline and week 12. Meanwhile, only small mean difference in control group on all three data.

#### **4. Discussion**

Living with sedentary lifestyle is commonly associated with various psychological consequences [20], [21]. Longer engagement with sedentary lifestyle leads to greater effects on the psychology involuntarily. This issue is merely expected because sedentary population is reported certainly exposed to major stress elements [22]. As a consequence, they are susceptible and tend to negatively react to any psychological stressors. This suggested there are difficulty that might be faced by sedentary people especially to deal either with internet or external pressure. With those emotional struggling, sedentary people also were found to have the greater chances to psychological depression and also disturbance of metabolic system following habitual daily routines which known as an excessive daytime sleepiness [23]. All indication were directed to severity of psychological issues which could critically affect the cognitive component.

From the various findings as mentioned, there was a clear inverse relationship between PA quality and human psychology. By enhancing the frequency and intensity of PA, the quality of psychology especially self-esteem is expected to improve. Various regimens were introduced as exercise designs which proposed to control and combat these critical problem. Unfortunately, the exercise regimens sometimes were too complex to follow and consume excessive time which eventually increase risk of withdrawal.

Therefore, sport activity could be introduced as an alternative to conservative exercises to improve PA in this study. This is based on the nature of sport itself which provides indirect encouragement, fun, create challenges, and recognize success. Hence, there are possible to consider sports as way of interventions to improve psychological aspects. It is essential to design an effective approach to minimize time spending in sedentary behaviour and encourage more active lifestyle changes. The present study was carried out to examine the effects of a twelve weeks archery intervention program and 12 weeks of detraining on the psychological factors of sedentary youth.

Evidence which relates sport involvement on self-esteem had increase over decades. Active individuals frequently reported had greater self-esteem [10]. However, the method was quite challenging for sedentary people because higher intensity and longer duration [24]. Besides, footballer reported had moderate to high self-esteem especially on body and physical self-esteem [25]. Unfortunately, it well understood that sedentary people had lack of skills and poor stamina which preventing them to do so. Therefore, important to introduce an individual game or activity which also improve the psychological elements especially self-esteem. Archery is an individual activity was previously acknowledged as an ancient activities for survival purposes [26]–[28] but enjoyable PA with also provides health benefits [17], [29]. The focus of this study was to carry out the archery as an intervention to combat sedentary lifestyle and enhance self-esteem and other psychological indices. The attainment of potential benefits, encouragement on sedentary youth is very important to engage with archery since the game is stationary, no physical contact or challenge from opponents and no special modification required.

After the archery intervention, self-esteem was reported improved significantly. Interestingly, the result was matched to previous studies which the subjects were actively involved in

structured training program and participated in tournaments [30]. Besides, the significant results also comparable to 5-months football intervention which targeted 80% maximum heart rate (HRmax) training [31]. This findings suggested how archery was succeed in initiating and boosting the self-esteem.

The self-esteem score was declined as expected after withdrawn from archery intervention. This trend is acceptable in which it also could affect other components such as musculoskeletal system [32] and general physical performances [33], [34]. Fascinatingly, the score still greater than baseline despite after withdrawal event. This phenomenon also reported in multi-component training [35] and resistance training [32], [36] which could developed from carry effects of particular intervention. The positive effect is important to drive and sustain the previous achievement.

With regular time spend on archery intervention, it provide beneficial impact on self-esteem from time to time on sedentary people. It is a promising intervention especially to cater various factors which contributed to sedentary behaviour [1], [37], [38]. Compared to other sports activities, archery is a PA which employed less aggressive movements and suitable to most of the people.

## 5. Conclusion

The study results show that traditional archery training does influence the changes in self-esteem during intervention and detraining period among sedentary youth. Twelve weeks of archery intervention was significantly improved the self-esteem. However, another twelve weeks of detraining reverse the gains of self-esteem during the intervention.

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