

HOSTED BY



ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: <http://ees.elsevier.com/ejbas/default.asp>

Factor analysis of traditional cardiovascular risk traits in Punjabi adolescents in India

Badaruddoza*, Sandeep Kaur Brar

Department of Human Genetics, Guru Nanak Dev University, Amritsar 143005, Punjab, India

ARTICLE INFO

Article history:

Received 20 August 2014

Received in revised form

15 November 2014

Accepted 20 November 2014

Available online 7 December 2014

Keywords:

Factor analysis

Anthropometric traits

Cardiovascular risk

Punjabi adolescents

ABSTRACT

The accuracy of different anthropometric indices to predict cardiovascular diseases is still debated in adolescent age groups and few data are available in state of Punjab in India. We compared the factor loadings of different anthropometric cardiovascular risk factors. A total of 1530 boys and 1530 girls, adolescents aged 10–18 years were recruited for the present study to identify cardiovascular risk factors. Principal component factor analysis (PCFA) was applied to extract orthogonal components from anthropometric and physiometric variables. Association between components were explained by factor loadings. PCFA reduced 14 risk factors to 4 uncorrelated components that explained 84.06% and 83.15% of total variance among boys, girls and combined subjects respectively. Factor 1 has high loading of the traits that reflects thickness of skinfolds. Comparably, factor 2 is loaded with SBP, DBP and pulse rate. Factor analysis reduced 14 inter-correlated cardiovascular risk factors to 4 newly defined factors. These uncorrelated factors can be interpreted to represent a distinct risk factor for cardiovascular disease in Punjabi adolescents aged 10–18 years.

Copyright 2015, Mansoura University. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

1. Introduction

The cardiovascular diseases (CVD) have grown significantly over the last two decades. The prevalence of CVD in India is known to be very high. However, not many data are available related cardiovascular disease in Indian adolescents, although consistent evidences are found from epidemiological studies on cardiovascular risk factors among adolescent in worldwide study [1–5]. The increasing prevalence of adolescent obesity is one of the major causes to be hypertensive in adulthood. It has also been suggested that the recessive gene or genes could be held responsible for higher BP in children [6]. Several studies

have found a strong linear relationship of body mass index (BMI), waist circumference (WC) and skinfold thickness with hypertension, dyslipidemia, and ischemic heart disease in Indian population [7–12]. Ethnic differences in the different risk factors for hypertension have been well documented in different studies in adults and childhood populations [1,13,14]. Body mass index (BMI) and waist circumference (WC) were widely used to predict the risk of cardiovascular diseases. Some have also advocated waist to hip ratio (WHR), waist to height ratio and skinfold thickness indices for adverse cardio-metabolic risk profile in adolescents [15–21]. However, various statistical methods have been applied to examine the performance of anthropometric indices for the identification of

* Corresponding author.

E-mail address: doza13@yahoo.co.in (Badaruddoza).

Peer review under responsibility of Mansoura University.

<http://dx.doi.org/10.1016/j.ejbas.2014.11.002>

2314-808X/ Copyright 2015, Mansoura University. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Table 1 – Clinical Characteristics (mean \pm standard deviation) according to sex among adolescents in Punjab.

Variables	Boys (n = 1530)		Girls (n = 1530)		Pooled (n = 3060)		P value Boys vs girls
	Mean	SD	Mean	SD	Mean	SD	
Height (cm)	155.41	14.46	151.21	10.07	153.31	12.63	<0.001
Weight (kg)	46.10	15.15	43.78	11.74	45.39	13.64	<0.001
Waist circumference (cm)	69.36	11.91	68.17	11.21	68.76	11.58	<0.004
Hip circumference (cm)	81.29	11.24	82.31	10.64	81.80	10.95	<0.01
Biceps skinfold (mm)	7.84	4.49	9.39	4.57	8.61	4.59	<0.001
Triceps skinfold (mm)	12.61	6.97	15.09	7.04	13.85	7.11	<0.001
Sub scapular skinfold (mm)	13.74	7.98	16.29	8.24	15.02	8.21	<0.007
Waist–hip ratio	0.85	0.06	0.83	0.07	0.84	0.07	<0.001
Body mass index (kg/m ²)	19.01	3.97	18.93	3.87	18.97	3.92	0.573
Systolic blood pressure (mmHg)	123.81	14.04	122.10	13.89	122.96	13.98	<0.001
Diastolic blood pressure (mmHg)	82.24	11.09	81.63	10.70	81.93	10.86	0.120
Mean blood pressure (mmHg)	96.09	11.43	95.12	11.17	95.61	11.31	<0.018
Pulse rate (counts/min)	77.65	7.54	77.32	7.34	77.48	7.44	0.220
Pulse pressure (mmHg)	41.58	8.46	40.47	8.46	41.02	8.48	<0.007

adverse cardiovascular risk profile [22–24]. Therefore, to quantify the magnitude of cardiovascular risk in the present study, multivariate data reduction techniques such as principal component factor analysis (PCFA) have been used to extract uncorrelated factors from various inter-correlated variables [24,25]. In the view of above consideration, the present work was undertaken to determine the significant traditional risk factors through principal component factor analysis (PCFA) among population based Punjabi adolescents aged 10–18 years. Punjab is one of the most prosperous states in India.

2. Subjects and methods

The study population included a total of 3060 (1530 boys, 1530 girls) adolescent subjects were recruited for the present study to identify effective traditional cardiovascular risk factors using principal component factor analysis (PCFA). The data were collected from educational institutes from various districts of Punjab. This study was approved by appropriate ethical research committee of Guru Nanak Dev University, Amritsar in year of 2010. This study population included adolescents from 10 to 18 years of age, of both sexes, enrolled in private higher secondary schools. This cross sectional study was carried out through classroom selection process divided into two stages. In the first stage, 25 Government and private schools were selected. The schools were randomly selected with respect to the proportional probability of school in the stratum. In the second stage, classrooms with respect to age group were selected by simple random sampling. The number was proportional to the population of students in each age group (10–18 years). All the selected students from the groups were considered eligible to participate in the present study after their parents had given written consent beyond student's verbal consent. Exclusion criteria were adolescents with orthopedic problems that prevented anthropometric measurements, no parental consent and adolescent pregnancy (if any).

2.1. Measurements

The anthropometric measurements were taken height (cm), weight (kg), waist circumference (WC) (cm), hip circumference

(HC) (cm) and three skinfolds (biceps, triceps and sub scapular). All anthropometric measurements were taken on each individual using standard anthropometric technique [26,27]. The height was measured using anthropometric rod with the standing erect position with the head in ear–eye plane. The reading was then, recorded to the nearest 0.1 cm. The weight of the subject was measured in kilograms by making them stand on a weighing machine with minimal clothing. Weight was recorded with an allowance deducted for clothing to the nearest 0.5 kg. Waist circumference was measured using a steel tape. The measurement was taken mid-way between the inferior margin of the last rib and crest of the ilium in a horizontal plane with relaxed abdomen. The tape was fitted snugly without compressing the soft tissue. Hip circumference of the subject was taken with steel tape fitted around the pelvis at the point of maximal protrusion of buttocks while the subject was standing with his/her feet close to each other. The readings were recorded for waist and hip circumferences to the nearest 0.1 cm. A Lange skinfold calliper was used to measure the skinfolds to the nearest 0.2 mm. Two subsequent measurements were taken and averages were used in the analysis [28]. The body mass index (BMI) expressed as the ratio of the body weight divided by body height squared (in Kg/m²) and waist to hip ratio (WHR) defined as waist circumference divided by hip circumference. The physiometric variables included systolic blood pressure (SBP), diastolic blood pressure (DBP) and pulse rate. The blood pressure was measured with standardized mercury sphygmomanometer and a stethoscope by following the recommendations of American Heart Association [29]. Two consecutive readings were recorded for each SBP and DBP and the average were used. Pulse rate was counted over one minute. Pulse Pressure was calculated as SBP-DBP. The age of the adolescents was determined directly from their reported date of birth in the school records. All the measurements were taken by second author.

3. Statistical analysis

Data was screened using SPSS version 17.0. The comparison of means between males and females were done by using student's t test. Principal Component Analysis was used to

Download English Version:

<https://daneshyari.com/en/article/559015>

Download Persian Version:

<https://daneshyari.com/article/559015>

[Daneshyari.com](https://daneshyari.com)