ORIGINAL ARTICLE

Studies of Blood Pressure and Prevalence of Hypertension in Schoolchildren in Jakarta

by

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Abstract

Blood pressure measurement was done on 4983 schoolchildren of 6 - 18 years schoolchildren was at random so that the sample population represented the children in Jakarta. The incidence of hypertension in this study is about 3.11%, of which most are found at the age of 15 years.

Presented at the VII[th] National Congress of Pediatrics in Jakarta 11 - 15 September 1987.

Introduction

A standard normal blood pressure in a population of children is necessary for determining the absence or presence of hypertension in a child. Hypertension found in adults is assumed to start since childhood (Lauer et al., 1985), although in 90% of the cases the exact causes are not known and they are included in a group of primary or essential hypertension.

In Indonesia, studies of blood pressure in children are scanty and up to now there is no standard of normal blood pressure available. The purpose of this study is to have a picture of normal blood pressure of children in Jakarta that can be used as a reference to other parts of the country.

Materials and Methods

This study was done by a medical team of the Dept. of Child Health, University of Indonesia, Dr. Cipto Mangunkusumo Hospital in collaboration with Kanwil Depdikbud DKI Jaya and Kanwil Depkes DKI Jaya, and it was carried out in March till April 1986. The study was conducted in 5 areas of Jakarta, i.e. Central Jakarta, East Jakarta, North Jakarta, West Jakarta and South Jakarta. The population consisted of students of elementary and junior high schools. All together there were 10 elementary and 10 junior high schools. The total population was 4983 students, consisted of 2524 boys and 2459 girls, with age range from 6 to 18 years. All of the samples (schools and students) were selected through stratified random sampling.

The blood pressures were examined at the right upper arm in seated and supine positions by 2 medical doctors consecutively. The systolic blood pressure was recorded at Korotkoff I sound and the diastolic blood pressure at Korotkoff V sound. For statistical analysis student t-test was used.

Results

A total of 4983 students were examined, consisted of 2068 elementary school students and 2915 junior high school students.

Table 1 : *Number, sex and school distribution*

Name of school	Number of Students	Sex	
		Boys	Girls
Jakarta Pusat :			
- SD Pasar Baru 02 Petang	287	149	138
- SD Petojo	68	30	38
- SMP Negeri 18	301	152	139
- SMP Bintang Kejora	243	91	152
Jakarta Utara :			
- SD Kalibaru 01 Pagi	334	202	182
- SD Dewi Sartika	91	49	42
- SMP Hangtuah 1	343	139	204
- SMP 162	368	168	180
Jakarta Barat :			
- SD Kali Angke	235	141	94
- SD Grogol 08	181	68	113
- SMPN 75	303	177	126
- SMP Damma Savana	172	101	71
Jakarta Selatan :			
- SD Tebet Barat	222	112	110
- SDN Pejaten 12	164	91	73
- SMP 56	367	140	227
- SMP Muhammadiah	387	165	122
Jakarta Timur :			
- SDN Batu Ampar	270	126	144
- SDN Pulo Gebang	166	73	93
- SMP Pangudi	144	80	64
- SMPN 135	367	224	143
JUMLAH	4983	2524	2459

Note : SDN = Sekolah Dasar Negeri (Elementary School)
SMP = Sekolah Menengah Pertama
SMPN = Sekolah Menengah Pertama Negeri } (Junior High School)

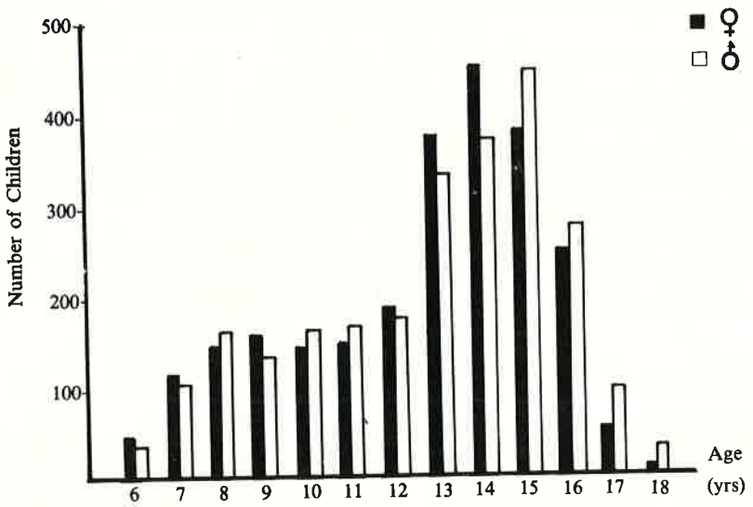

Fig. 1 : *Age and sex distribution of 2889 children age 6 - 18 years*

The mean systolic and mean distolic blood pressures of boys and girls were depicted in fig. 2 and fig. 3.

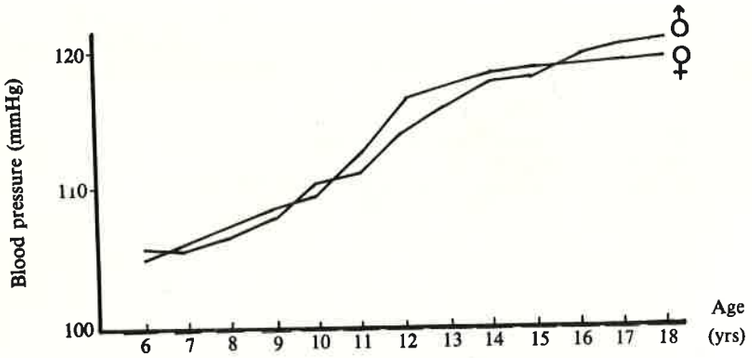

Fig. 2 : *Mean systolic blood pressure*

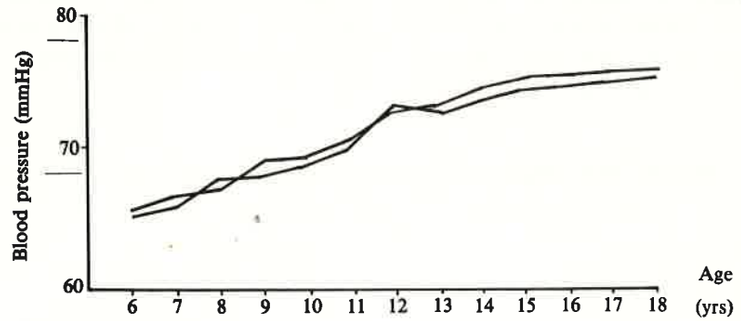

Fig. 3 : *Mean diastolic blood pressure*

The mean systolic and diastolic blood pressures of boys were very similar to that of girls, and they were statistically not significant.

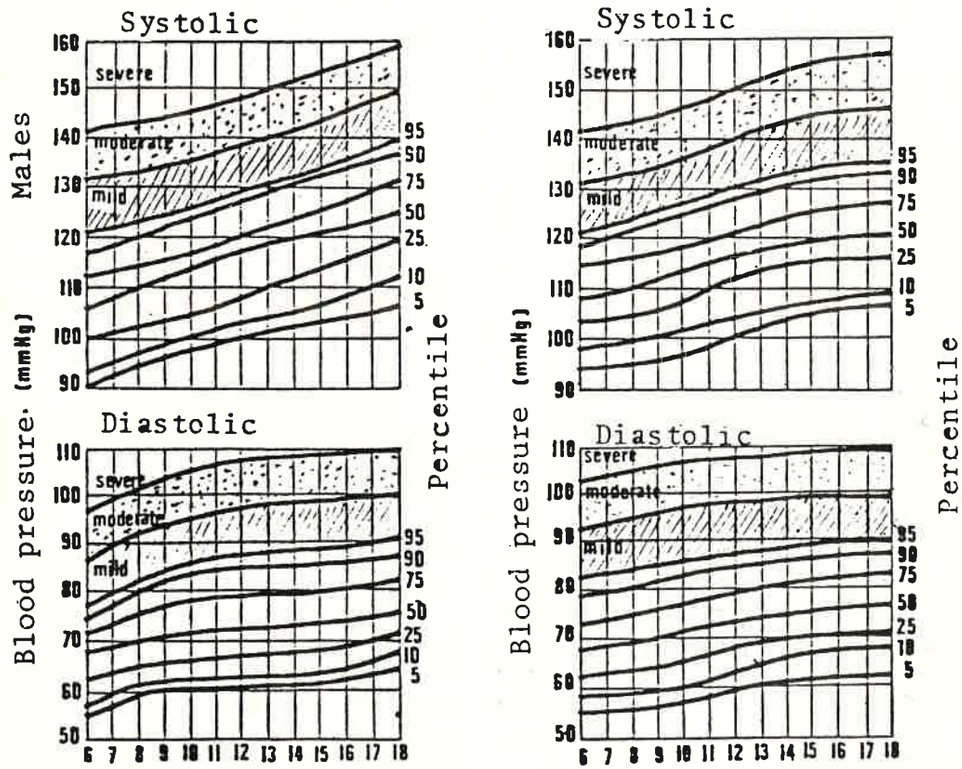

Fig. 4 : *Age-sex-specific percentile chart of 4983 children*

Age-sex-specific percentile charts of systolic and diastolic blood pressures are presented in fig. 4. These charts were developed from measurements made on 4983 school children. Based on these percentile charts, we could find that in 155 children with blood pressure was above 95th percentile (table 2).

Table 2 : *Children with blood pressures above the 95th percentile*

Age (yrs)	Girls	Boys	No.	%
5	-	-	-	-
7	3	-	3	1.36
8	3	2	5	1.60
9	1	3	4	1.36
10	1	3	4	1.28
11	8	3	11	3.48
12	9	1	10	2.77
13	15	11	26	3.64
14	17	8	25	3.04
15	20	22	42	5.06
16	8	12	20	3.80
17	3	3	6	3.00
18	-	-	-	-
Totals	88	67	155	3.11

If these mean blood pressures are compared with the blood pressure reported by the Task Force on Blood Pressure Control in Children (1977), than we could find that systolic blood pressure of male students is significantly different at the age of 15 – 18 years and of the female students is significantly different at 18 years of age. For the diastolic pressure, there is significant difference at the age of 17 – 18 years for male students and at 18 years of age for female students (figs 5.1. – 5.4.).

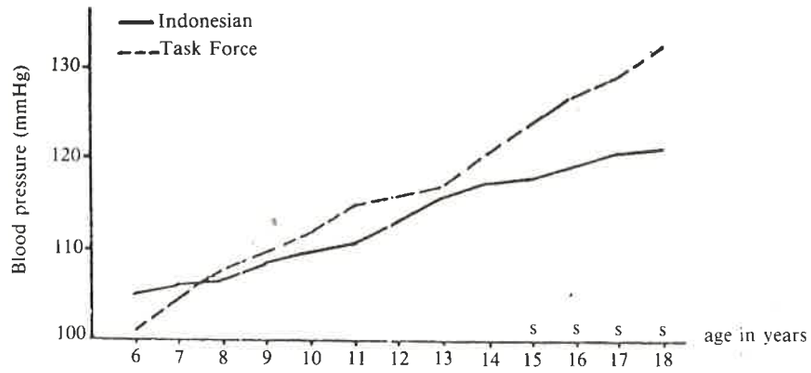

Fig. 5.1. : *Mean systolic blood pressure of Indonesian boy students and the Task Force*

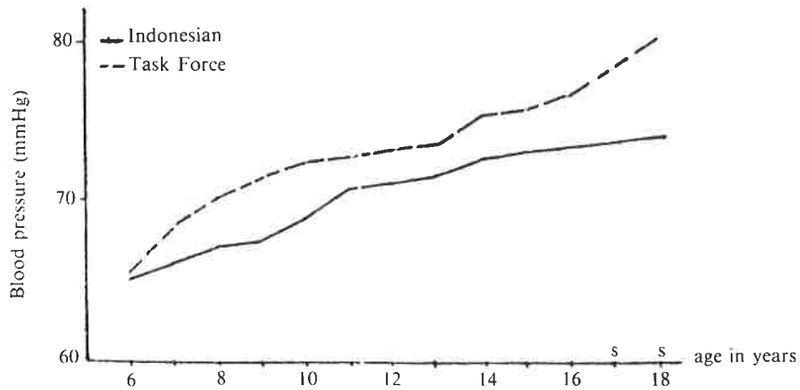

Fig. 5.2. : *Mean diastolic blood pressure of Indonesian boy students and the Task Force*

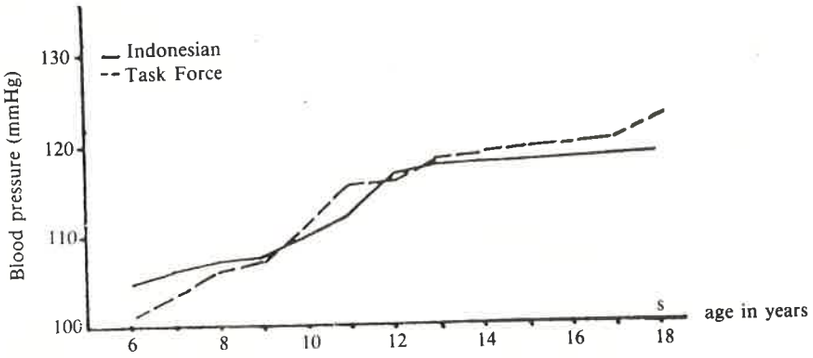

Fig. 5.3. : *Mean systolic blood pressure of Indonesian girl students and the Task Force*

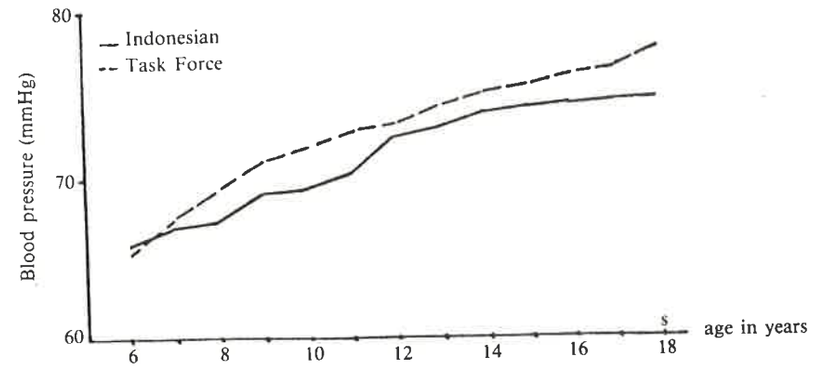

Fig. 5.4. : *Mean diastolic blood pressure of Indonesian girl students and the Task Force*

Discussion

A normal standard blood pressure in a population of children is very important because it can be used to detect the presence of hypertension at an early stage.
The blood pressure in a child is greatly influenced by various factors, such as age, height, weight and nutritional condition (Voors et al., 1976; Lauer et al., 1985). Nevertheless, a standard of blood pressure against age and sex can be used as guidance of population (Task Force, 1977).

In this study measurement of blood pressure was done on 4983 schoolchildren of 6 - 18 years old in 5 regions of the Metropolitan City of Jakarta, in which the selection of the region and schoolchildren was at random so that the sample population represented the children in Jakarta. The incidence of hypertension in this study is about 3.11%, of which most are found at the age of 15 years, (i.e. 5.06%). This does not differ much from the study reported by Kristanti et al., in 1971, who found an incidence of 4.2% in children 3 - 12 years of age. Likewise the study of Wahab (1986) in Yogyakarta (Central Java) found an incidence of 3.18%. Further evaluation of these children with hypertension should be done to look for factors of predisposition, like a history of hypertension in the family. A more careful and accurate physical and laboratory examinations should also be performed (Task Force, 1977).

The average blood pressure in this study, compared with that reported by the Task Force 1977, are significantly different ferences at certain ages (see fig 5.1. and fig. 5.2.). These differences may be caused by differences of race and nutritional condition (Voors et al., 1976). Because the number of these samples is relatively large and they are taken from almost every social stratum, so the result of this study might be useful as guidance and reference of the normal standard blood pressure in children in Indonesia.

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