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Study of blood pressures of subjects over 75 years of age in nursing homes

Richard Chris Pitner
University of Nebraska Medical Center

A STUDY OF BLOOD PRESSURES OF SUBJECTS OVER 75 YEARS OF AGE IN NURSING HOMES

RICHARD C. PITNER

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There have been many studies regarding the relationship of blood pressure with weight, height, and age, but little on subjects over 65 years of age. There had been little information on blood pressures in the elderly until Master and Lasser reported their findings in 1958. This was probably due to the fact that most studies are done by insurance companies who deal only with those under 65. This study was to determine the blood pressure in apparently healthy people over 75 years old in nursing homes.

Studies of those who are under 65 years of age have shown that: (1) there is a rise in the systolic and diastolic pressure as the weight increases in both men and women (Boyton and Todd[1], Dunham[5], Master, Dublin, and Marks[8], and Schnurman[16]); (2) there is a higher mortality associated with increased weight because of a greater incidence of degenerative and metabolic disease such as atherosclerosis, hypertensive cardiovascular disease and diabetes mellitus (Dublin and Marks[4]); and (3) the average weight of the general population and the number of obese increase with advancing age until about 50 years of age (Symonds[17]).

Previous studies on the elderly were based on an inadequate number of subjects or covered an unrepresentative sample. Master and his associates made a study of blood pressures of 5,612 subjects over 65 years of age in good

health. Unlike this study here reported, Master's group did not personally ascertain the data from observations upon patients; instead, they compiled data obtained by questionnaires sent to physicians throughout the country. Their compilations show that height bears little or no relationships to blood pressure, but increases with increasing weight. In contrast to the trend at ages under 65 years, the mean systolic and diastolic pressures do not show a continuous rise with age after 65 years. After the age of 74 years, the systolic pressure declines slowly in women, but remains essentially constant in men. The mean diastolic pressure shows little variation from ages 65 years to 80 years and tends to decline thereafter.

Methods and Material

The subjects in this study are all inhabitants of homes for the aged in Omaha. The homes were selected so that all areas and types of homes were represented. Only those 75 years of age or over and in apparently good health were included. Those with known cardiovascular disease, an acute illness, or on medication effecting blood pressure were excluded. This however did not exclude subjects with undiagnosed cardiovascular disease. Those on unknown medication were also rejected.

The number finally accepted for this study was 122 subjects, ranging from 75 years of age to 99 years of age. Of the 122 selected, 35 subjects were male and 87 females. All subjects were divided according to sex and again divided into five year age groups from 75 years to 100 years. There were 7 males and 23 females in the 75-79 age group; 10 males and 36 females in the 80-84 age group; 12 males and 22 females in the 85-89 age group; 3 males and 4 females in the 90-94 age group; and 3 males and 2 females in the 95-100 age group.

The charts of the subjects were screened to determine any history of disease and treatment received or being received. The ages of the subjects were taken from the charts. The blood pressures were taken at least one hour after eating and most of them in the evening. Comstock[13] with 1,162 cases showed no difference in blood pressures in the morning or afternoon. The subjects were in the sitting position and pressures obtained on the left arm. Rodstein[14] showed that there was only a mild fall of blood pressures upon standing in 250 aged persons and that the pressure never fell below 90/54. A hand model tycos sphygmomanometer was used to take the pressure. A standard stethoscope with a diaphragm was used. The systolic pressure was taken at the onset of the Korotkoff sounds and the diastolic pressure at the diminution

of sounds. The sounds were recorded at the nearest 2 mm. mark. Also recorded were the pulse and respiratory rate. These were counted for one minute. The arithmetic mean or average, average deviation, variance and standard deviation (σ) were determined for each age group. The average for all males and for all females were then determined. The average of both female and males were also figured.

During this survey as an aside study of interest, subjects were also asked if they were edentulous. As this inquiry was not started at the beginning of the survey, not all of the subjects in the study were included. The rather surprising findings are reported here, even though the dental survey was not the essential investigative problem.

Results

Males The mean systolic blood pressure of the 75-79 age group was 153 mm. Hg. and the mean diastolic pressure 79 mm. Hg. with a standard deviation of 34 and 14 respectively. There was a decline in the mean systolic pressure with increase in age except for the 90-94 age group with a mean pressure of 154 mm. Hg. (σ=23). The mean diastolic pressure remained about the same in all age groups except the 95-100 age group which had a diastolic mean of 64 mm. Hg. (σ = 4). It is interesting that there was a decrease in weight with increasing age. Two out of seven in the 75-79 age group were on medications,

both of which were vitamins. Two of five in this group asked were edentulous.

The mean blood pressure in the 80-84 age group was 148 mm. Hg. (σ = 29) systolic and 80 mm. Hg. (σ = 16) diastolic. Out of ten in this group, two were taking medications. Of eight asked in this group, four were edentulous.

The 85-89 age group of males had a mean blood pressure of 141 mm. Hg. (σ = 13) systolic and 79 mm. Hg. (σ = 8) diastolic. In this age group only 4 out of 12 did not take medication. Five of the eight receiving medications were taking vitamins. Five out of nine asked in this group were edentulous.

The mean systolic pressure reached its peak in the 90-94 age group at 154 mm. Hg. (σ = 23). The mean diastolic pressure was 73 mm. Hg. (σ = 5) which is an increase over the other groups. All of the men in this age group were edentulous but none of them were receiving medication.

The mean blood pressure of the males 95-100 was 123 mm. Hg. (σ = 7) systolic and 64 mm. Hg. (σ = 4) diastolic. This is the lowest mean for both systolic and diastolic of all groups. Of the three in this group, only one received medication which was a sleeping pill.

The mean systolic blood pressure for males of all ages was 145 mm. Hg. The mean diastolic pressure was 78 mm. Hg.

13 out of 35 males were receiving medication, 8 of which were vitamins, and 14 out of 28 asked were edentulous. The average male in this study was 85 years old and weighed 136 pounds with a pulse of 78 per minute.

Females The mean systolic pressure seemed to rise from the 75-79 age group to the 85-89 age groups and descent with the 90-94 age group. The peak was at the 95-100 age group but this is because only two samples were obtained, one of which had undiagnosed hypertension.

The mean diastolic pressure continued to rise with age from 74 mm. Hg. of the 70-79 age group to 99 mm. Hg. of the 95-100 age group.

The 75-79 age group had a mean blood pressure of 154 mm. Hg. ($\sigma = 22$) systolic and 74 mm. Hg. ($\sigma = 13$) diastolic. 14 out of the 23 were receiving medication with 10 of these receiving vitamins. Of 16 asked, 11 were edentulous.

The mean blood pressure of the 80-84 age group was 162 mm. Hg. ($\sigma = 24$) systolic and 85 mm. Hg. ($\sigma = 7$) diastolic. 13 out of 36 in the group receiving medication. Of 31 asked, 21 were edentulous. Of the twenty-one, three wore upper plates only.

In the 85-89 age group of females the mean blood pressure

was 161 mm. Hg. ($\sigma = 23$) systolic and 77 mm. Hg. ($\sigma = 9$) diastolic. Of the 22 females in this group, 9 received medication with 6 of the 9 taking vitamins. 17 of 19 asked were edentulous but 2 of these wore lower plates only.

The mean blood pressure of the 90-94 age group was 156 mm. Hg. ($\sigma = 21$) systolic and 91 mm. Hg. ($\sigma = 12$) diastolic. Three of four in this group were receiving medication, all on vitamins. Only one person in this group was asked about dentures and she wore a lower plate only.

In the 95-100 age groups, the mean blood pressure was 185 mm. Hg. ($\sigma = 25$) systolic and 95 mm. Hg. ($\sigma = 5$) diastolic. Only one of the two were edentulous. Neither of the two were receiving any medication.

The mean blood of all females in all age groups was 159 mm. Hg. systolic and 83 mm. Hg. diastolic. The average female weighed 129 pounds and was 83 years old with a pulse of 78 per minute.

Both Sexes It is interesting that the mean systolic pressure of the females always remained higher than that of the males. The mean diastolic pressure varied though both were close except from 90 years and above. The weight of both sexes decreased with increasing age. The respiratory rate remained constant for both sexes at all ages. The heart rate also was

fairly constant in all ages.

The mean blood pressure for both sexes of all ages (122 subjects) was 155 mm. Hg. systolic and 81 mm. Hg. diastolic. The average person in this study was 84 years old, weighed 131 pounds, had a pulse of 78 per minute, and breathed 20 times per minute. Of the 122 subjects in th study, 54 were receiving medication. Of the 54, 35 were receiving vitamins, 5 were on tranquilizers and 5 were receiving donnatal.

These means are very similar to those reported by Master and his group[10]. They reported a mean for males above 65 years as 145 mm. Hg. systolic and 82 mm. Hg. diastolic. For females they reported a mean of 156 mm. Hg. systolic and 82 mm. Hg. diastolic. Out of the 95 asked, only 29 were not edentulous.

Summary

1. Blood pressures of 122 apparently healthy inhabitants over 74 years of age, 35 males and 87 females, in homes for the aged are given.
2. The pulse, respirations, weight, medication, and wearing of dentures were also recorded.
3. The subjects were divided into sexes, subdivided into 5 year age groups and the mean blood pressures recorded as follows:

(a) 75-79

Males - 153/79 mm. Hg.

Females - 154/74 mm. Hg.

(b) 80-84

Males - 148/80 mm. Hg.

Females - 162/85 mm. Hg.

(c) 85-89

Males - 141/79 mm. Hg.

Females - 161/77 mm. Hg.

(d) 90-94

Males - 154/73 mm. Hg.

Females - 156/91 mm. Hg.

(e) 95-99

Males - 123/64 mm. Hg.

Females - 185/95 mm. Hg.

4. The mean blood pressure for all males was 145/78 mm. Hg. and the mean pressure for all females was 159/83 mm. Hg. The mean pressure for both males and females was 155/81 mm. Hg.
5. Of the 122 in the study, 54 (44%) were receiving medication.
6. Of 95 subjects asked, 66 (69%) were edentulous.

Conclusion

1. The systolic pressure of males decreases with age after 75 while the diastolic remains almost constant.
2. Both the systolic and diastolic pressures in females increase with age after 75 and are higher than in males.
3. There is a decrease in weight in healthy elderly people with increasing age.
4. The majority of the subjects in this study have good dental care.
5. The life expectancy is greater for those without hypertension.

Acknowledgements

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2. The managers of the homes surveyed
3. The subjects of the survey
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MALES 75-79

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
1	78	220--	108	84	24	164	no	ne
2	77	140--	70	76	19	153	no	ne
3	77	160--	72	84	19	163	no	e
4	77	140--	80	80	24	124	no	na
5	75	110--	64	67	18	160	vit	na
6	77	146--	74	81	21	148	no	ne
7	78	156--	86	76	23	160	vit	e
AVG	77	153--	79	78	21	153	2:7	2:5 not edentulous

Standard deviation of the systolic pressure 34

Standard deviation of the diastolic pressure 14

FEMALES 75-79

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
1	75	190--	94	80	20	170	no	ne
2	75	170--	110	87	19	174	b&d	ne
3	77	130--	76	89	21	104	vit	e
4	78	150--	100	88	20	122	t&a	na
5	78	144--	70	80	20	143	no	e
6	78	150--	74	76	21	113	di	na
7	78	132--	92	80	23	155	no	na
8	78	160--	76	76	22	101	no	na

FEMALES 75-79 con't

#	AGE	BP S	BP D	P	RESP	WT	DRUGS	DENTAL CONDITION
9	79	200	100	76	20	150	t	e
10	75	190	84	88	24	150	vit	e
11	77	138	74	88	18	120	vit	na
12	78	170	80	61	21	100	vit, d thyroid	na
13	76	170	100	79	19	150	vit	ne
14	75	120	68	80	18	143	no	ne
15	78	130	66	79	19	120	no	e
16	79	156	82	75	21	142	no	e
17	75	170	90	81	21	160	B_{12}	e
18	76	108	66	79	19	115	vit	e
19	77	152	82	83	19	135	vit	ne
20	75	158	80	80	17	134	vit	e
21	77	156	78	83	23	155	no	e
22	78	158	78	75	21	120	vit	e
23	79	150	86	77	19	131	no	e
AVG	77	154	74	80	20	135	14:23	5:16 not edentulous

Standard deviation of the systolic pressure 22

Standard deviation of the diastolic pressure 13

MALES 80-84

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
1	80	180--	110	88	22	184	no	ne
2	84	140--	64	69	21	143	no	e
3	84	110--	68	79	19	103	no	ne
4	80	130--	66	76	20	115	no	na
5	80	210--	100	68	20	160	no	na
6	81	120--	66	75	19	135	no	ne
7	82	142--	90	85	21	143	no	e
8	82	148--	74	81	21	123	no	e
9	83	146--	80	73	22	148	vit	ne
10	84	150--	80	75	19	150	no	e
AVG	82	148--	80	77	20	140	2:10	4:8 not edentulous

Standard deviation of the systolic pressure 29

Standard deviation of the diastolic pressure 16

FEMALES 80-84

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
1	84	194--	84	88	22	162	b	e
2	82	140--	76	76	20	172	no	e
3	82	149--	90	75	21	128	vit, d	e
4	81	140--	70	93	21	81	d	e

FEMALES 80-84

#	AGE	BP S	BP D	P	RESP	WT	DRUGS	DENTAL CONDITION
5	82	174--	90	88	20	115	vit	e
6	82	140--	70	80	20	138	milk/ mag	e
7	81	140--	76	95	21	119	eye/ drops	e
8	80	144--	70	59	19	130	no	ne
9	84	180--	90	80	20	125	no	ne
10	84	168--	90	84	20	95	no	e
11	84	170--	110	79	19	150	no	na
12	80	130--	66	73	19	122	no	na
13	83	150--	80	50	20	105	no	na
14	80	220--	90	60	20	132	no	na
15	83	120--	80	75	20	83	t	ne
16	82	160--	80	99	18	130	no	na
17	82	130--	80	74	16	135	no	ne
18	84	210--	104	72	20	125	vit, d	ne
19	80	180--	140	67	19	114	no	e
20	80	150--	80	81	21	155	no	e
21	84	160--	100	99	20	110	vit	e
22	82	156--	70	81	20	130	vit thyroid	e
23	83	134--	78	85	18	150	no	e
24	84	190--	108	87	19	154	no	e

FEMALES 80-84 con't

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
25	81	152--	88	77	19	125	no	ne
26	81	140--	80	76	18	140	no	ne
27	82	210--	80	72	20	135	no	ne
28	84	150--	86	69	19	120	no	e
29	84	150--	66	76	20	136	no	e
30	83	158--	82	71	20	123	no	e
31	83	178--	90	81	20	148	vit	e
32	82	162--	84	74	16	118	no	ne
33	81	160--	84	76	17	108	vit	e
34	84	172--	96	85	22	150	no	e
35	83	168--	78	65	21	140	no	e
36	84	144--	70	64	17	133	vit	e
AVG	82	162--	85	75	19	129	13:36	10:31 not edentulous

Standard deviation of the systolic pressure 24

Standard deviation of the diastolic pressure 7

MALES 85-89

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
1	87	160--	80	60	18	174	vit	e
2	89	150--	90	97	19	142	no	ne
3	88	110--	60	71	27	134	tedral	na

MALES 85-89 con't

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
4	88	140--	80	85	21	140	decadron	ne
5	89	140--	74	80	20	144	no	e
6	87	140--	80	63	19	130	t	na
7	87	130--	80	88	20	153	vit	ne
8	85	144--	76	88	20	180	vit	e
9	88	150--	90	96	20	120	no	ne
10	89	142--	84	72	20	130	no	e
11	88	138--	74	88	18	150	vit	ne
12	87	152--	80	80	22	156	vit	e
AVG	88	141--	79	81	20	143	8:12	5:10 not edentulous

Standard deviation of the systolic pressure 13

Standard deviation of the diastolic pressure 8

FEMALES 85-89

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
1	89	210--	108	92	24	122	vit, b	e
2	87	150--	72	73	19	106	vit	e
3	86	176--	74	89	25	99	t	e
4	87	178--	74	83	19	82	no	e
5	86	174--	80	81	21	133	no	e

FEMALES 85--89 con't

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
6	87	140--	80	95	19	128	no	ne
7	89	176--	70	72	20	152	no	e
8	87	110--	60	136	19	100	doriden	na
9	87	140--	80	89	17	120	vit	na
10	88	150--	76	79	23	130	no	na
11	86	166--	74	88	20	102	vit	e
12	86	170--	90	72	21	162	eye/ drops	e
13	89	144--	76	72	20	128	no	e
14	87	140--	70	60	18	144	no	e
15	89	146--	76	95	19	113	no	e
16	87	212--	78	91	21	118	no	e
17	86	150--	74	72	20	140	no	e
18	87	160--	78	79	20	119	no	ne
19	86	158--	76	77	19	105	vit	e
20	87	148--	68	75	17	110	no	e
21	88	172--	82	85	21	140	no	e
22	87	166--	82	83	23	135	vit	e
AVG	87	161--	71	80	20	122	9:22	2:19 not edentulous

Standard deviation of the systolic pressure 23

Standard deviation of the diastolic pressure 9

MALES 90-94

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
1	93	150--	78	80	20	132	no	e
2	92	180--	70	79	19	168	no	e
3	94	132--	70	65	17	125	no	e
AVG	93	154--	73	75	19	142	0:3	0:3 not edentulous

FEMALES 90-94

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
1	94	154--	90	81	21	130	vit	e
2	90	160--	100	79	23	140	vit	na
3	94	180--	100	80	20	135	vit	na
4	90	128--	74	78	20	130	nc	na
AVG	92	156--	91	80	21	134	3:4	0:1 not edentulous

MALES 95-100

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
1	99	130--	68	88	24	113	no	na
2	98	116--	60	60	20	80	b	na
3	98	124--	64	80	18	95	no	na
AVG	98	123--	64	76	21	96	1:3	0:0 not edentulous

MALES 95--100 con't

Standard deviation of the systolic pressure 7

Standard deviation of the diastolic pressure 4

FEMALES 95--100

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
1	97	170--	80	76	18	135	no	ne
2	95	210--	110	84	20	145	no	e
AVG	96	185--	95	80	19	140	0:2	1:2 not edentulous

Standard deviation of the systolic pressure 25

Standard deviation of the diastolic pressure 5

MALES ALL AGES AVERAGE

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
35	85	145--	78	78	20	136	13:35	11:26 not edentulous

FEMALES ALL AGES AVERAGE

#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
87	83	159--	83	78	20	129	39:87	18:69 not edentulous

MALES & FEMALES ALL AGES AVERAGE

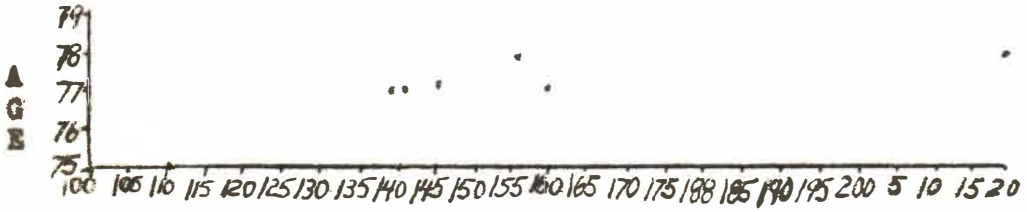
#	AGE	BP S	D	P	RESP	WT	DRUGS	DENTAL CONDITION
122	84	155--	81	78	20	131	54:122	29:95 not edentulous

CODE

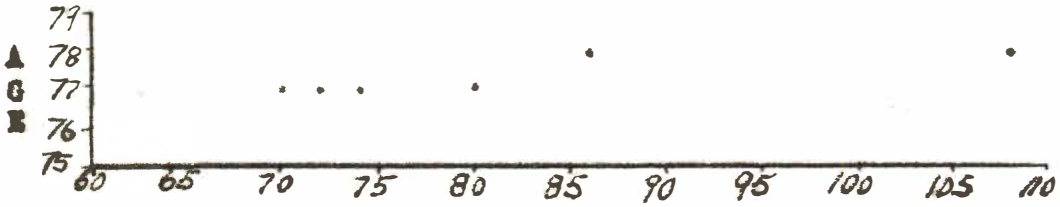
a	-	aminophyllin	P	-	pulse
b	-	barbituate	SD	-	standard deviation
BP	-	blood pressure	S	-	systolic
D	-	diastolic	t	-	tranquilizer
di	-	dilantin	vit	-	vitamins
d	-	donnatal	WT	-	weight
Resp	-	respiratory rate			

CODE for DENTAL CONDITION

e	-	edentulous
ne	-	presence of at least one natural tooth
na	-	not asked



Males 75–79 systolic pressure



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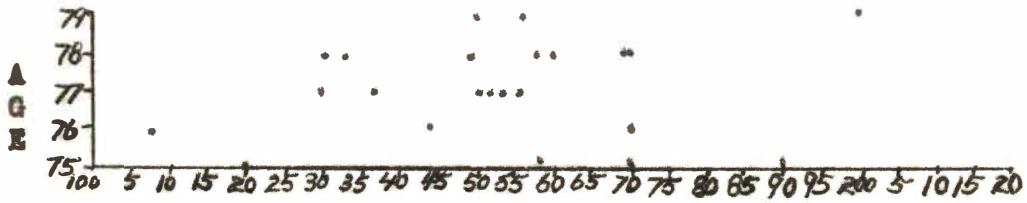

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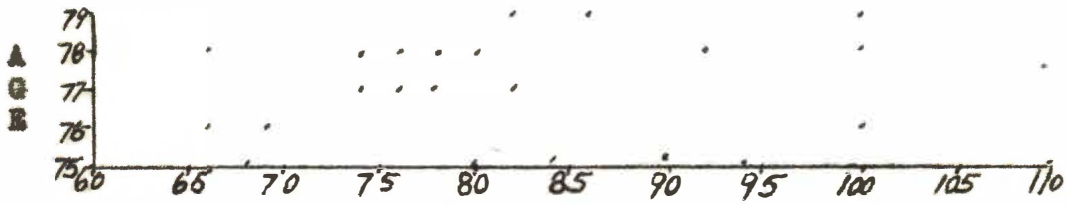

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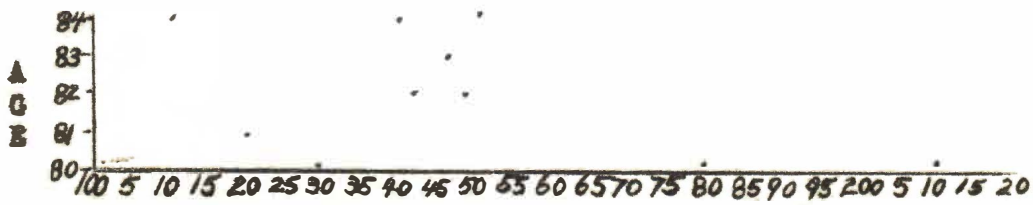
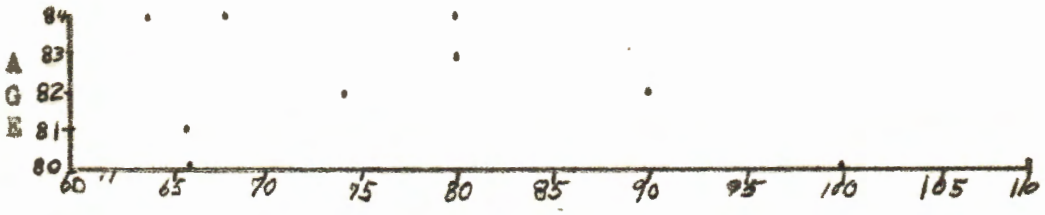
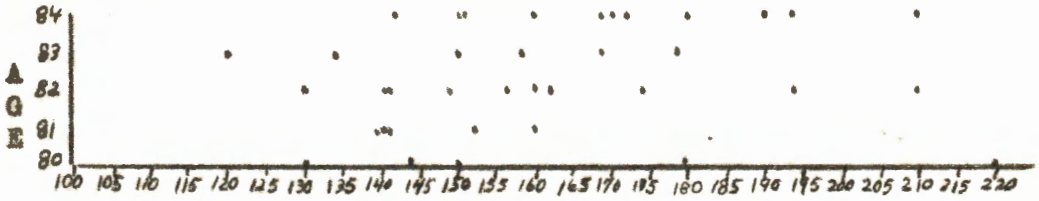


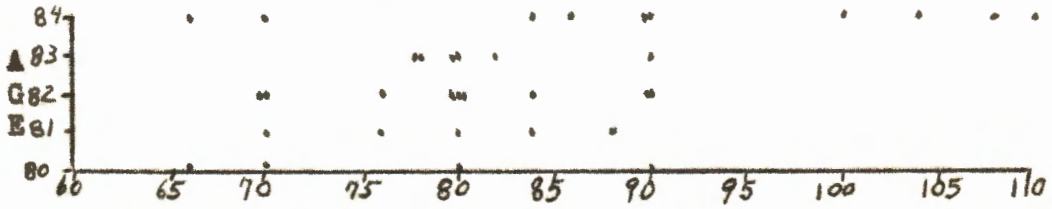
Males 80–84 systolic pressure



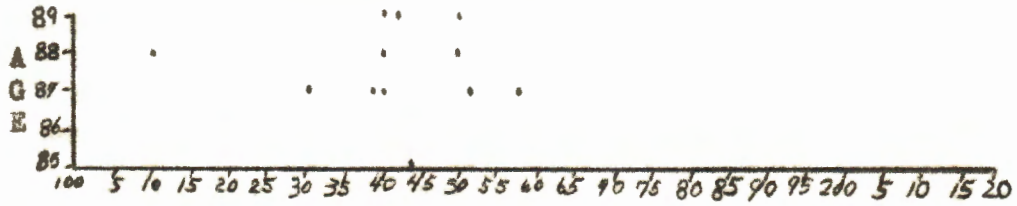
Males 80-84 diastolic pressure



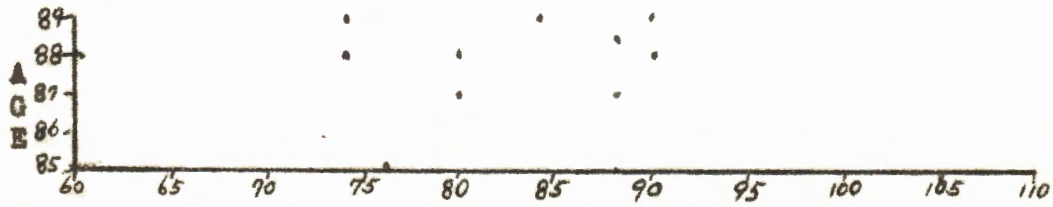
Females 80-84 systolic pressure



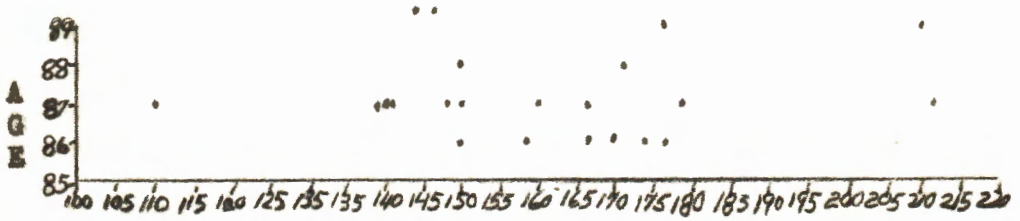
Females 80-84 diastolic pressure



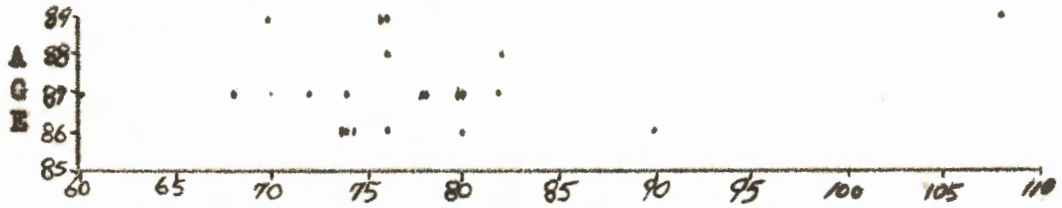
Males 85-89 systolic pressure



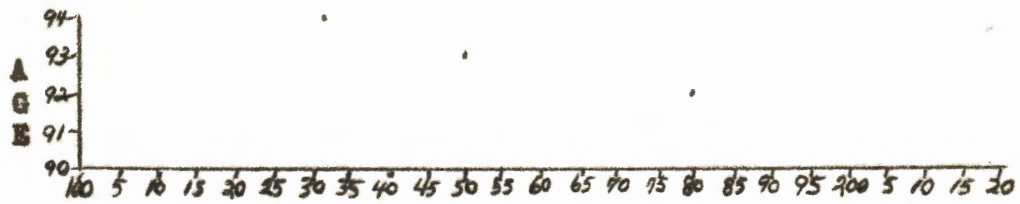
Males 85-89 diastolic pressure



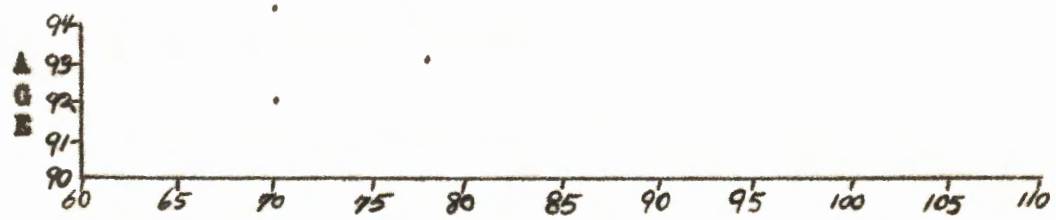
Females 85-89 systolic pressure



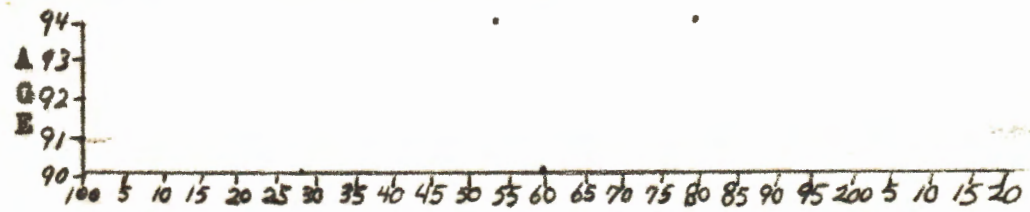
Females 85-89 diastolic pressure



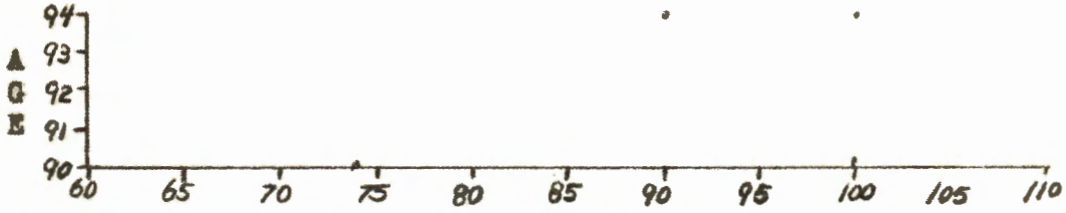
Males 90-94 systolic pressure



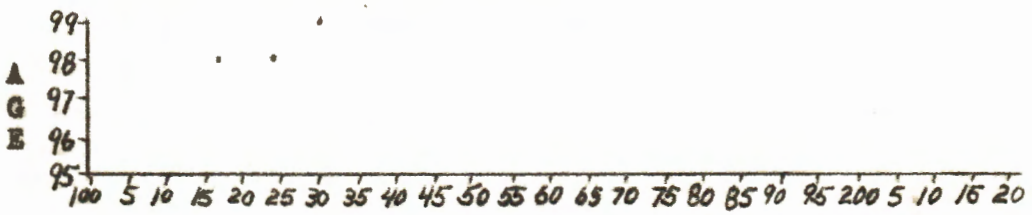
Males 90-94 diastolic pressure



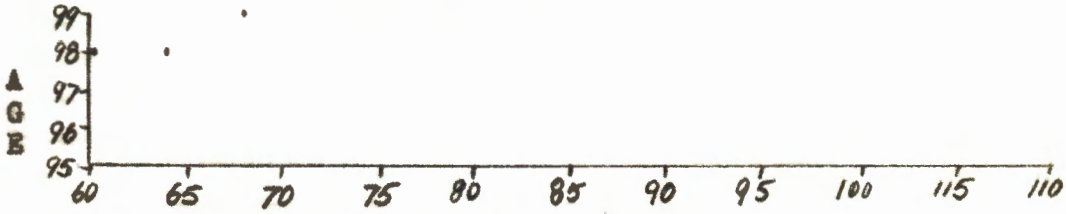
Females 90-94 systolic pressure



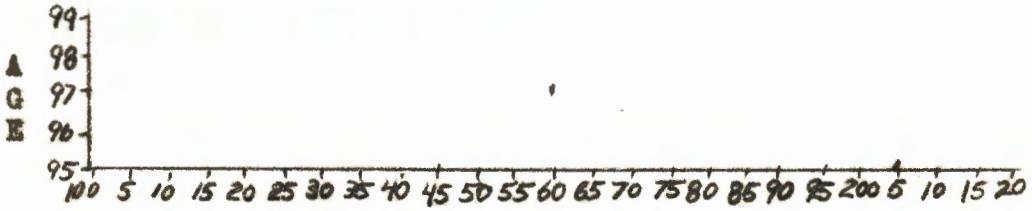
Females 90–94 diastolic pressure



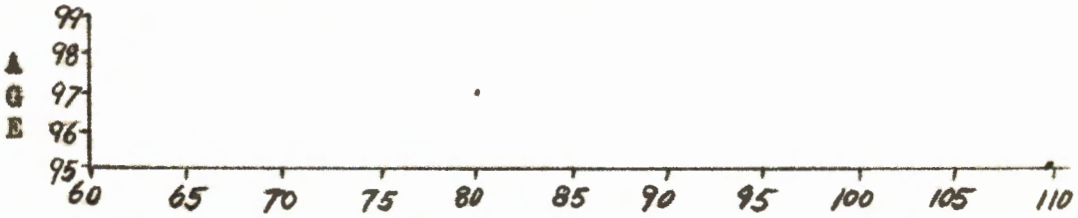
Males 95–99 systolic pressure



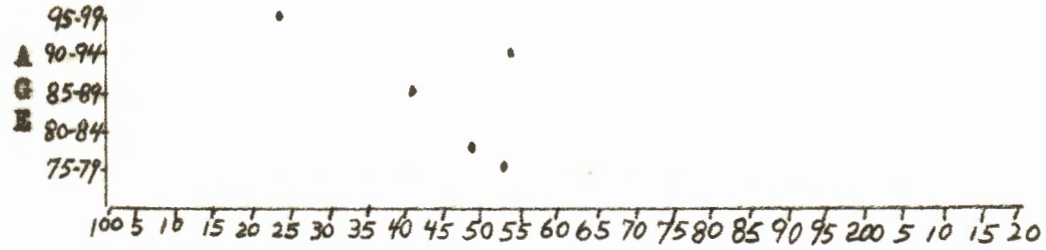
Males 95–99 diastolic pressure



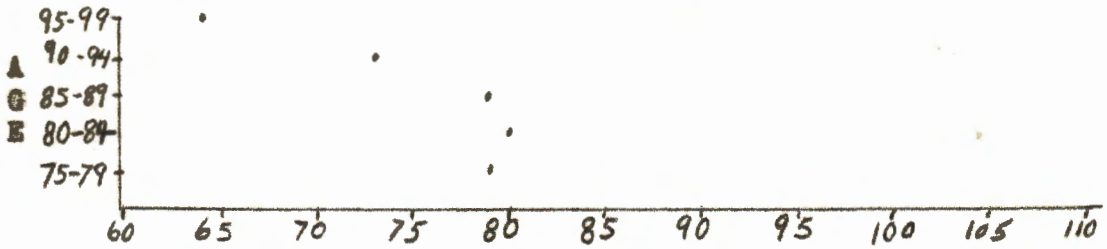
Females 95–99 systolic pressure



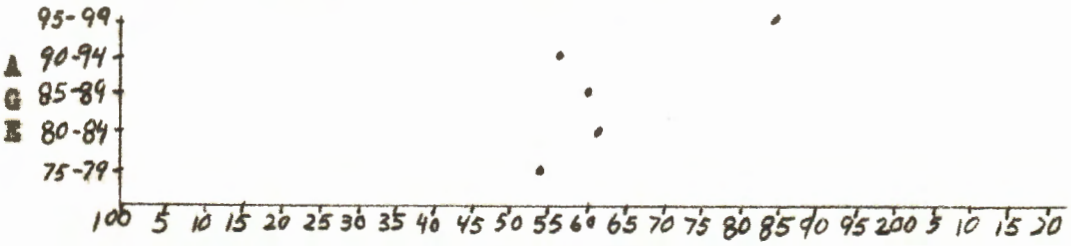
Females 95–99 diastolic pressure



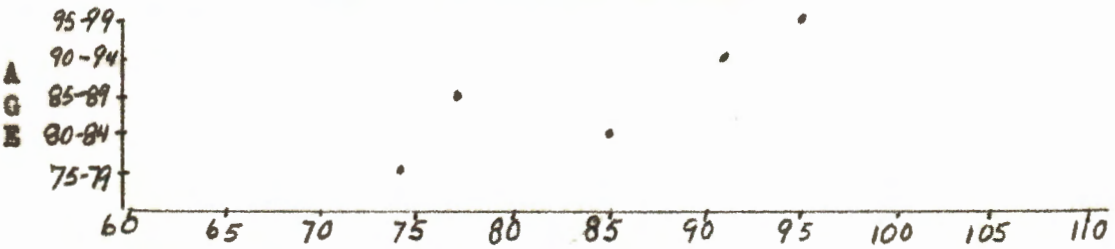
Males all ages 75-99 systolic pressure



Males all ages 75-99 diastolic pressure



Females all ages 75-99 systolic pressure



Females all ages 75-99 diastolic pressure

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