Chapter III

PROBLEM AND PROCEDURE

The importance of the study of child development and the need of studying and establishing the norms and interrelationships of the aspects of physical growth have already been discussed (see Introduction). The relevant literature has also been reviewed in the preceding chapter. The problem and procedure for the present study have been discussed in the present chapter.

Problem

As it has been observed earlier, the present study has been undertaken with a view to studying a number of different aspects of physical growth of children of both sexes from urban as well as rural areas. The study has been restricted to children from two to six years of age, observed at an interval of three months.

For the present study samples of children of age levels from two to six years have been observed. The children (of both sexes) came from families from urban and rural areas and were mostly selected from nursery schools (balwadis or kindergartens) in the age group 2 years - 6 months to 5 years

- 6 months. The younger children (2 years to 2½ years) were contacted in their homes and the older children (upto six years) in primary schools.

The data on the physical development of infants presented here consist of twelve direct measurements and an additional one derived from them. The direct measurements included (1) weight, (2) height, (3) head circumference, (4) chest circumference, (5) width between shoulders, (6) arm length, (7) sitting height, (8) upper arm circumference, (9) fore-arm circumference, (10) thigh circumference, (11) calf circumference and (12) foot length. The derived measurement was the length of the lower limb (leg); this was derived by substracting sitting height from total or standing height.

The inclusion of subjects of both sexes and two main areas of residence, viz. urban and rural, enabled the investigator also to examine the sex differences as well as area (milieu or main type of environment) differences, if any, in these physical measures of growth. Further, the varied background information collected about the subjects made it possible to study available data in relation to some variables, such as education, occupation, income, socio-economic level etc. of the parents, age of mother at first birth of a child, number of siblings in the family, family size and birth order of

children under study.

The data obtained have been subjected to adequate statistical techniques for analysis, such as chi-square test, analysis of variance (F-test) technique and correlational techniques (e.g. product-moment correlation, biserial correlation, and contigency correlation). A special technique to analyse the trend of development or of specific items of physical growth has been also used to study growth pattern of 600 children under mixed longitudinal study. All the results of statistical analysis have been presented in tables and discussed in subsequent chapters containing results and discussion.

The present investigation has been taken up with several specific objectives, viz.,

(1) To collect reliable empirical data on the essential aspects of physical development which would include, in addition to the usually studied aspects of height and weight, the growth of the head, chest, upper and lower limbs and feet;

(2) To establish reliable and acceptable norms of physical growth at various age points for the pre-school years, especially for Gujarat;

(3) To investigate the influence of the urban and rural

milieu as well as sex differences in the physical growth of pre-school children;

(4) To study the influence of the socio-economic status of the family on the physical growth of pre-school children; and later, as a follow-up study.

(5) To study the influence of the mother's age (at the time of the birth of the child under investigation), birth order of the child and size of the family (meaning the number of siblings) on physical development during the pre-school years.

These were the primary objectives of the study. However, other relevant background information was also obtained regarding the health conditions of the children, the educational and occupational information on mother and father, and the personality of children as viewed by parents, though this aspect of study is not claimed to be exhaustively and systematically studied with refinement of control and design.

In addition, the availability of urban sample of same children for continuous study over a sufficient period of time (at least one year) encouraged the investigator to make also a longitudinal study of physical growth, besides the main cross-sectional approach which is usually resorted to in such a doctoral study constrained by time-limit. This type of longitudinal study involving overlapping age-ranges may best be described as a Mixed Longitudinal Study.

The procedural problems that arose were several; the investigator had to make decisions on some points before the investigation could be taken up :

(a) The urban and rural areas (milieu) to be covered under the study;

(b) The institutions/homes to be covered in the study;

(c) The sample number of children to be included in the study;

(d) The tools to be used for measuring the aspects of growth;

(e) The procedure of measurement and the physical landmarks;

(f) Training of assistants;

(g) Analysis of the data to be collected.

(a) Selection of the urban and rural areas

The fact that the investigator resides in Baroda and is enrolled as a research scholar in the Faculty of Education and Psychology of the Maharaja Sayajirao University of Baroda weighed heavily on the selection of Baroda as the urban milieu to be included in the present investigation.

For the rural milieu mostly the villages around Baroda

were selected. Some children from rural areas of Surat district were also included as the investigator was assured cooperation there.

For the longitudinal study children were to be measured every three months which implied that the areas to be included in the study had to be accessible by road throughout the year. This cannot be assured for most of the rural areas, especially during the monsoon. Hence only urban children were included in the longitudinal study.

(b) Institutions/homes covered in the study

In Baroda Balwadis (kindergarten schools) were selected in different localities so as to cover the different socio-economic groups. Balwadis have many points in their favour for being selected for such studies in preference to private homes. In the Balwadis one can measure at a time many children in the pre-school age group coming from varied socio-economic groups. Also, one may expect cooperation from teachers who appreciate the importance of such investigations. In Balwadis the children's response is more cooperative than at home. Main advantage of selecting kindergartens and schools is that at one place one is able to measure a large number of children with relatively low expenditure of time and money, in comparison to visits at homes scattered over a large area. Again,

the Balwadis are better places than homes for longitudinal studies, for in the former one may expect to get the same child for observation at least for a year and the children enrolled in Balwadis are usually available throughout the school days (barring vacations) whereas among the children not enrolled in Balwadis there may be many who transfer to places with their elders thus leaving the investigator helpless when he visits their homes for periodic data collection.

With the above considerations in mind, only Balwadi-going children were included in the present investigation as far as possible. However, it was not possible at Balwadis to study children of the age group two-to-three years. The minimum age for being enrolled in the Balwadis is 2 years and 6 months and many parents do not send their children to Balwadis till they are at least three years of age. In such cases, the home visits procured the children of 2-to-3-years age group for study.

In the rural milieu only such villages which had Balwadis were selected for study. As a result of the efforts of the Government and other social welfare agencies there are many villages all around, which have Balwadis and consequently the availability of rural centres and cooperation of workers therein necessary for studies like the present one assisted the investigator to extend her study also to the rural area.

(c) Sample number of children included in the study

a) Apart from the requirements demanded by the statistician one has to take into account the possibility of losing many of the subjects halfway during the period of study. This risk of losing the subjects for study is really serious in case of the age group two-to-three years. The mothers may often visit their parental homes and, obviously, take the infants with them. Also the incidence of illness appears to be higher in this age group. This may be related to the cutting of teeth. Some parents may not like that their tender children are subjected to physical handling by outsiders repeatedly every three months and they may not be found willing to cooperate with the investigator after one or two initial measurements are taken. This may not present a very serious problem in a cross-sectional study, but the inadequacy or unsuitability of such subjects in a longitudinal study is obvious.

Such considerations make it imperative that much larger numbers of children are included at each age-level (or age point) than the minimum numbers desired on statistical grounds. For the cross-sectional study the minimum number of children was fixed at 80 and for the longitudinal study at 40 on the whole at each of the 17 age points distributed at intervals of three months between two and six years of age under study.

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Efforts were made to ensure that at least at this lower limit of numbers of children, boys and girls were sufficiently represented for statistical reasons. Thus out of a fairly very large number of children (more than 3500) contacted at the beginning the number of children actually available for the statistical analysis of the data at the end of investigation included 990 boys and 868 girls making a total of 1858 children of whom 991 came from the urban milieu and the rest (i.e. 861) from the rural milieu. The observations made on these 1858 subjects at different possible intervals amounted to 5699 in all. This formed a cross-sectional study. The (mixed) longitudinal study finally reported data on 600 urban children (316 boys and 284 girls), each observed continuously at interval of three months for five times (at least), thus giving in all 600 X 5 = 3000 observations.

(b) Number of Observations.

It should be noted that an attempt has been made to observe and make measurements of different aspects of physical growth repeatedly at intervals in case of most of the children. However, in practice very few children could be observed continuously for a sufficient length of time for reasons noted below; consequently the data available have been studied in two parts, namely, (i) cross-sectional study of a total sample

of 1858 children, combining all the observations at different age-points, irrespective of the subjects being the same or different; (ii) longitudinal study of 600 urban children of both the sexes (out of 1858 of the main sample), whose continuous data at least for five observations were available. The total number of subjects (N) and the observations (O) available on them have been summarized areawise, sexwise, age-level-wise, socio-economic level-wise etc. in tables 3.1 to 3.4 and graphically represented in figures 3.1 to 3.4. In case of table 3.2 showing the number of observations at each age-point, it should be borne in mind that the number of observations (O) correspond to the number of subjects (N) observed at that particular age-point in a cross-sectional study.

There were quite a few dropouts during the course of the investigation. The main reasons for these dropouts were :

1) transfer of the father;
2) change of residence and change of school without leaving forwarding address;
3) illness of the child;
4) death of the child (very rarely);
5) the parents (especially the mother) not cooperating; this last reason was mostly faced in the age group two-to-three years.

(d) & (e) Tools of measurements and the measuring procedure

(see Appendix 1 for figures)

Singh and Bhasin (1968) was followed for defining anthropometric measurements and fixing the bodily landmarks. The other work found useful is by Robinson (1963).

1. Weighing Balance

For weight German-made spring balances calibrated in kilogram were used. The child was made to stand on the platform of the balance barefoot and the weight taken. The weight was taken with underwears on. Every time a child was to be weighed the pointer on the balance scale was adjusted to zero. The units of measurements of weight were kilograms.

In a few cases, again in the two-to-three years age group, the subjects would not cooperate by standing on the balance. In these cases the mother was weighed with the child in her arms and again without the child and the child's weight was calculated as the difference between the two weights.

2. Measurement of Height (standing height) and the sitting height.

All the measurements other than weight were taken in centimetres, and from the left side of the child.

(Appendix 2)

A platform-cum-measuring rod was specially designed for the present investigation. The device consists of a wooden platform (A) on which is mounted a square rod (B) at right angles to the plane of the platform. The child is made to stand barefoot on the platform A, in such a way that the heels touch the flanks (B). A steel tape with centimetre markings (upwards with zero marked at the bottom end of the rod B) is mounted laterally on the rod on the left side when viewed from the front. The head is positioned so that the lowest point on the border of the bone socket of the left eye and the highest point on the anterior margin of the tragus of each ear lie in a plane at right angles to the long axis of the trunk. In this position the stature (standing height) was measured as the projected (straight line) distance from the top of the head to the plantar surfaces of the feet. To determine the top of the head a right angle (D) with one arm moving in the grove E on the rod B and the other arm projecting at right angles to the rod B in the front (over the platform) was used. This right angle was suitably moved in the grove so that its projected arm rested upon the top of the child's head. The reading on the scale E corresponding to the lower surface of the projected arm of the right angle gave the standing height in centimetres.

Sitting height. Sitting height was taken with the help

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of the same device. The measuring device was placed on a table of such a height that the feet of a child sitting on the top with the legs hanging freely from the knee joint would not touch the floor on which the table rests. The child was made to sit on the platform in an upright position with his flanks touching the platform and the lower half of the lower limbs (legs) hanging freely from the knee joint. The dorsal surface of the buttocks would press against the flanks on the lower end of the rod. The reading on the scale corresponding to the top of the head in this position would give the sitting height.

The length of the lower limbs was derived as the difference between the standing height and the sitting height of the subject.

3. Length of the foot. The device for the measurement of height has a contrivance for measuring the length of foot also. There is a block F which can freely move in the grove G on the platform. There is a pointer P mounted on this block on its side facing the rod B. This pointer slides over a scale S mounted on the left edge of the platform. The scale is marked in centimetres from zero to 30 cm. with the zero on the end towards the rod B.

The child stands on the platform A with his heels touching the rod flanks B'B'. The block F is moved along the grove G

till its side with the pointer touches the foremost point of the left foot when the scale is read at the point corresponding to the pointer P. This gives the length of the foot.

4. Measure tape.

Singer measure tape with a centimetre scale on it was used for taking the measurements of the shoulder breadth and the circumferences (girths) of the various parts of the body included in the present study. A liberal supply of tapes was maintained so as to avoid the possibility of using over stretched and worn out tapes. The procedure adopted for the various parts of the body is now described.

Shoulder Breadth (Biacromial Breadth) or the dorsal distance between the two shoulders was measured as the distance between the two acromia. While the subject stood on a stool or on floor, the investigator stood behind the subject. With the left hand the investigator placed the zero end of the tape on the left acromion of the subject and with the right hand the tape was stretched upto the right acromion of the subject. The distance was taken as the biacromial breadth.

Head Circumference was measured as the horizontal circumference of the head along with the hair. The investigator stood before the standing subject and the tape was held on the glabella with the left hand and then taken around the

head horizontally over the left side (with the investigator's right hand) to ophistocranion and then back to the glabella. The tape was allowed to overlap the zero end beyond the 10th centimetre mark and the marking on the scale of the overlapping portion of the tape corresponding to the 10th mark was read. This reading minus ten gave the head circumference in centimetres.

Chest Girth or circumference of the chest was measured with the subject breathing normally. To take this measurement the investigator stood in front of the standing subject. The tape was placed around the chest horizontally at the level of the nipples passing over the lower scapular angle in such a way that the mark of 10th centimetre on the tape was placed on the right nipple of the subject and the reading on the tape overlapping this point which corresponded with the 10th centimetre was read. The reading minus ten centimetres gave the circumference of the chest in centimetres.

Thigh Girth. This was measured as the maximum circumference of the upper leg between the knee joint and the gluteal furrow. The investigator held the tape at the 10th mark on the scale and placed it around the left thigh from the left side of the subject. The mark on the scale on the overlapping tape corresponding to the tenth mark was read. This reading minus ten gave the girth of the thigh.

Calf Girth was taken as the circumference of the calf where the calf muscles are most developed. The procedure adopted was similar to that described for thigh girth.

Arm Length. The subject stood erect with the arms fully stretched and hanging freely. The distance between the left acromion and the tip of the middle finger of the left hand of the subject was measured by means of the measuring tape and taken as the length of the arm (upper limb).

Girth of the Upper Arm was measured as the maximum circumference of the left upper arm where the bicep muscles are most developed.

Girth of the Fore-arm was measured as the maximum circumference of the left forearm between the elbow and the wrist.

(f) Training of assistants :

Measurements were taken under the direct supervision of the investigator hereself wherever possible. This was especially true about the urban study. In case of the rural milieu the work had to be entrusted to trained assistants at times. The investigator contacted the Department of Anatomy of the Baroda Medical College and made hereself familiar with the technique of locating the various physical landmarks. The assistants were taught this technique and their measurements were frequently checked

to ensure that correct procedure was followed.

(g) Data-collection and processing

A data sheet proforma was prepared and copies thereof were printed (Appendix 3). The observations recorded were coded to be transferred on IBM computer cards.

Other characteristics of the sample under study :

The earlier paragraphs have described the main characteristics of the sample, i.e., the main variables that have been studied, viz., area (milieu), sex and socio-economic level, as influencing the various aspects of physical growth. The distribution of the total sample classified on the basis of these variables for both approaches has been already shown in tables 3.1, 3.2, 3.3 and 3.4. However, more information on other characteristics of the sample was also collected in the questionaire. The data on these characteristics are summarized in the next tables 3.5 to 3.12 with appropriate graphs along with. This information is simply summarized for understanding the details of the sample, but it is not statistically sufficiently analyzed here to examine the influence of these characteristics on the growth, particularly because of the limitations of time and space in such a doctoral work. It is followed up separately in the follow-up studies elsewhere. The characteristics of the

sample summarized are :

1. Family income level classified into five categories, viz.,

(a) less than Rs. 200/- p.m.

(b) Rs. 200 upto Rs. 400/- p.m.

(c) Rs. 400 upto Rs. 800/- p.m.

(d) Rs. 800 upto Rs.1600/- p.m.

(e) Above Rs. 1600/- p.m.

(table 3.5)

2. Education of the father classified as

(a) Illiterate

(b) Primary education

(c) Secondary education

(d) College education (undergraduate)

(e) Postgraduate education.

(table 3.6)

3. Occupation levels of the father, classified as

(a) Manual labourers, etc.

(b) Clerks, school-teachers, etc.

(c) College teachers, junior officers, petty merchants, etc.

(d) Professionals (doctors, lawyers, engineers, big businessmen, senior officers, university professors, etc.)

(e) Higher categories such as heads of institutions, senior executives and directors of big firms and industries, etc.

(table 3.7)

4. Education of the mother classified as

(a) Illiterate

(b) Primary

(c) School final and upto standard X

(d) S.S.C.

(e) undergraduate college education

(f) Graduates

(g) Postgraduate education

(table 3.8)

5. Occupation of the mother classified as

(a) Housewife (not employed outside)

(b) Working outside (earning upto Rs. 500/- p.m., holding regular posts)

(c) Working outside (earning above Rs. 500/- p.m.)

(table 3.9)

6. Family size (classified on the basis of the number of siblings).

(a) with one child

(b) with two siblings

(c) with three siblings

(d) with four or five siblings

(e) with six or more siblings

(i) sex-wise, (ii) area (milieu)-wise, (iii) family income-wise, (iv) father's education-wise (v) father's occupation-wise, (vi) mother's education-wise, (vii) mother's occupation-wise, (viii) socio-economic level-wise).

[table 3.10(i-viii)]

7. Mother's age at first child-birth classified as

(a) below 20 years

(b) 21 - 25 years

(c) 26 - 30 years

(d) 31 - 35 years

(e) above 35 years

(i) sex-wise (ii) area-wise, (iii) family income-wise, (iv) father's education-wise, (v) father's occupation-wise,(vi)mother's education-wise, (vii) mother's occupation-wise (viii) Socio-economic level-wise

[table 3.11(i-viii)]

8. Birth order position of the children classified as

(a) first born

(b) second born

(c) third born

(d) fourth born

(e) fifth, sixth, seventh and above-born

(i) at each of 17 age-points of children,

(ii) in each of the five categories of age of mother.

[table 3.12 (i & ii)]

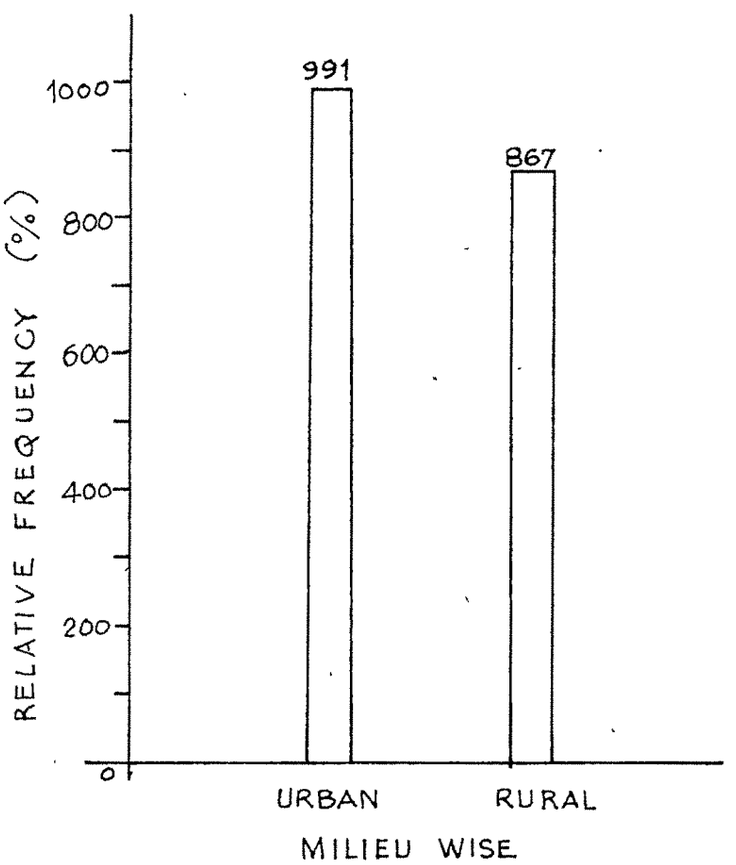
It should be noted that wherever possible whatever statistical information is possible and relevant to the study has been given in the relevant sections of the discussion of results in next chapters.

Table 3.1 - showing the distribution of the total subjects (N) as well as observations (O) in the whole sample area-wise, sex-wise and area X sex-size.

(cross-sectional study).

Area (Milieu)	Boys		Girls		Total children	
	N	O	N	O	N	O
Urban	514	2488	477	2278	991	4766
Rural	476	518	391	415	867	933
Total	990	3006	868	2693	1858	5699

GRAPH NO. 3·1 (a)


991
867
1000
800
600
400
200
0
RELATIVE FREQUENCY (%)
URBAN
RURAL
MILIEU WISE

GRAPH NO. 3·1(b)

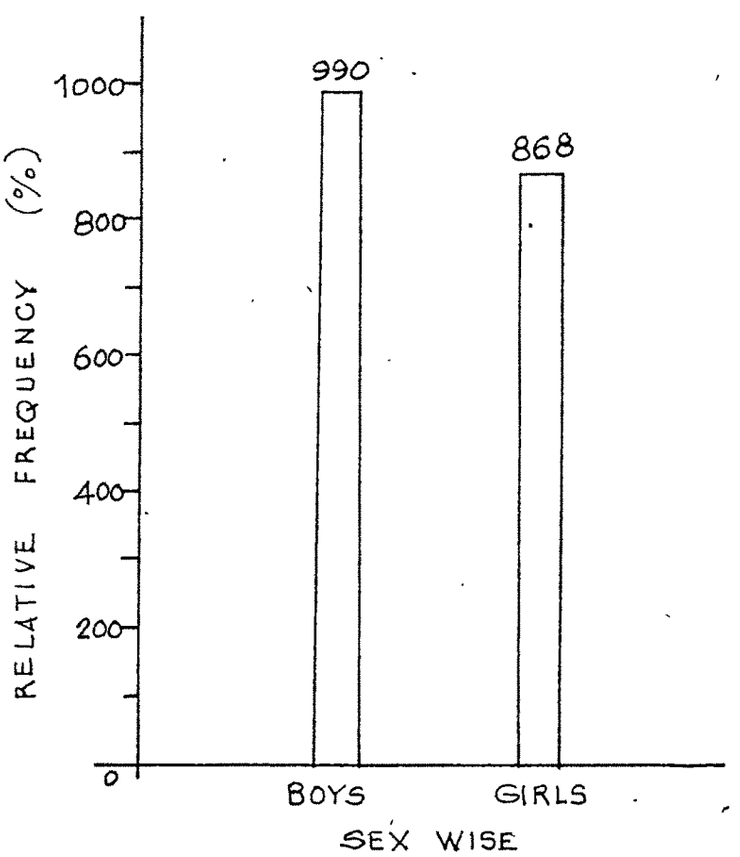

RELATIVE FREQUENCY (%)
1000
800
600
400
200
0
990
868
BOYS
GIRLS
SEX WISE

FIG. 3·1 (c)

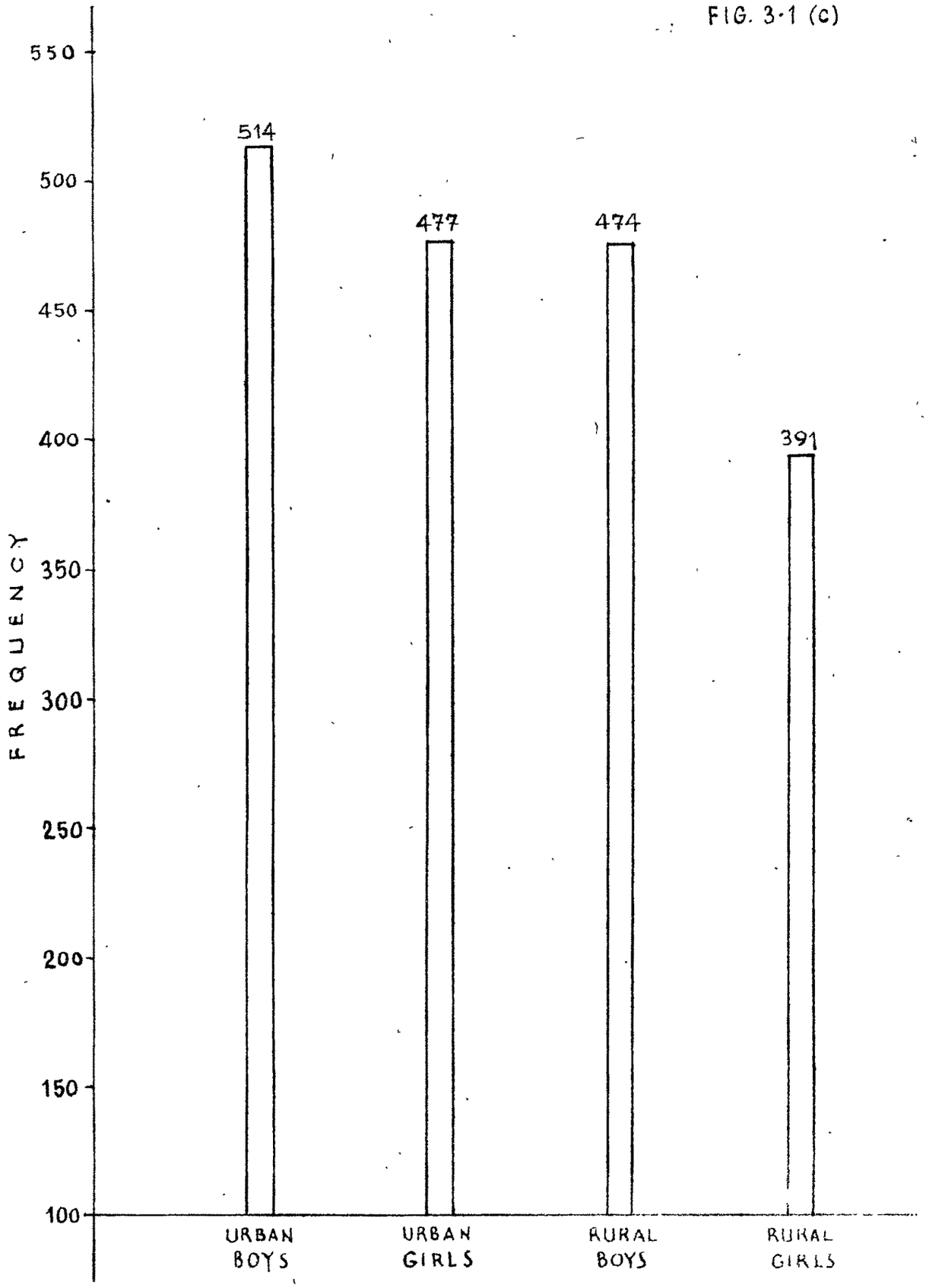

550
500
450
400
350
300
250
200
150
100
FREQUENCY
514
477
474
391
URBAN BOYS
URBAN GIRLS
RURAL BOYS
RURAL GIRLS

Table 3.2 - showing the distribution of the total number of observations (O) area-wise, sex-wise and area X sex-wise at each of the 17 age-points.

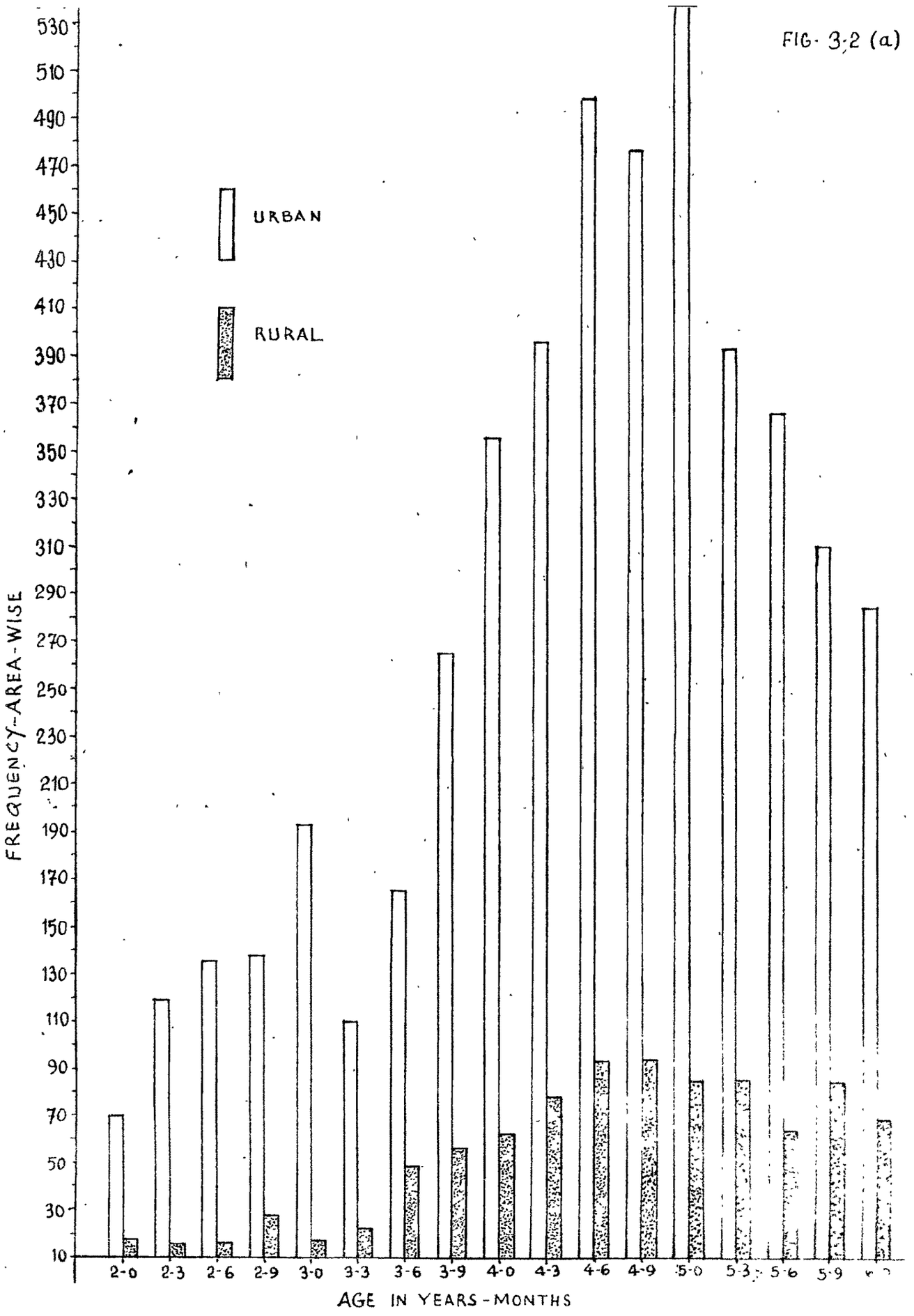
Age point Yrs./months	Milieu X Sex-wise			
	URBAN		RURAL	
	Boys	Girls	Boys	Girls
2 - 0	38	32	8	9
2 - 3	62	57	6	10
2 - 6	73	62	10	6
2- 9	74	64	15	13
3 - 0	107	86	12	05
3 - 3	57	53	12	10
3 - 6	85	80	33	15
3 - 9	143	122	25	31
4 - 0	176	180	35	27
4 - 3	213	183	50	28
4 - 6	242	207	54	39
4 - 9	253	224	54	40
5 - 0	283	256	46	39
5 - 3	191	202	42	43
5 - 6	183	183	37	27
5 - 9	158	152	42	42
6 - 0	150	135	37	31
	2488	2278	518	415

5699

Table 3.2 - contd.

Age point Yrs./months	Milieu-wise		Sex-wise		Total Children
	Total Urban	Total Rural	Total Boys	Total Girls	
2 - 0	70	17	46	41	87
2 - 3	119	16	68	67	135
2 - 6	135	16	83	68	151
2 - 9	138	28	89	77	166
3 - 0	193	17	119	91	210
3 - 3	110	22	69	63	132
3 - 6	165	48	118	95	213
3 - 9	265	56	168	153	321
4 - 0	356	62	211	207	418
4 - 3	396	78	263	211	474
4 - 6	449	93	296	246	542
4 - 9	477	94	307	264	571
5 - 0	539	85	329	295	624
5 - 3	393	85	233	245	478
5 - 6	366	64	220	210	430
5 - 9	310	84	200	194	394
6 - 0	285	68	187	166	353
	4766	933	3006	2693	5699

FIG. 3.2 (a)


URBAN
RURAL
FREQUENCY-AREA-WISE
530
510
490
470
450
430
410
390
370
350
330
310
290
270
250
230
210
190
170
150
130
110
90
70
50
30
10
2-0
2-3
2-6
2-9
3-0
3-3
3-6
3-9
4-0
4-3
4-6
4-9
5-0
5-3
5-6
5-9
AGE IN YEARS-MONTHS

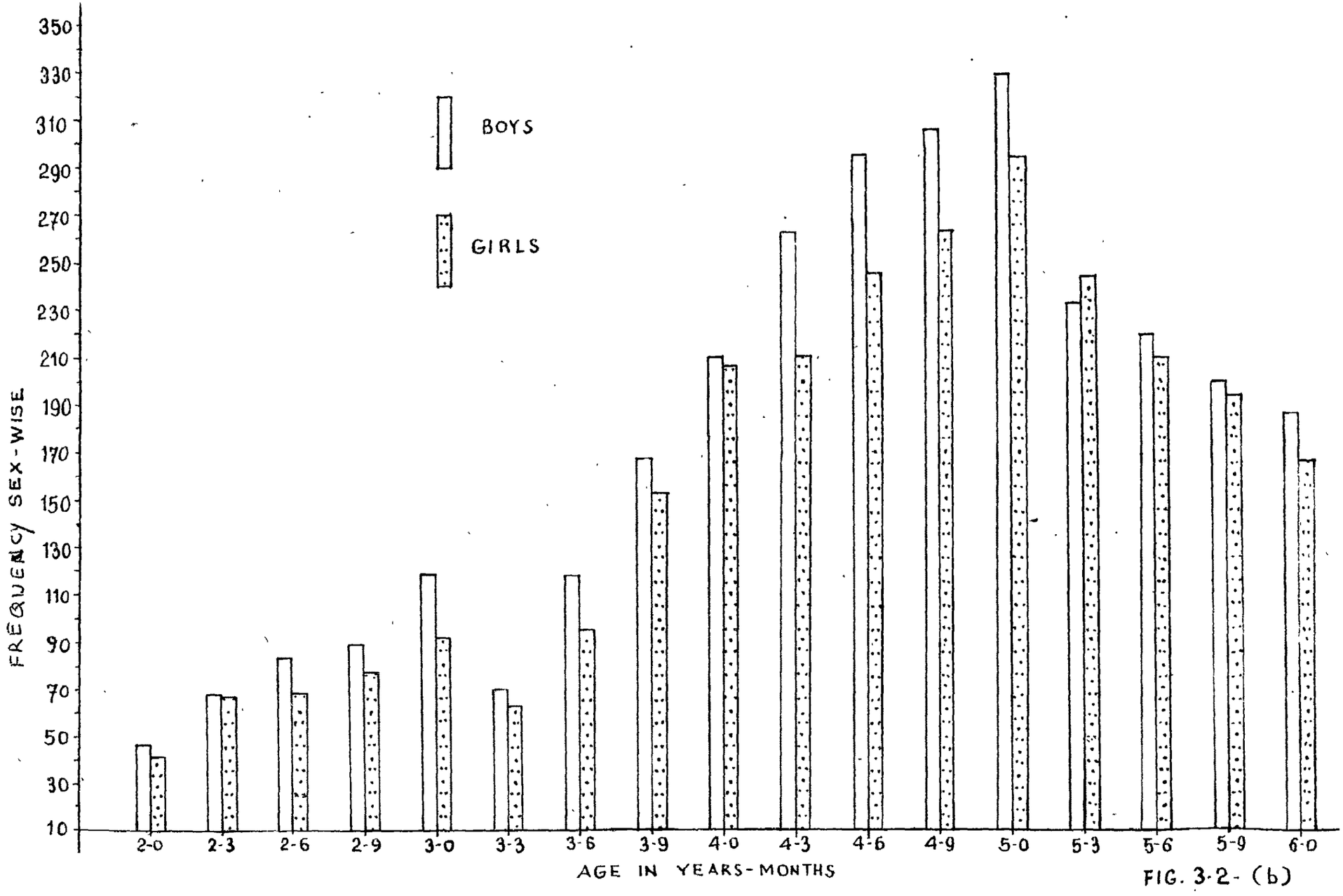

350
330
310
290
270
250
230
210
190
170
150
130
110
90
70
50
30
10
FREQUENCY SEX-WISE
BOYS
GIRLS
2-0
2-3
2-6
2-9
3-0
3-3
3-6
3-9
4-0
4-3
4-6
4-9
5-0
5-3
5-6
5-9
6-0
AGE IN YEARS-MONTHS

FIG. 3·2- (b)

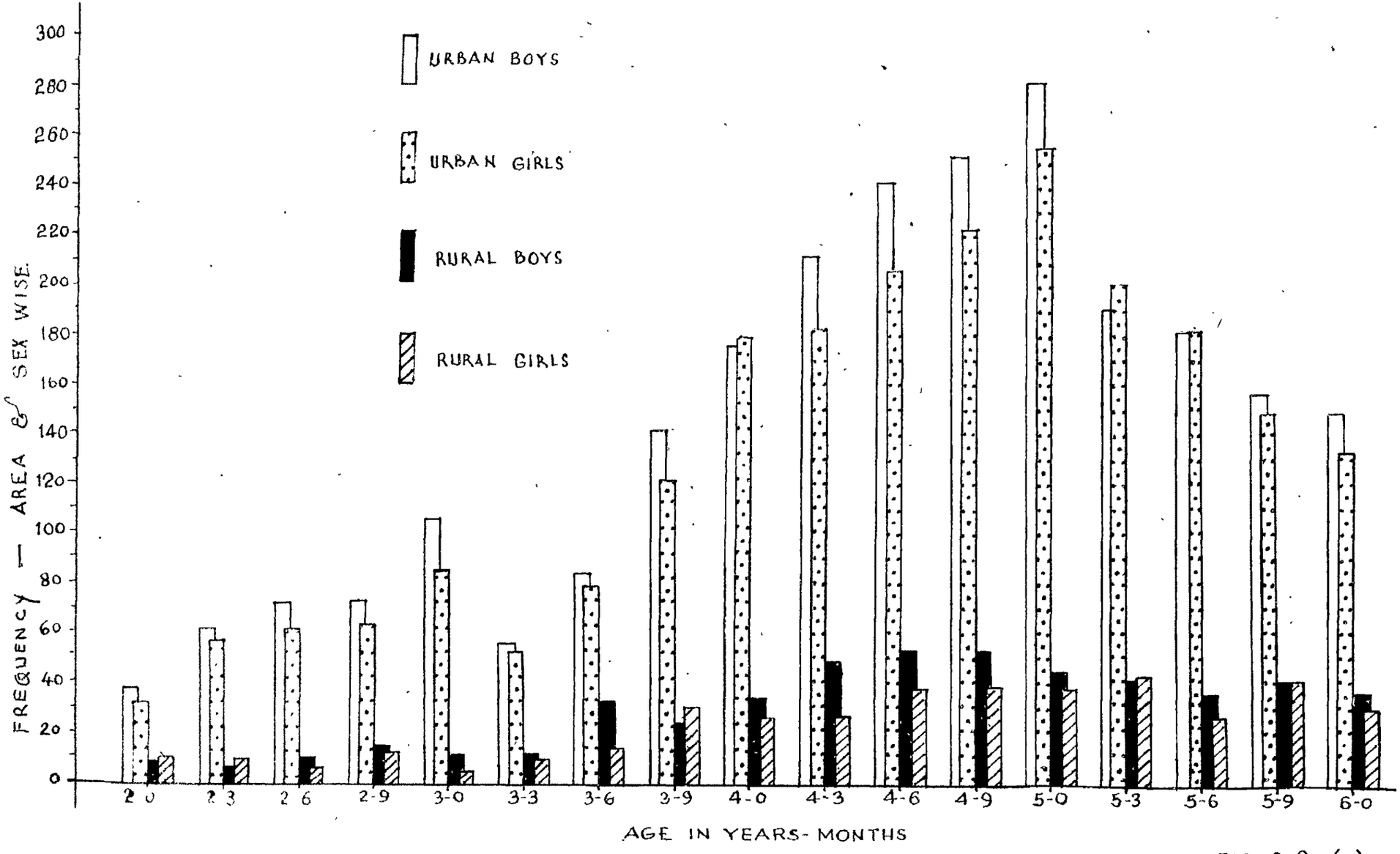

URBAN BOYS
URBAN GIRLS
RURAL BOYS
RURAL GIRLS
FREQUENCY — AREA & SEX WISE
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
2-0
2-3
2-6
2-9
3-0
3-3
3-6
3-9
4-0
4-3
4-6
4-9
5-0
5-3
5-6
5-9
6-0
AGE IN YEARS- MONTHS

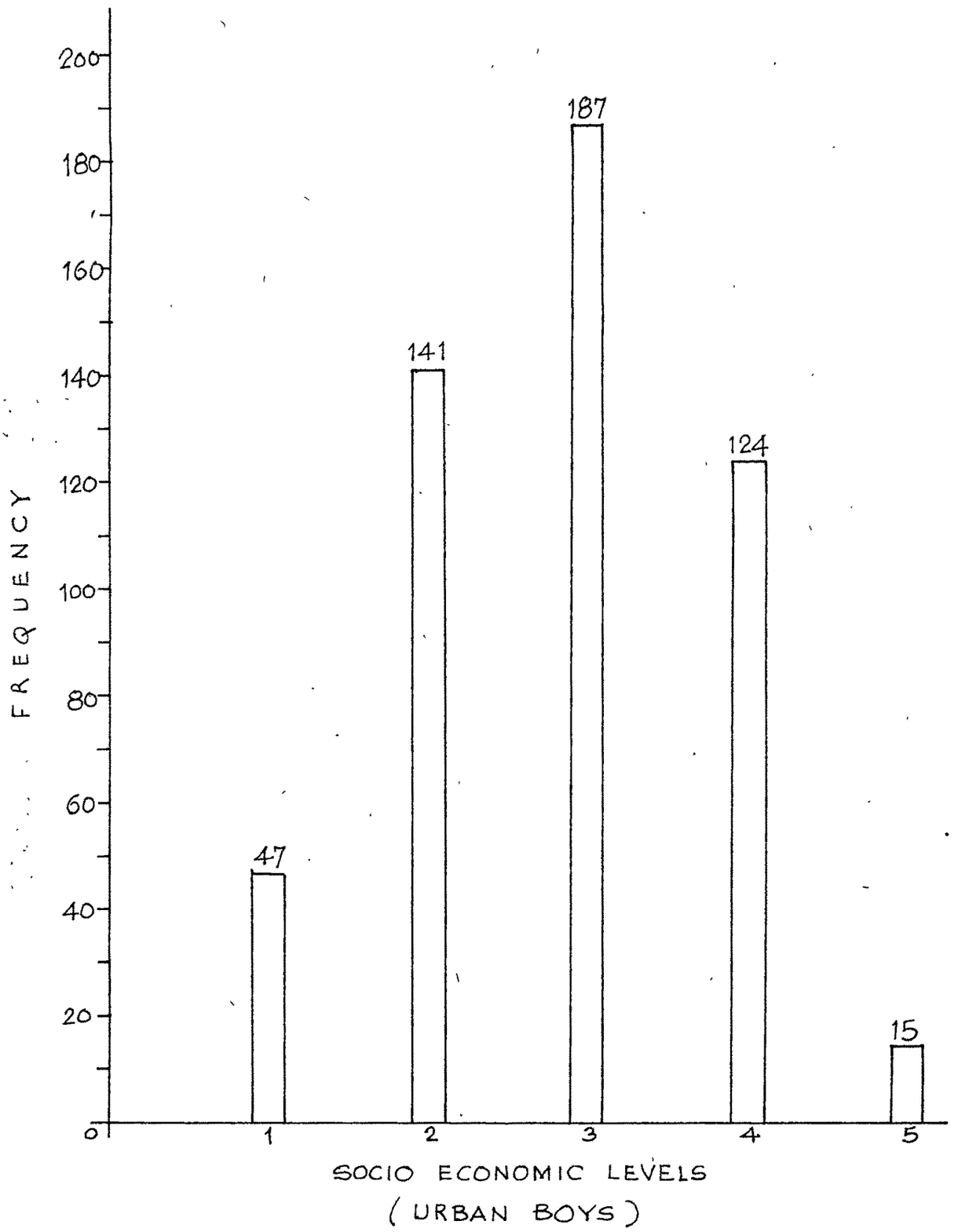
FIG. 3·2-(c)

Table 3.3 - showing distribution of the total sample area x sex x socio-economic level-wise.

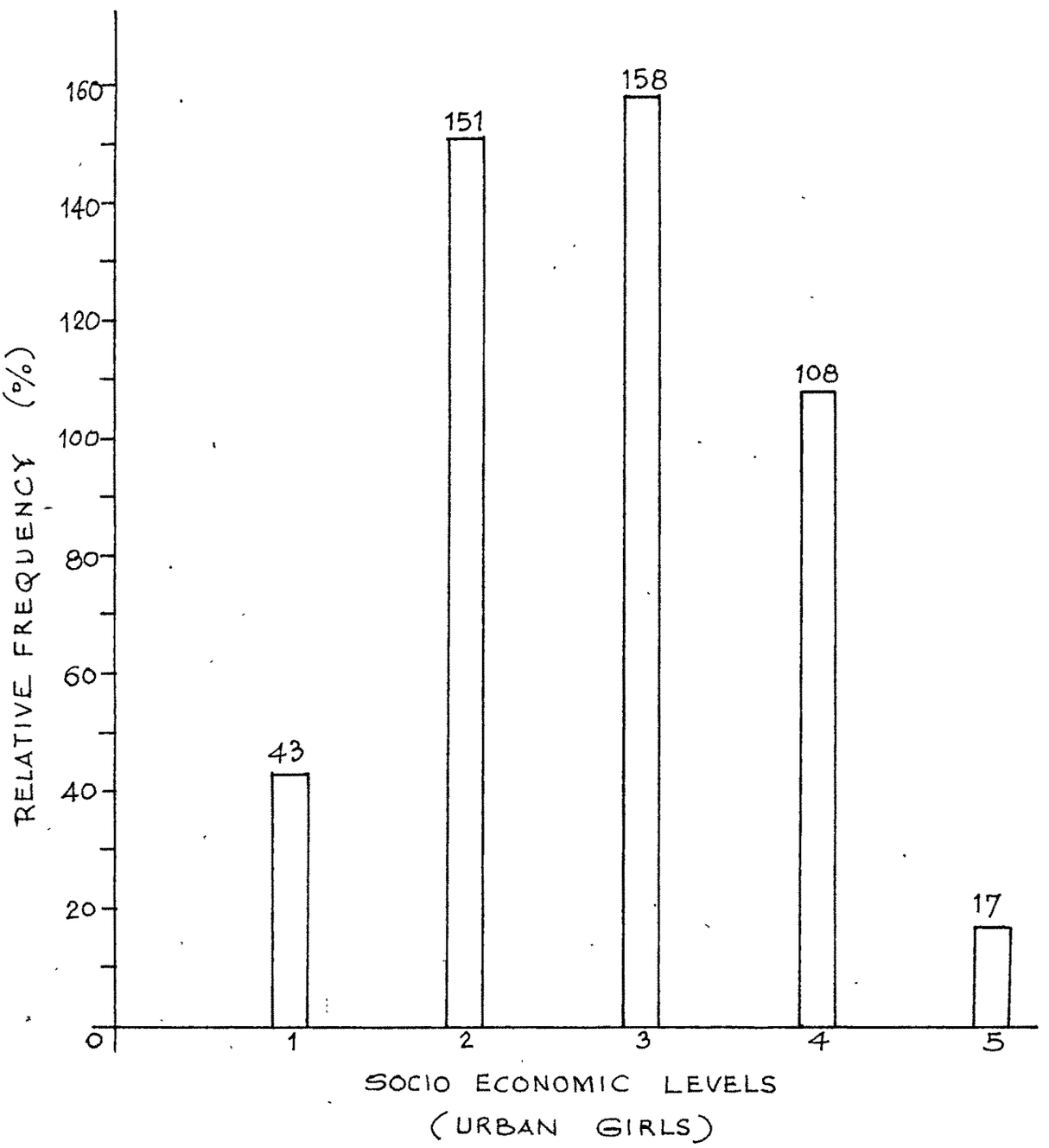
(cross-sectional study)

Socio-economic Level.	AREA X SEX				AREA		SEX		TOTAL SAMPLE
	Urban		Rural						
	Boys	Girls	Boys	Girls	Urban	Rural	Boys	Girls	
Low	47 (9.1%)	43 (9.0%)	68 (14.3%)	49 (12.5%)	90 (9.1%)	117 (13.5%)	115 (11.6%)	92 (10.6%)	207 (11.1%)
Low-middle	141 (27.4%)	151 (31.7%)	160 (33.6%)	122 (31.2%)	292 (29.5%)	282 (32.5%)	301 (30.4%)	273 (31.5%)	574 (30.9%)
Middle	187 (36.4%)	158 (33.1%)	219 (46.0%)	186 (47.6%)	345 (34.8%)	405 (46.7%)	406 (41.0%)	344 (39.6%)	750 (40.4%)
High-middle	124 (24.1%)	108 (22.6%)	28 (5.9%)	33 (8.4%)	232 (23.4%)	61 (7.0%)	152 (15.4%)	141 (16.2%)	293 (15.8%)
High	15 (2.9%)	17 (3.6%)	1 (0.2%)	1 (0.3%)	32 (3.2%)	2, (0.2%)	16 (1.7%)	18 (2.1%)	34 (1.8%)
Totals	514 (51.9%)	477 (48.1%)	476 (54.9%)	391 (45.1%)	991 (53.3%)	867 (46.7%)	990 (53.3%)	868 (46.7%)	1858 (100%)
	991 (53.3%)		867 (46.7%)		1858		1858		

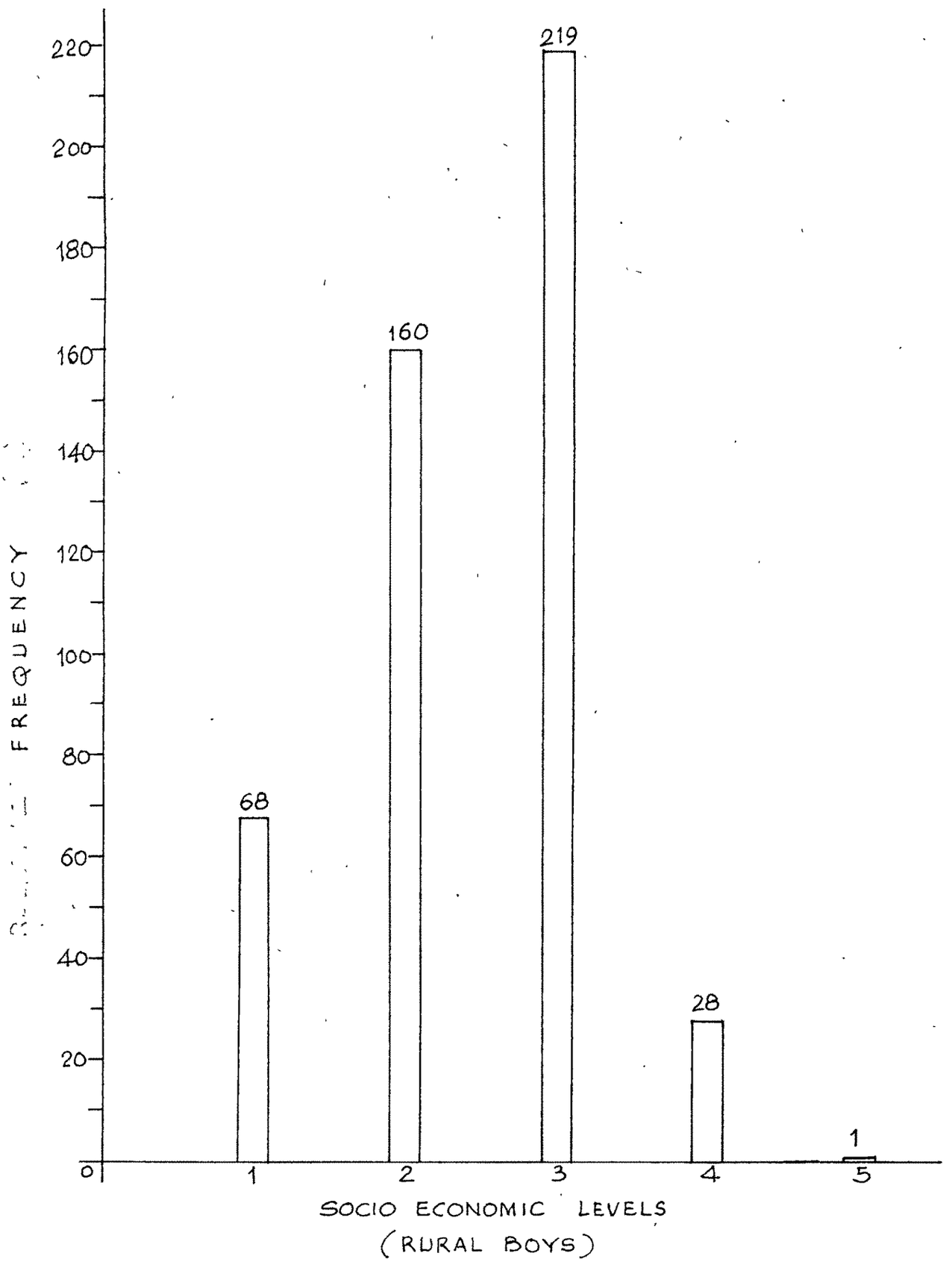
GRAPH NO. 3·3 (a)


200
180
160
140
120
100
80
60
40
20
0
FREQUENCY
47
141
187
124
15
1
2
3
4
5
SOCIO ECONOMIC LEVELS
(URBAN BOYS)

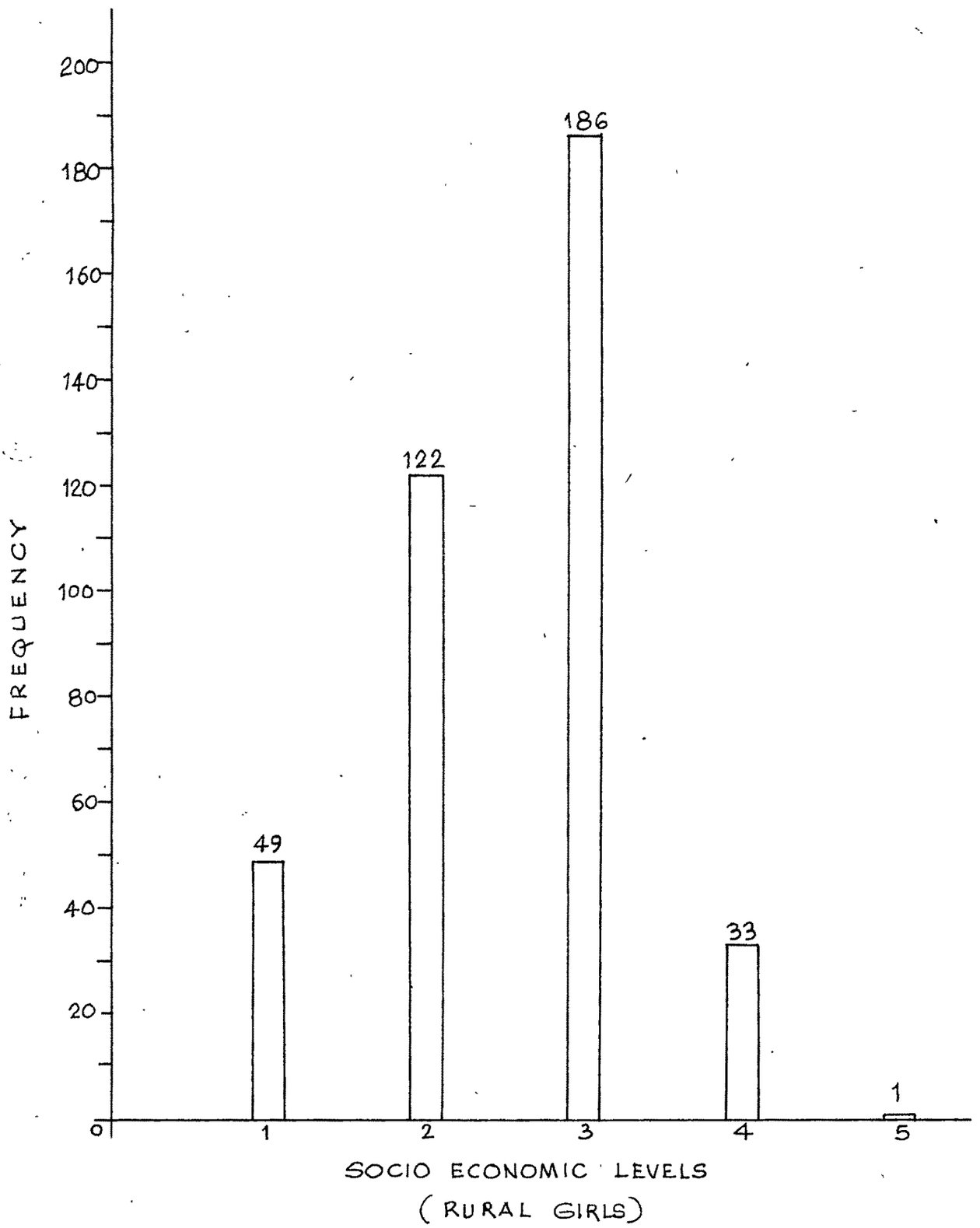
GRAPH NO.3·3(b)


RELATIVE FREQUENCY (%)
160
140
120
100
80
60
40
20
0
43
151
158
108
17
1
2
3
4
5
SOCIO ECONOMIC LEVELS
(URBAN GIRLS)

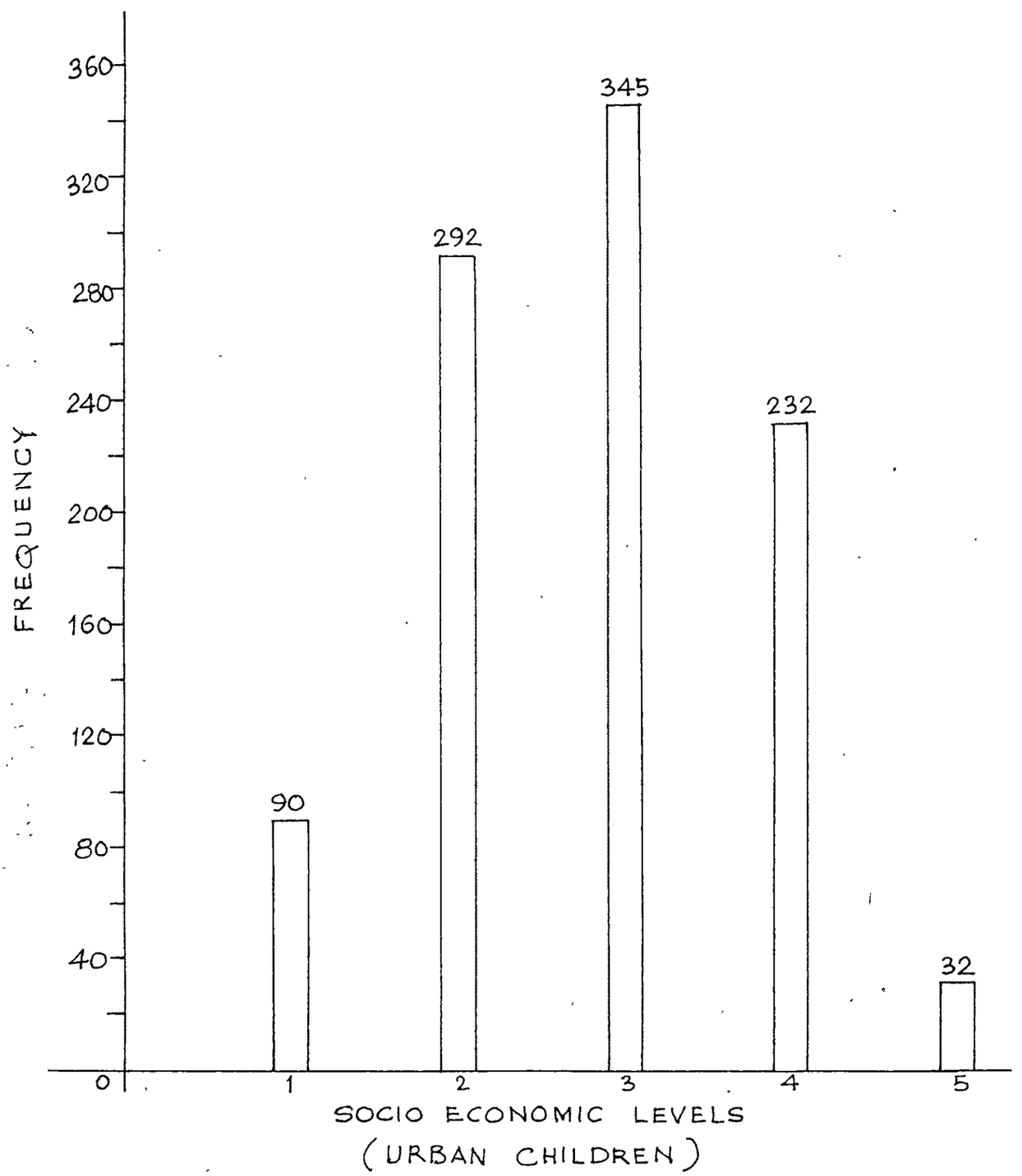
GRAPH NO. 3.3 (c)


FREQUENCY
220
200
180
160
140
120
100
80
60
40
20
0
68
160
219
28
1
1
2
3
4
5
SOCIO ECONOMIC LEVELS
(RURAL BOYS)

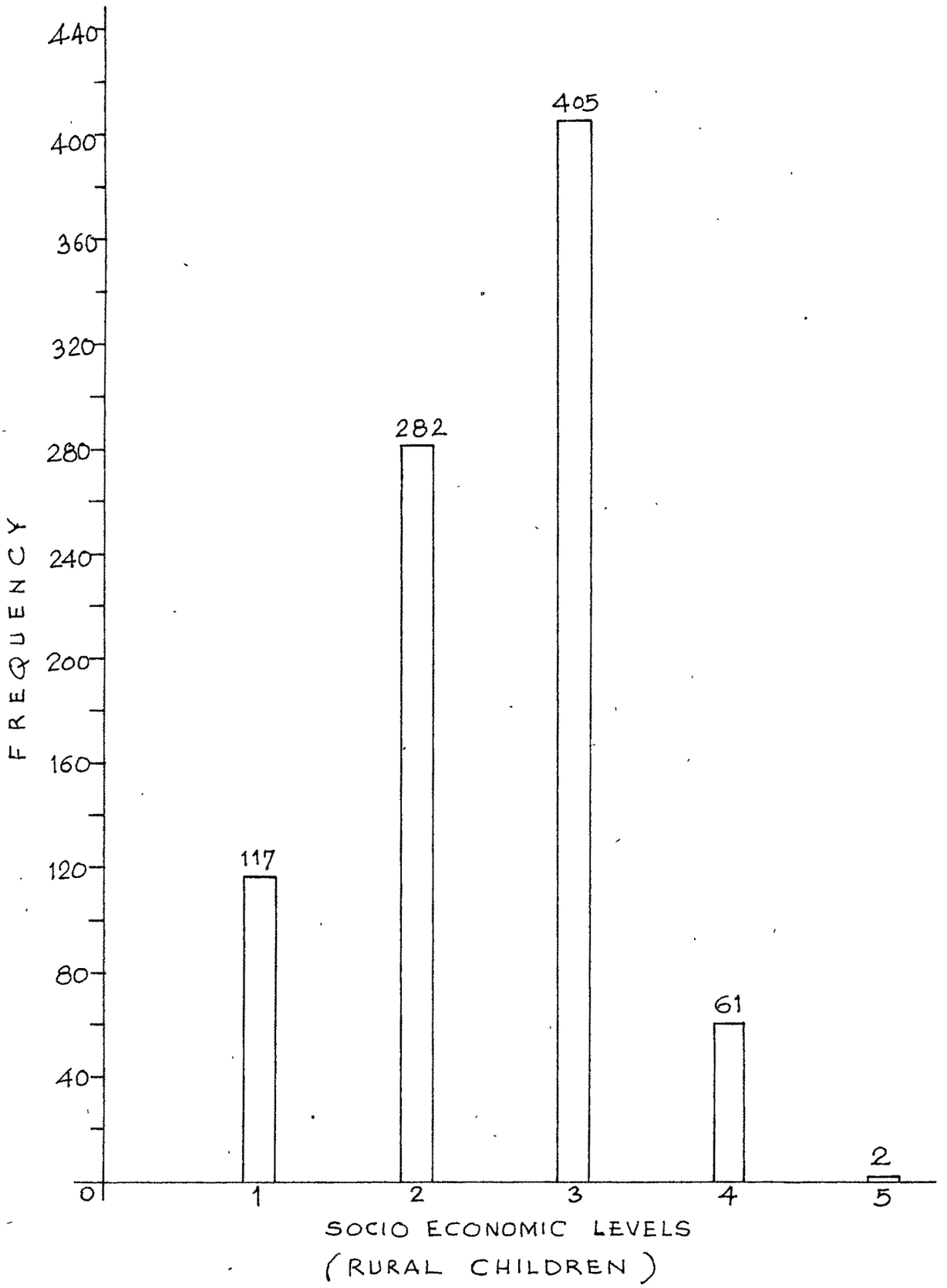
GRAPH NO.3.3(d)


FREQUENCY
200
180
160
140
120
100
80
60
40
20
0
49
122
186
33
1
1
2
3
4
5
SOCIO ECONOMIC LEVELS
(RURAL GIRLS)

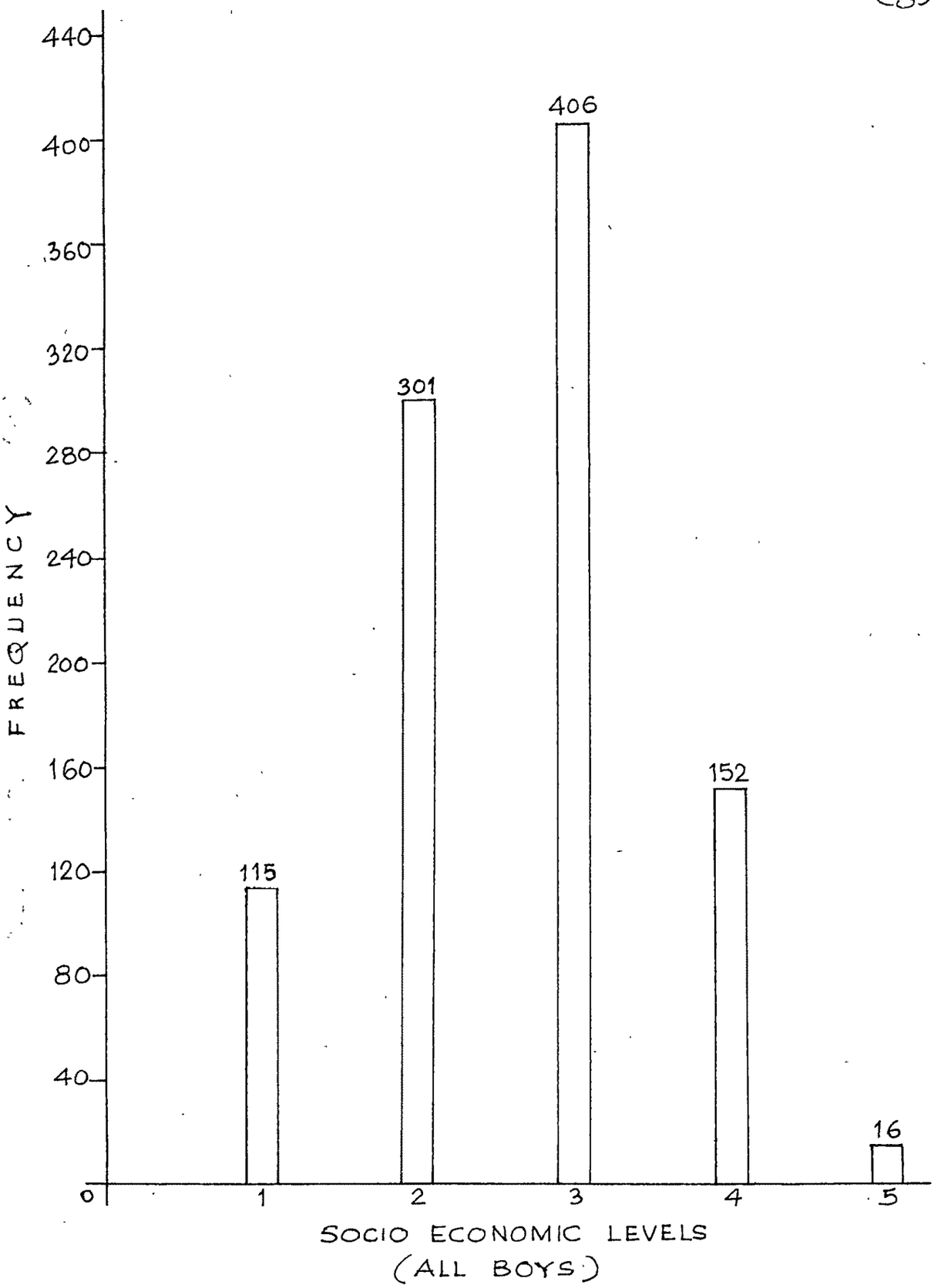
GRAPH NO. 3·3 (e)


360
320
280
240
200
160
120
80
40
0
FREQUENCY
90
292
345
232
32
1
2
3
4
5
SOCIO ECONOMIC LEVELS
(URBAN CHILDREN)

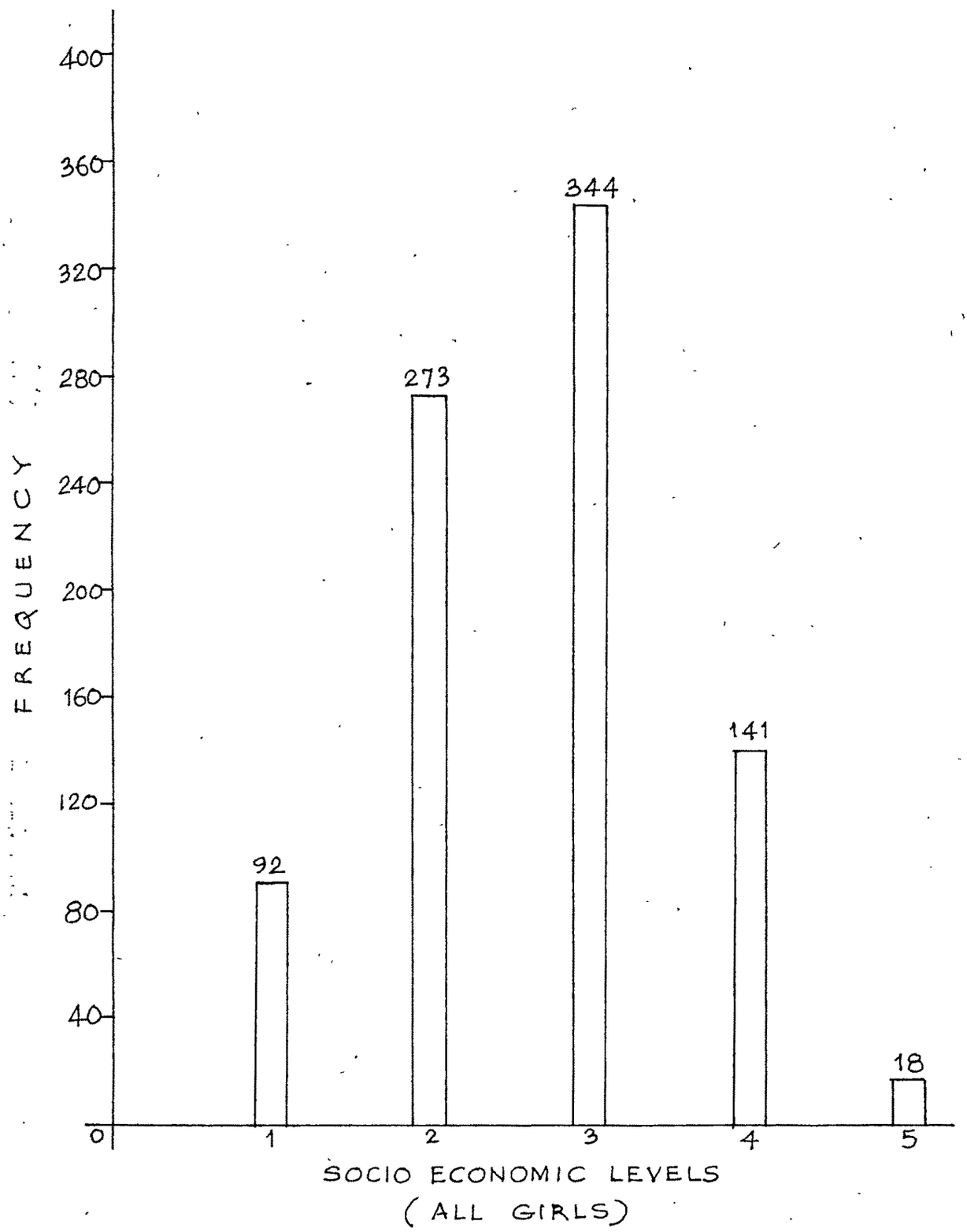
GRAPH NO. 3.3 (f)


440
400
360
320
280
240
200
160
120
80
40
0
FREQUENCY
117
282
405
61
2
1
2
3
4
5
SOCIO ECONOMIC LEVELS
(RURAL CHILDREN)

GRAPH NO. 3·3(g)


440
400
360
320
280
240
200
160
120
80
40
0
FREQUENCY
115
301
406
152
16
1
2
3
4
5
SOCIO ECONOMIC LEVELS
(ALL BOYS)

GRAPH NO. 3.3(h)


400
360
320
280
240
200
160
120
80
40
0
FREQUENCY
92
273
344
141
18
1
2
3
4
5
SOCIO ECONOMIC LEVELS
(ALL GIRLS)

GRAPH NO. 3·3 (i)

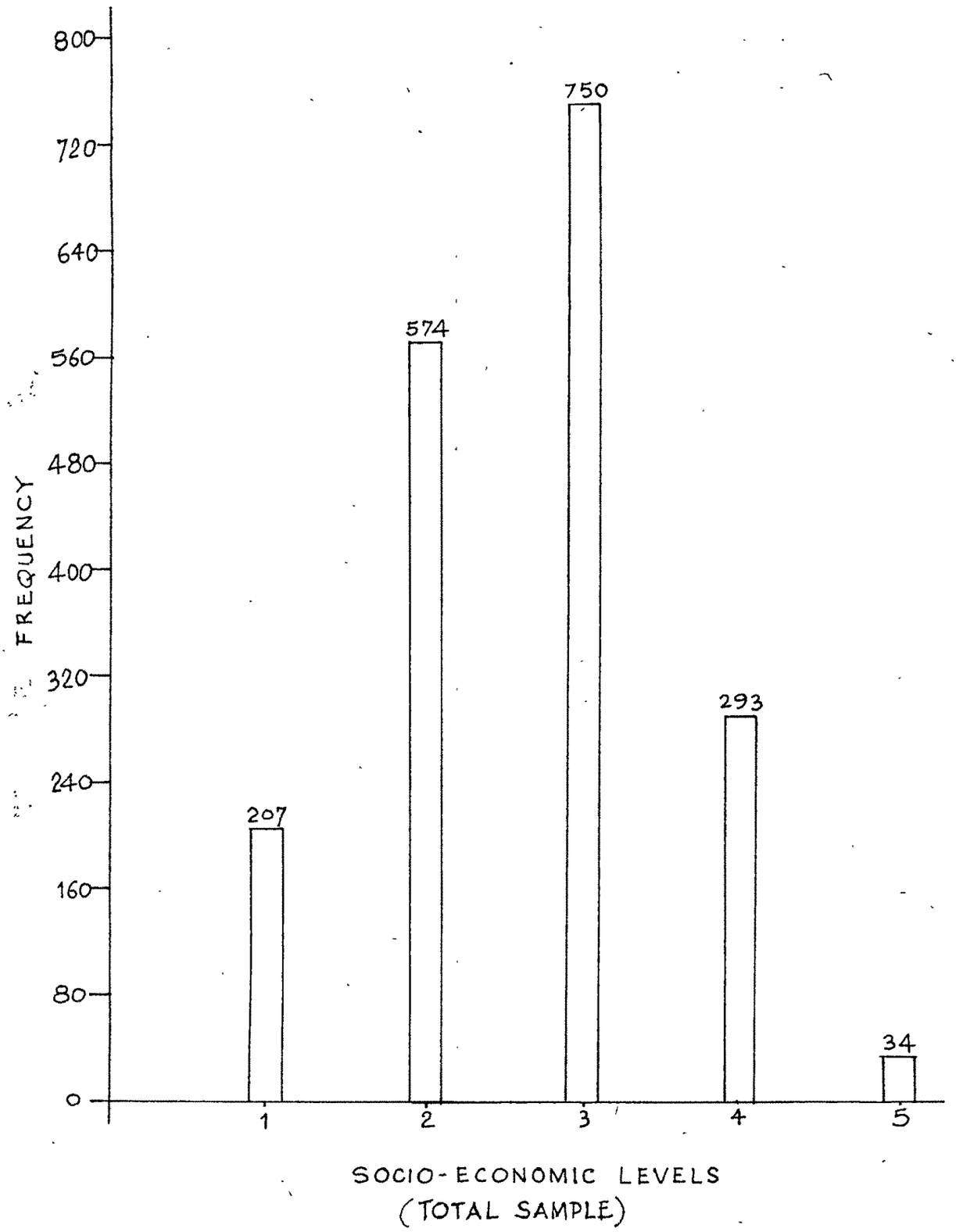

800
720
640
560
480
400
320
240
160
80
0
FREQUENCY
207
574
750
293
34
1
2
3
4
5
SOCIO-ECONOMIC LEVELS
(TOTAL SAMPLE)

Table 3.4 - showing the sex-wise distribution of the total number of urban subjects (N) at each of the 17 age-points. (Longitudinal study).

Age - point Years-months	Total N	Boys	Girls
2.0	48	29	19
2.3	48	29	19
2.6	48	29	19
2.9	48	29	19
3.0	107	58	49
3.3	59	29	30
3.6	123	65	58
3.9	207	116	91
4.0	295	150	145
4.3	289	154	135
4.6	360	193	167
4.9	367	193	174
5.0	345	171	174
5.3	257	137	120
5.6	204	104	100
5.9	133	65	68
6.0	62	29	33
	3000	1580	1420

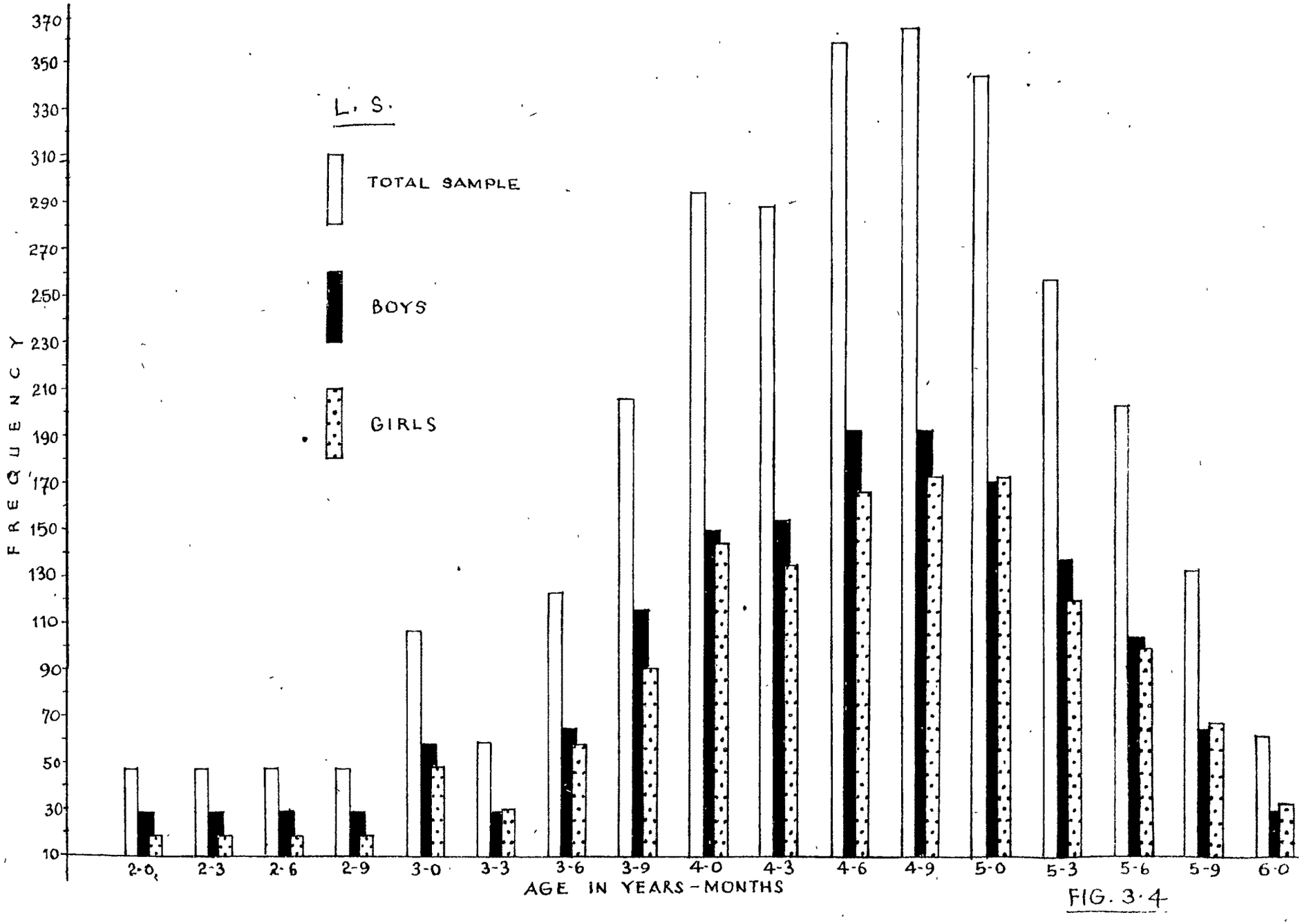

L. S.
TOTAL SAMPLE
BOYS
GIRLS
FREQUENCY
370
350
330
310
290
270
250
230
210
190
170
150
130
110
90
70
50
30
10
2-0
2-3
2-6
2-9
3-0
3-3
3-6
3-9
4-0
4-3
4-6
4-9
5-0
5-3
5-6
5-9
6-0
AGE IN YEARS - MONTHS

FIG. 3·4

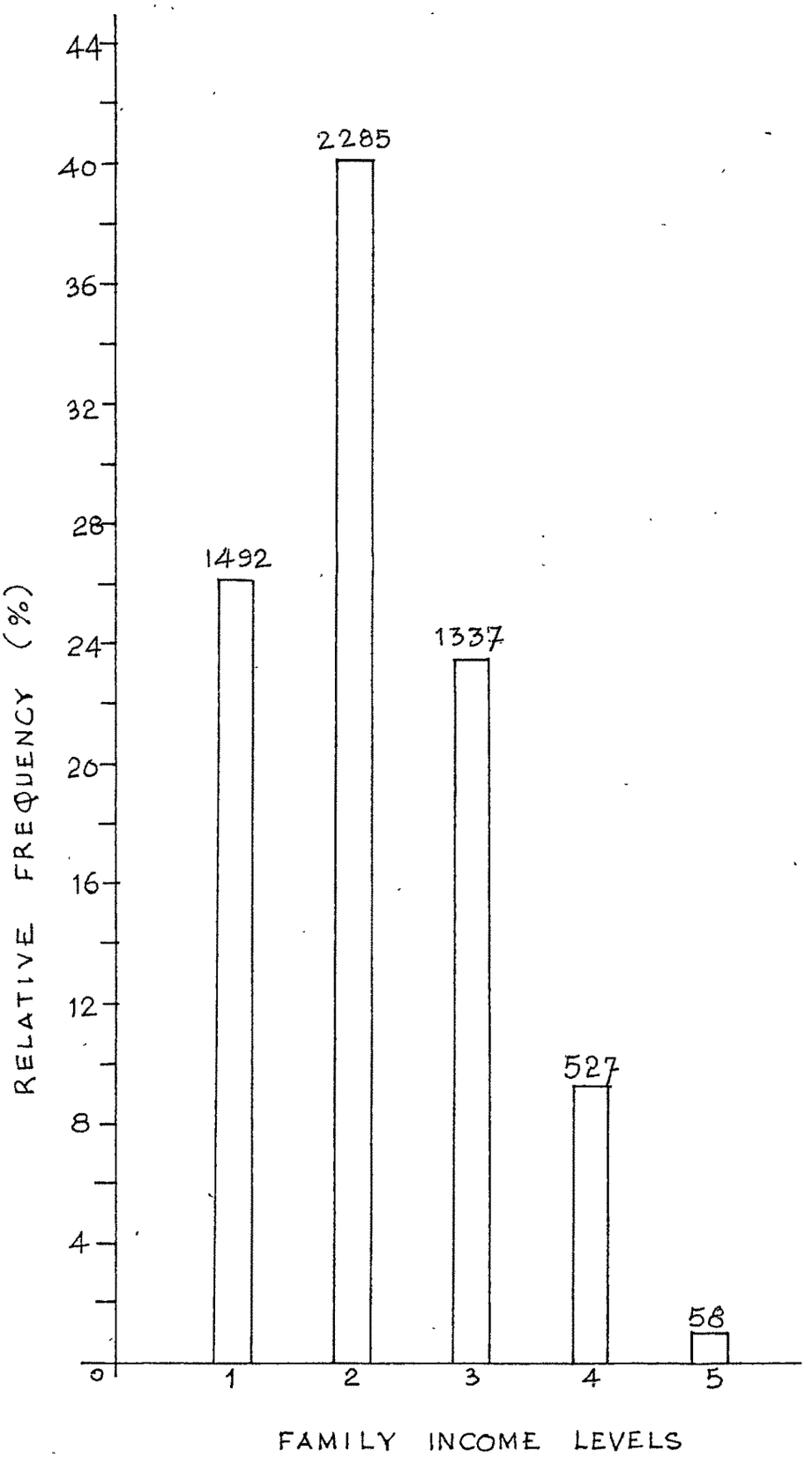
Table 3.4(i) - showing the sex-wise distribution of the total number of observations(O) of urban subjects (N) at each of 17 age-points indicating the over-laps of different age-ranges.
(Longitudinal Study)

Age range			2-0	2-3	2-6	2-9	3-0	3-3	3-6	3-9	4-0	4-3	4-6	4-9	5-0	5-3	5-6	5-9	6-0	
2-0 to 3-0 yrs.	Boys	N	29	29	29	29	29													
	Girls	N	19	19	19	19	19													
3-0 to 4-0	Boys						29	29	29	29	29									
	Girls						(30)	(30)	(30)	(30)	(30)									
3-6 to 4-6	Boys								36	36	36	36	36							
	Girls								28	28	28	28	28							
3-9 to 4-9	Boys									51	51	51	51	51						
	Girls									33	33	33	33	33						
4-0 to 5-0	Boys										34	34	34	34	34					
	Girls										54	54	54	54	54					
4-3 to 5-3	Boys											33	33	33	33	33				
	Girls											20	20	20	20	20				
4-6 to 5-6	Boys												39	39	39	39	39			
	Girls												32	32	32	32	32			
4-9 to 5-9	Boys													36	36	36	36	36		
	Girls													35	35	35	35	35		
5-0 to 6-0	Boys														29	29	29	29	29	
	Girls														33	33	33	33	33	
'O' at each age level	Total	Boys	29	29	29	29	58	29	65	116	150	154	193	193	171	137	104	65	29	1580
	Total	Girls	19	19	19	19	49	30	58	91	145	135	167	174	174	120	100	68	33	1420
"	Total children (Boys +Girls)		48	48	48	48	107	59	123	207	295	289	360	367	345	257	204	133	62	3000

Table 3.5 - showing the number of observations in each of the family income levels.
(cross-sectional study)

Family Income Level	Frequency (O)	Rel.Freq. %
Less than Rs. 200/- p. m.	1492	26.2
Rs. 200 - 400 p. m.	2285	40.1
Rs. 400 - 800 p. m.	1337	23.5
Rs. 800 -1600 p. m.	527	9.2
Above Rs. 1600	58	1.0
Total	5699	100.0

GRAPH NO.3·5


44
40
36
32
28
24
20
16
12
8
4
0
RELATIVE FREQUENCY (%)
1492
2285
1337
527
58
1
2
3
4
5
FAMILY INCOME LEVELS

99

Table 3.6 - showing the number of observations (O) in each of the five educational levels of the father. (cross-sectional study).

Educational Level of the Father	Frequency (O)	Rel.Freq. (%)
Illiterate	84	1.5
Primary	981	17.2
Secondary	2946	51.7
College	1352	23.7
Post-graduate	336	5.9
Total	5699	100.0

GRAPH NO 3·6

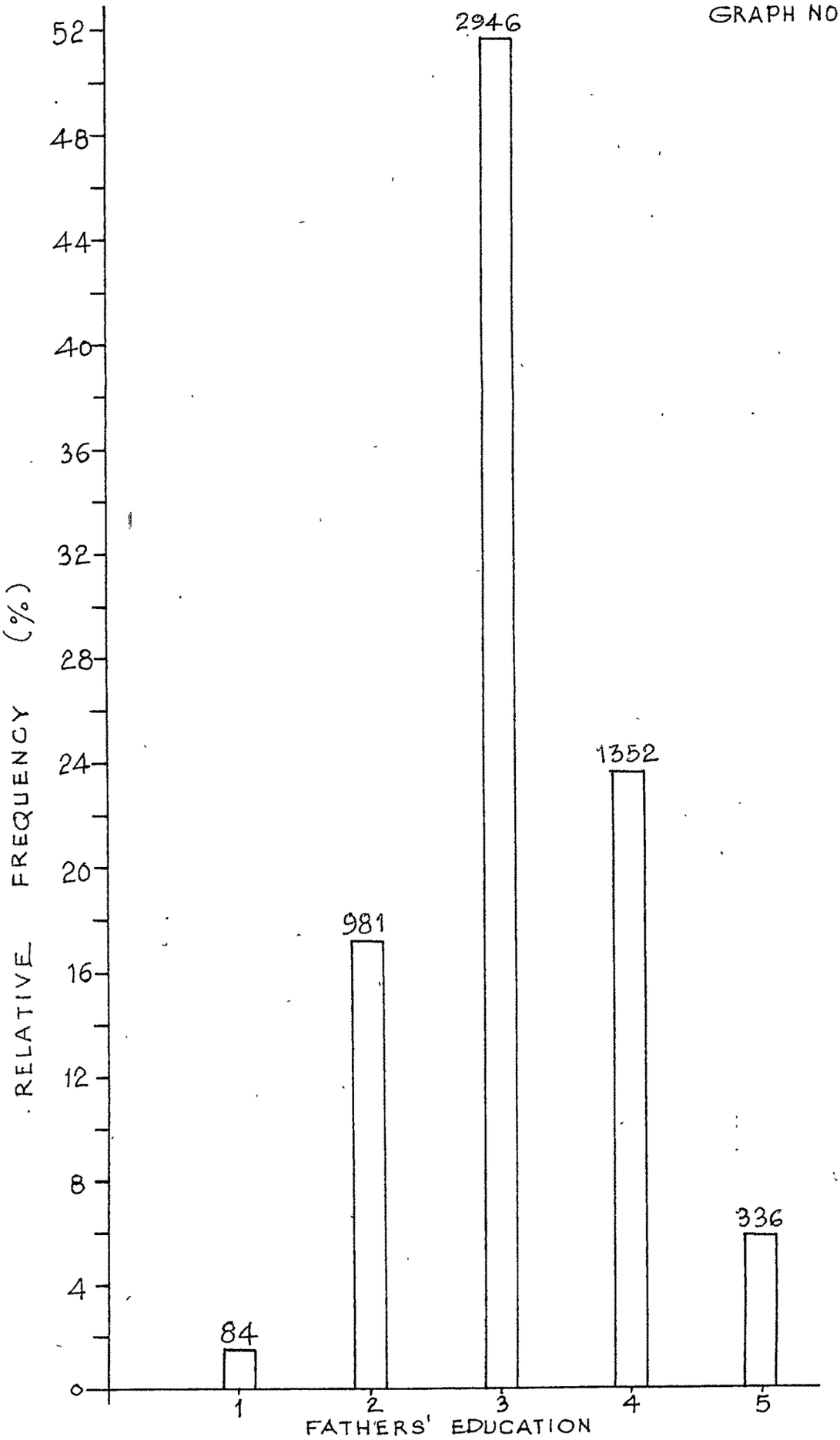
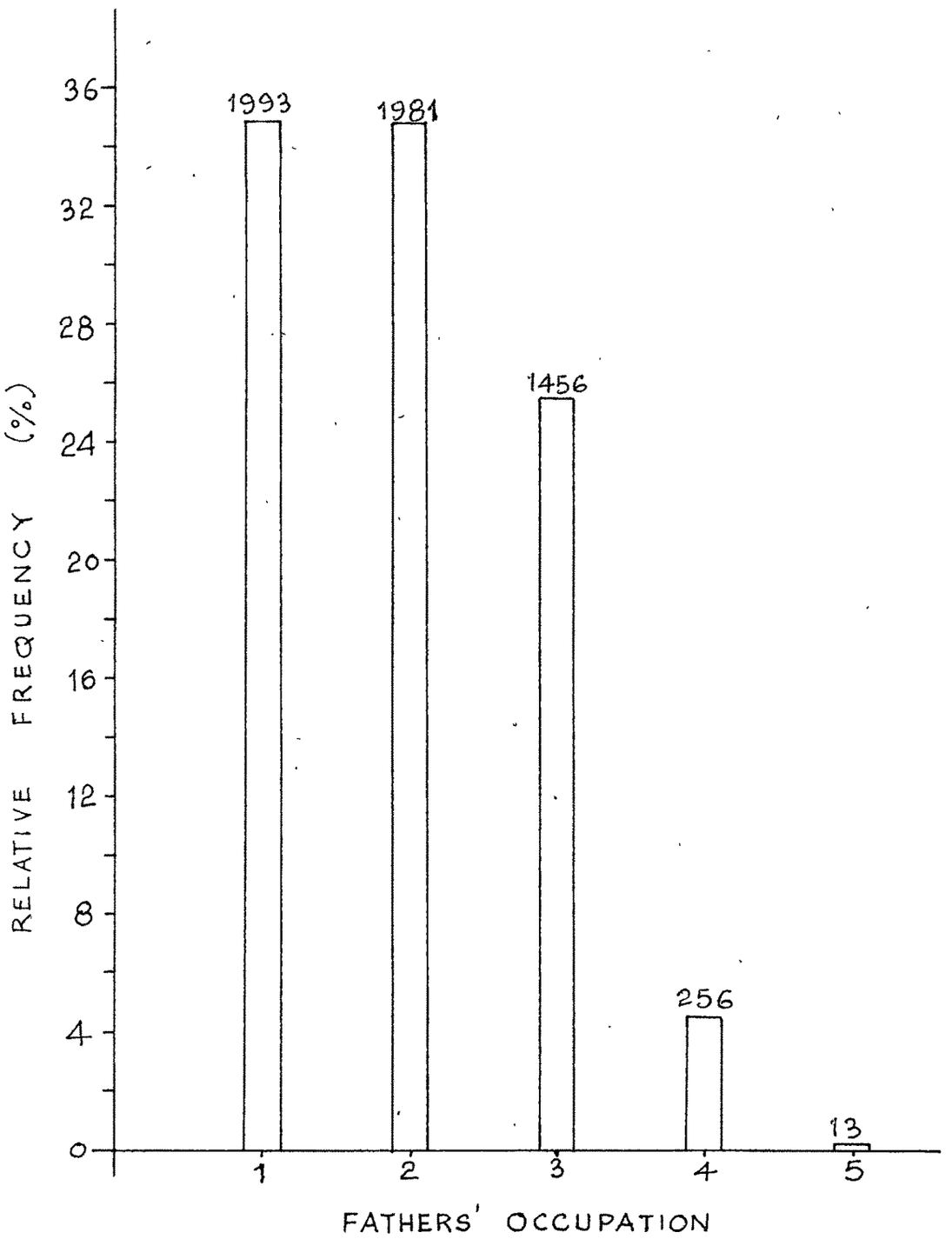

RELATIVE FREQUENCY (%)
52
48
44
40
36
32
28
24
20
16
12
8
4
0
84
981
2946
1352
336
1
2
3
4
5
FATHERS' EDUCATION

Table 3.7 - showing the number of observations (O) in each of the five occupational levels of fathers. (cross-sectional study).

Occupational Level of the Father	Frequency (O)	Rel.Freq. (%)
Labourers	1993	34.9
Clerks, school teachers etc.	1981	34.8
College teachers, Jr. officers	1456	25.5
Professionals (Doctors etc.); Sr. officers.	256	4.5
Higher categories.	13	0.2
Totals	5699	100.0

GRAPH NO. 3·7

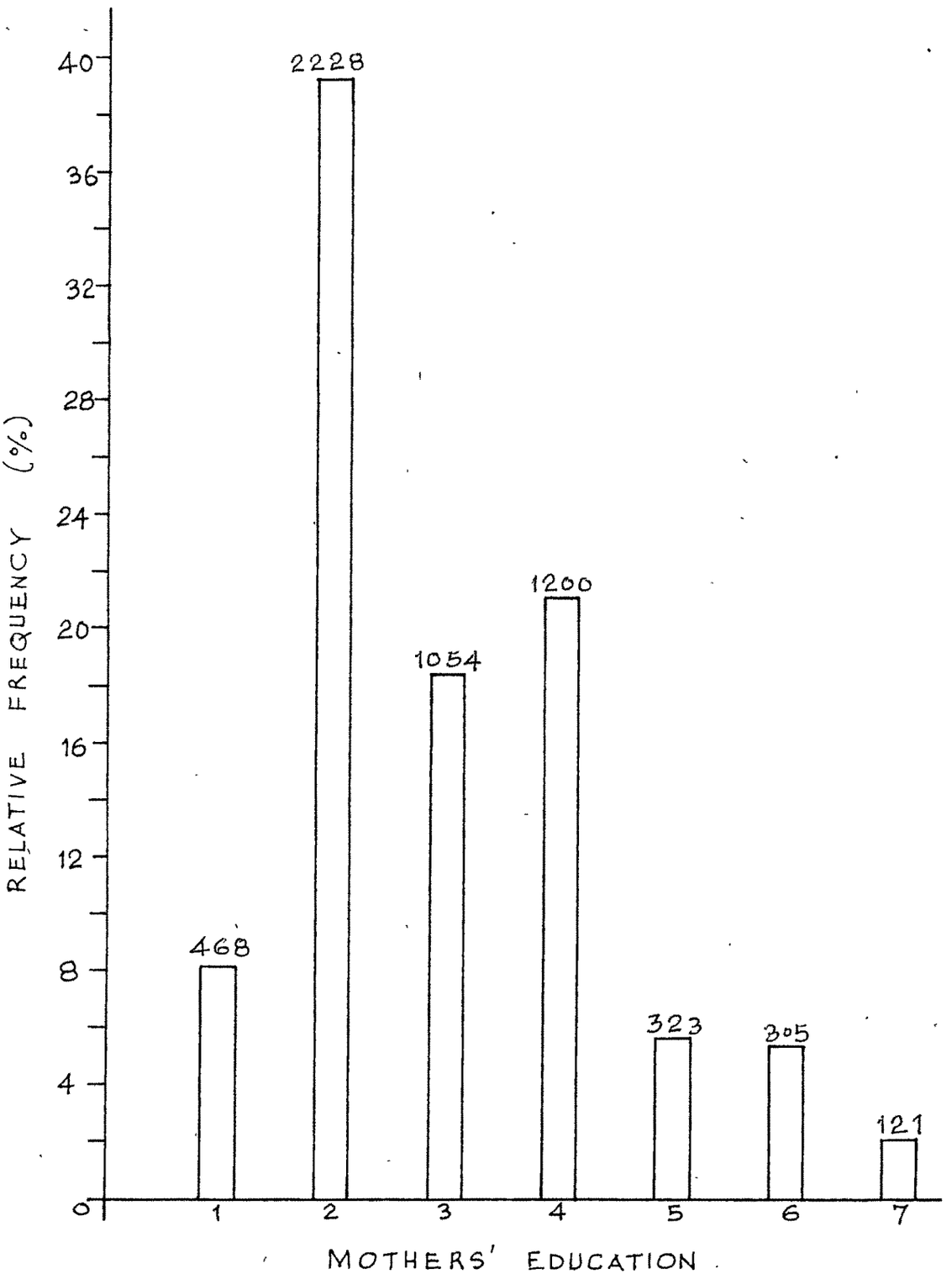

RELATIVE FREQUENCY (%)
36
32
28
24
20
16
12
8
4
0
1993
1981
1456
256
13
1
2
3
4
5
FATHERS' OCCUPATION

107

Table 3.8 - showing the number of observations (O) in each of the seven educational levels of mothers. (cross-sectional study).

Educational Level of the Mother		Frequency (O)	Rel. Freq. (%)
Illiterate		468	8.2
Primary		2228	39.1
Secondary Edu.:	School Final -Std.X	1054	18.5
	S.S.C.	1200	21.1
College Edu. :	Undergraduate	323	5.7
Post-graduate Edu.:	Graduate + Professional Diploma	305	5.4
	Postgraduate	121	2.1
	Total	5699	100.0

GRAPH NO.3·8

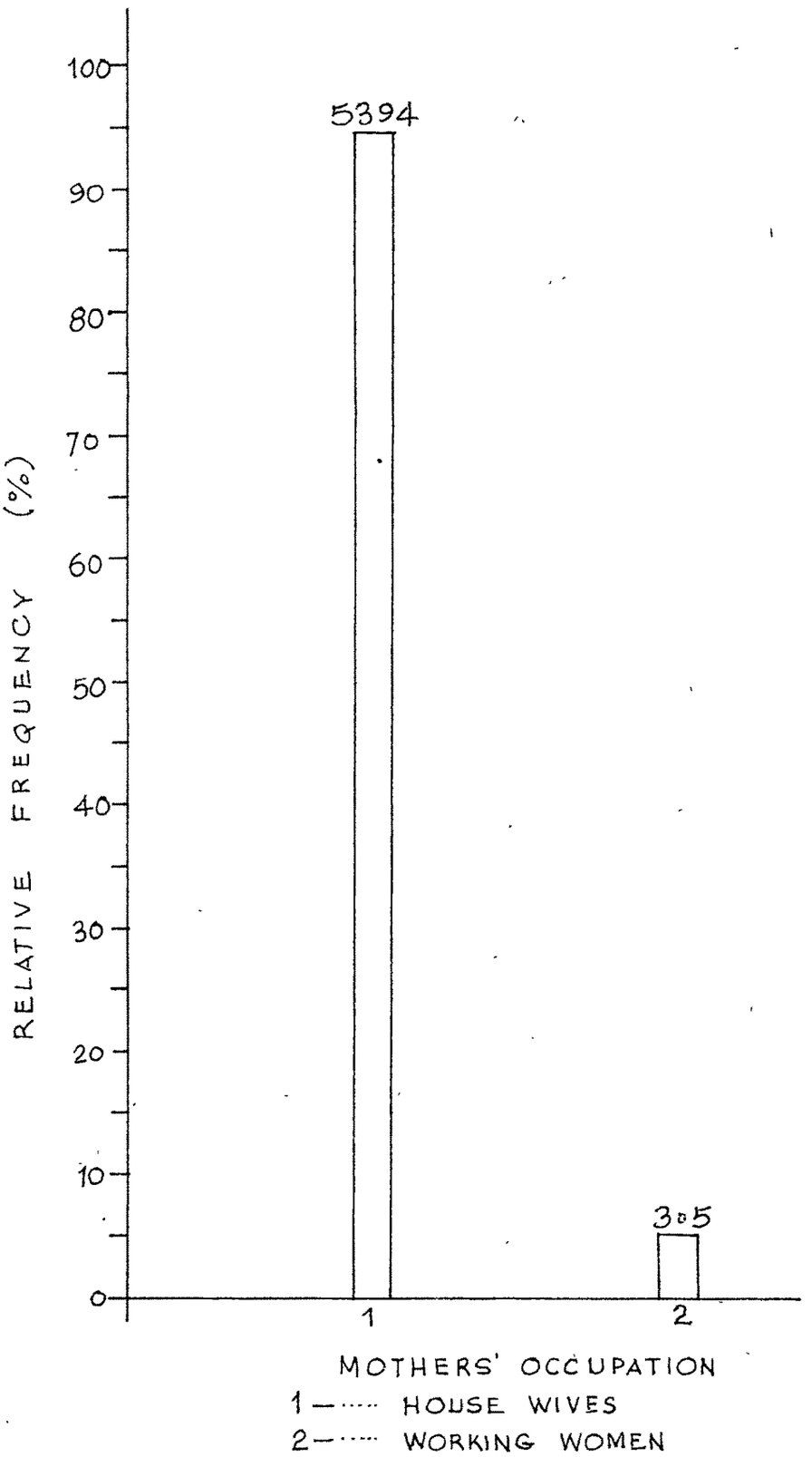

RELATIVE FREQUENCY (%)
40
36
32
28
24
20
16
12
8
4
0
468
2228
1054
1200
323
305
121
1
2
3
4
5
6
7
MOTHERS' EDUCATION

102

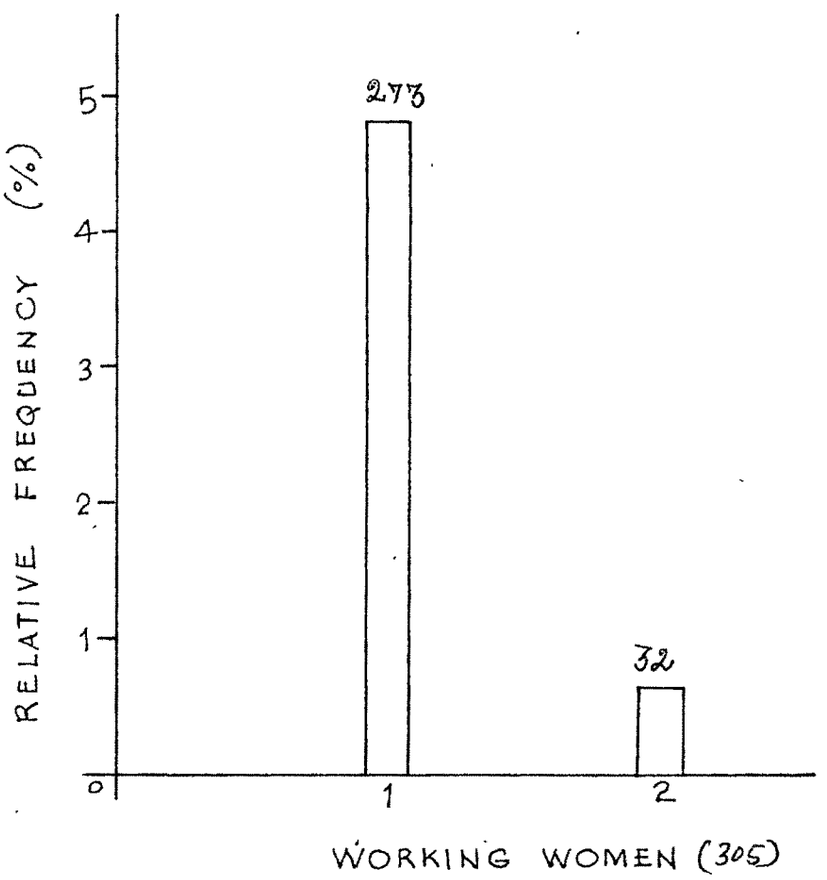
Table 3.9 - showing the number of observations (O) in each of the three occupational levels of mothers. (cross-sectional study).

Occupational Level of the Mother	Frequency (O)	Rel. Freq. (%)
Household work	5394	94.6
Employed	305	5.4
(A) Upto Rs. 500/- p. m.	273	4.8
(B) Above Rs. 500/- p. m.	32	0.6
Totals	5699	100.0

GRAPH NO. 3·9 (a)


100
90
80
70
60
50
40
30
20
10
0
RELATIVE FREQUENCY (%)
5394
305
1
2
MOTHERS' OCCUPATION
1 —···· HOUSE WIVES
2 —···· WORKING WOMEN

GRAPH NO. 3·9 (b)


RELATIVE FREQUENCY (%)
5
4
3
2
1
0
273
32
1
2
WORKING WOMEN (305)
1 —··· UPTO 500 P M.
2 —····· ABOVE 500 P.M

103

Table 3.10 - showing the number of observations (O) according to the number of siblings in the Family (family size).

(cross-sectional study)

Number of Siblings in the Family	Frequency (O)	Rel. Freq. (%)
One	547	9.6
Two	1907	33.5
Three	1768	31.0
Four	994	17.4
Five	260	4.6
Four & Five (combined)	1254	22.0
Six	153	2.7
Seven	57	1.0
Eight + nine	13	0.2
Six, Seven, Eight-nine (combined)	223	3.9
Total	5699	100.0

GRAPH NO. 3·10

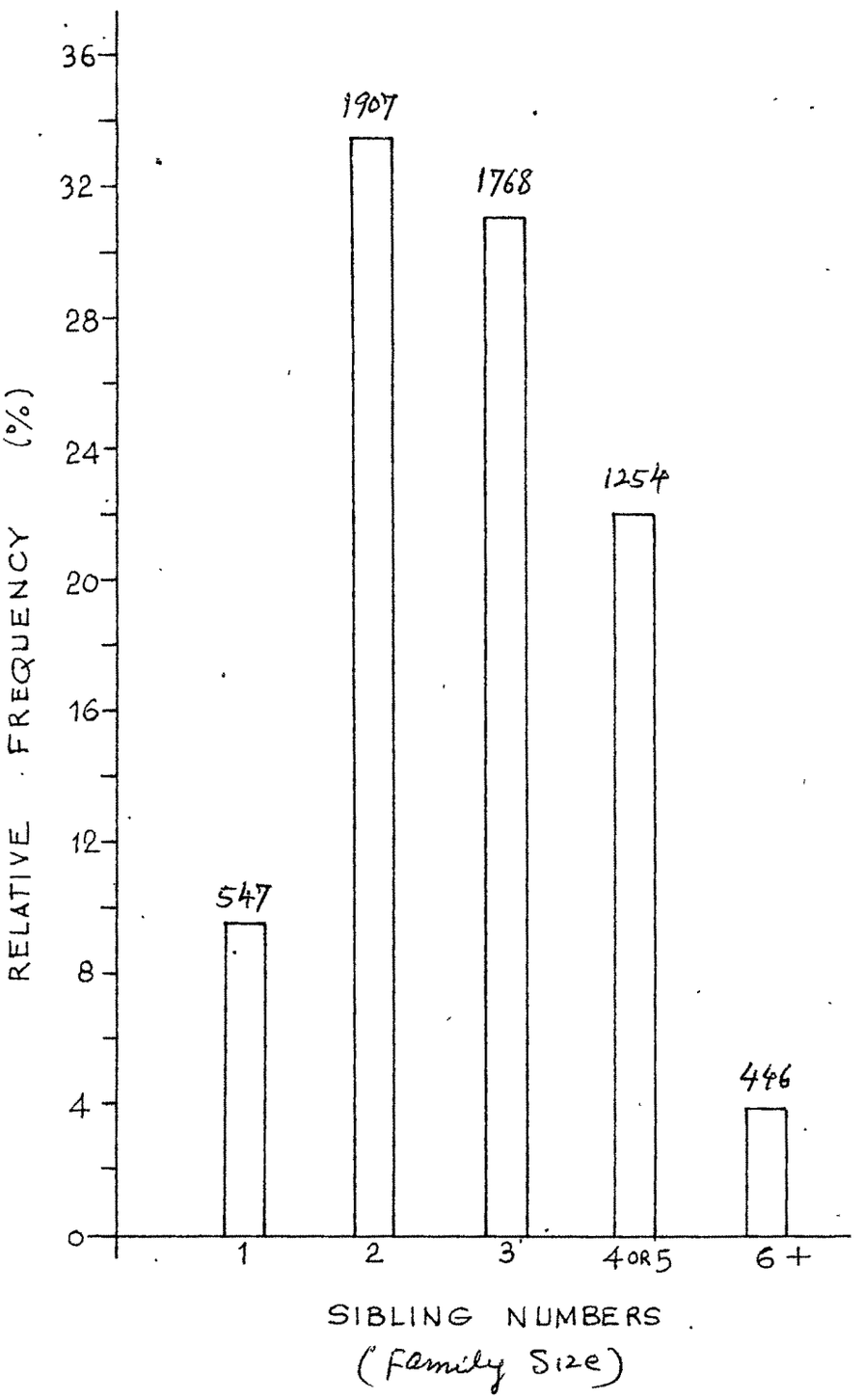

RELATIVE FREQUENCY (%)
36
32
28
24
20
16
12
8
4
0
547
1907
1768
1254
446
1
2
3
4 OR 5
6 +
SIBLING NUMBERS
(Family Size)

Table 3.10(i) - showing the number of observations (O) and Average Family size (number of siblings sex-wise (sex of children). (cross-sectional study).

Sex of Child	Family Size (Number of siblings)									Totals	Mean Sibling Number	Std. dev.
	1	2	3	4	5	6	7	8	9			
Boy	317	1031	934	509	134	55	19	7	0	3006	2.796	1.183
Girl	230	876	834	485	126	98	38	3	3	2693	2.955	1.287
Totals	547	1907	1768	994	260	153	57	10	3	5699		
				1254		223						
Family size	1	2	3	4 & 5		6 and more						

Table 3.10(ii) - showing the number of observations (O) and average family size (number of siblings) of urban and rural children. (cross-sectional study).

Milieu	Family size (Number of siblings)									Totals	Mean Sibling Number	Std. dev.
	1	2	3	4	5	6	7	8	9			
Urban	467	1685	1443	824	188	116	38	5	-	4766	2.812	1.190
Rural	80	222	325	170	72	37	19	5	3	933	3.173	1.408
Totals	547	1907	1768	994	260	153	57	10	3	5699		
				1254		223						
Family size	1	2	3	4 & 5		6 and more						

Table 3.10 (iii) - showing the number of observations (O) and average family size (number of siblings) income-wise. (cross-sectional study).

Income group	Family size (Number of siblings)									Totals	Mean Sibling Number	Std. dev.
	1	2	3	4	5	6	7	8	9			
Low	160	453	401	269	105	79	17	6	2	1492	3.035	1.416
Low-middle	238	769	712	409	82	58	15	1	1	2285	2.813	1.185
Middle	114	492	459	205	47	8	9	3	0	1337	2.740	1.076
High-mid	33	182	166	105	25	4	12	0	0	527	2.937	1.190
High	2	11	30	6	1	4	4	0	0	58	3.362	1.459
Totals	547	1907	1768	994	260	153	57	10	3	5699		
Family size	1	2	3	1254 4 & 5		223 6 and more						

Table 3.10 (iv) - showing the number of observations (O) and average family size (number of siblings) Father's education Level-wise. (Cross-sectional study).

Father's Educational Level	Family size (Number of siblings)									Totals	Mean Sibling Number	Std. dev.
	1	2	3	4	5	6	7	8	9			
Illiterate	9	5	12	33	6	10	7	1	1	84	4.120	1.756
Primary	56	210	280	224	124	63	21	1	2	981	3.448	1.415
Secondary	274	987	939	553	104	63	18	8	0	2946	2.839	1.171
College	187	540	431	154	16	17	7	0	0	1352	2.520	1.039
Postgraduate	21	165	106	30	10	0	4	0	0	336	2.580	0.983
Totals	547	1907	1768	994	260	153	57	10	3	5699		

				1254			223
Family size	1	2	3	4	&	5	6 and more

Table 3.10 (v) - showing the number of observations (O) and average family size (number of siblings) Father's occupational level-wise. (cross-sectional study).

Father's Occupational Level	Family size (Number of siblings									Totals	Mean Sibling Number	Std. dev.
	1	2	3	4	5	6	7	8	9			
Labourers	160	585	566	422	146	92	20	1	1	1993	3.090	1.311
Clerks, school-teachers etc.	221	672	651	294	73	45	15	8	2	1981	2.784	1.225
College-teachers, Jr. officers etc.	146	555	464	241	27	11	11	1	0	1456	2.677	1.060
Professionals (Doctors etc.) Sr. officers	19	92	79	36	14	5	11	0	0	256	2.973	1.373
Higher categories	2	2	8	1	0	0	0	0	0	13	2.615	0.870
Totals	547	1907	1768	994	260	153	57	10	3	5699		
Family size	1	2	3	1254 4 & 5		223 6 and more						

Table 3.10 (vi) - showing the number of observations (O) and average family size (number of siblings) Mother's educational level-wise. (cross-sectional study).

Mother's Educational Level	Family size (Number of siblings)									Totals	Mean Sibling Number	Std. dev.
	1	2	3	4	5	6	7	8	9			
Illiterate	29	82	113	107	66	48	14	7	2	468	3.735	1.622
Primary	178	541	724	538	137	78	30	1	1	2228	3.125	1.263
School Final - Std. X	92	380	359	165	38	10	8	2	0	1054	2.762	1.100
S.S.C.	133	537	365	136	18	10	1	0	0	1200	2.502	0.952
Undergraduate	46	134	116	19	1	7	0	0	0	323	2.430	0.964
Graduate + Professional Diploma	48	164	64	29	0	0	0	0	0	305	2.243	0.831
Postgraduate	21	69	27	0	0	0	4	0	0	121	2.215	1.089
Totals	547	1907	1768	994	260	153	57	10	3	5699		

Family size	1	2	3	4 & 5	6 and more
				1254	223

Table 3.10 (vii) - showing the number of observations (O) and average family size (number of siblings) Mother's occupational level-wise. (cross-sectional study).

Mother's Occupational Level	Family size (Number of siblings)									Totals	Mean Sibling Number	Std. dev.
	1	2	3	4	5	6	7	8	9			
Household work	486	1755	1712	973	259	145	51	10	3	5394	2.901	1.229
Employed	52	152	65	21	1	8	6	0	0	305		
A. Upto Rs.500/- p.m.	42	140	55	21	1	8	6	0	0	273	2.440	1.236
B. Above Rs.500/- p.m.	10	12	10	0	0	0	0	0	0	32	1.609	0.583
Totals	547	1907	1768	994	260	153	57	10	3	5699		
Family size	1	2	3	1254 4 & 5		6	223 and more					

Table 3.10 (viii) - showing the number of observations (O) and average family size (number of siblings) socio-economic level-wise. (cross-sectional study).

Socio-economic Level	Family size (number of siblings)									Totals	Mean Sibling Number	Std. dev.
	1	2	3	4	5	6	7	8	9			
Low	51	111	131	138	65	57	14	0	1	568	3.528	1.529
Low-middle	161	579	555	355	108	46	13	8	2	1827	2.951	1.261
Middle	214	770	676	329	61	40	19	2	0	2111	2.743	1.148
High-middle	118	395	360	166	22	10	7	0	0	1078	2.663	1.056
High	3	52	46	6	4	0	4	0	0	115	2.757	1.121
Totals	547	1907	1768	994	260	153	57	10	3	5699		
				1254			223					
Family size	1	2	3	4 & 5		6	and more					

GRAPH NO. 3.11

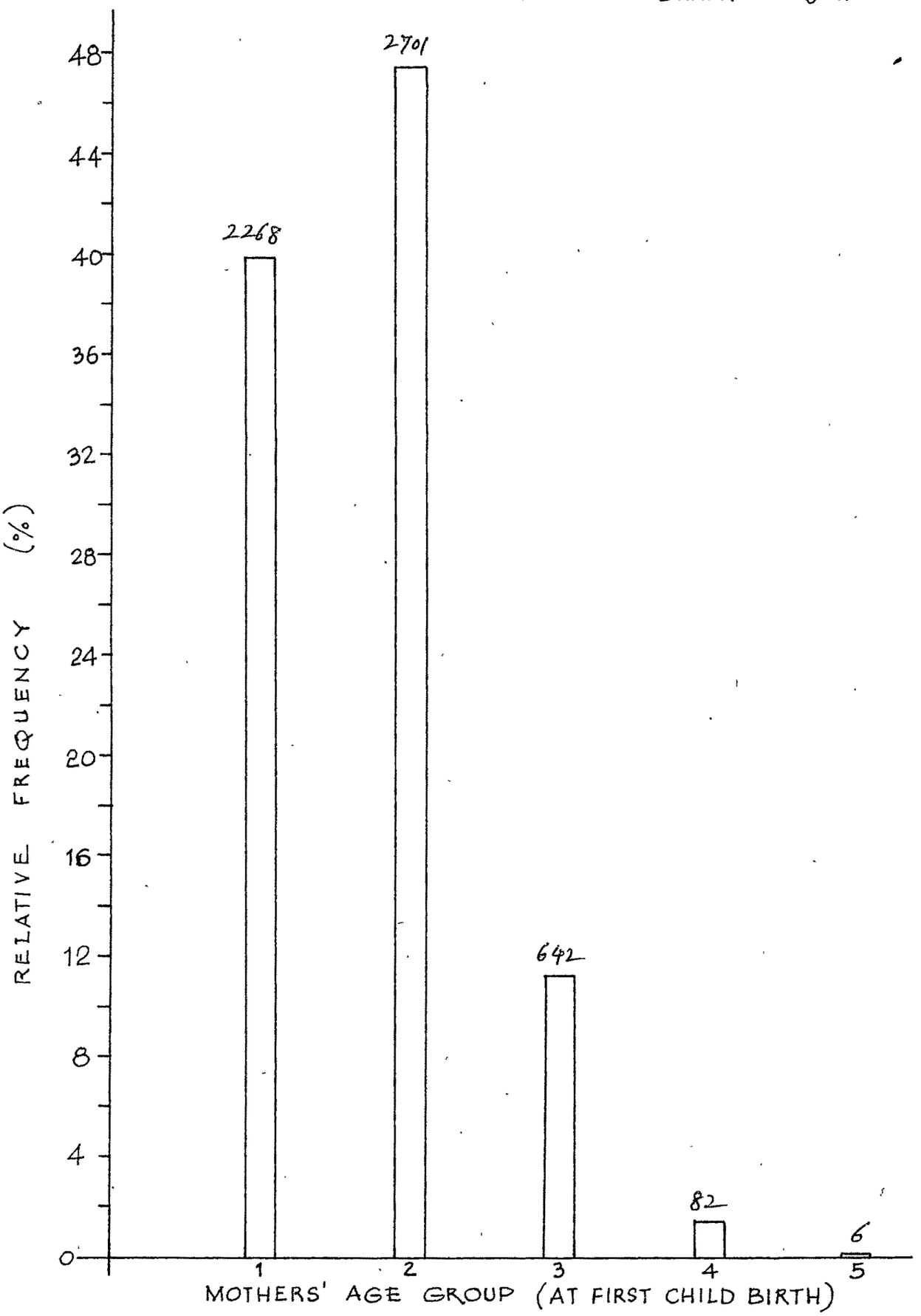

RELATIVE FREQUENCY (%)
48
44
40
36
32
28
24
20
16
12
8
4
0
2268
2701
642
82
6
1
2
3
4
5
MOTHERS' AGE GROUP (AT FIRST CHILD BIRTH)

Table 3.11 - showing the number of observations mother's age-group wise (age at the first child-birth). (cross-sectional study)

Age-group	Frequency (O)	%
Below 20 years	2268	39.8
21 - 25 years	2701	47.4
26 - 30 years	642	11.3
31 - 35 years	82	1.4
above 35 years	6	0.1
	5699	100.0

Table 3.11(i)- showing the mean age of the mothers at the first child birth (cross-sectional study).

Sex of the child under observation	Frequency (O)	Mean age (mother) in years	Std. dev.
Boy	3006	21.55	3.597
Girl	2693	21.68	3.544
Whole population	5699	21.61	3.572

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Table 3.11 (ii) - showing the mean age of Mothers at first child-birth, area-wise.
(cross-sectional study)

Milieu (area)	Frequency (O)	Mean age (Mother) in years	Std. dev.
Urban	4766	21.878	3.535
Rural	933	20.253	3.454
Whole population	5699	21.612	3.572

Table 3.11 (iii) - showing the mean age of Mothers at first child-birth in different income groups. (cross-sectional study)

Income-group	Frequency (O)	Mean age (Mother) in years	Std. dev.
Low	1492	20.589	3.392
Low-middle	2285	21.610	3.597
Middle	1337	22.399	3.556
High-Mid	527	22.245	3.133
High	58	24.069	4.180
Whole population	5699	21.612	3.572

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Table 3.11 (iv) - showing the mean age of Mothers at first child-birth father's educational levelwise. (cross-sectional study)

Educational Level of the Father	Frequency (O)	Mean age (Mother) in years	Std. dev.
Illiterate	84	20.506	4.481
Primary	981	20.269	3.466
Secondary	2946	21.634	3.568
College	1352	22.271	3.314
Postgraduate	336	22.961	3.410
Whole population	5699	21.612	3.572

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Table 3.11 (v) - showing the mean age of Mothers at first child-birth, Father's occupational level-wise. (cross-sectional study)

Occupational Level of the Father	Frequency (O)	Mean Age (Mother) in years	Std. dev.
Labourers	1993	20.637	3.415
Clerks, school-teachers etc.	1981	21.784	3.588
College-teachers, Jr.officers etc.	1456	22.424	3.432
Professionals (Doctors etc.), Sr. officers	256	23.063	3.376
Higher categories	13	23.462	1.127
Whole population	5699	21.612	3.572

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Table 3.11 (vi) - showing the mean age of Mothers at first child-birth, mother's educational level-wise. (cross-sectional study)

Educational Level of the Mother	Frequency	Mean age (Mother) in years	Std. dev.
Illiterate	468	19.585	4.147
Primary	2228	20.772	3.544
School final - Std. X	1054	21.614	3.200
S.S.C.	1200	22.671	3.090
Undergraduate	323	22.808	3.333
Graduate + Professional Diploma	305	23.875	2.112
Postgraduate	121	25.496	2.678
Whole population	5699	21-612	3.572

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Table 3.11 (vii) - showing the mean age of Mothers at first child-birth, Mother's occupational level-wise.

(cross-sectional study)

Occupational Level of the Mother	Frequency	Mean Age (Mother) in years	Std. dev.
Household work	5394	21.513	3.546
Employed			
(A) upto Rs. 500/- p.m.	273	22.978	3.316
(B) Above Rs.500/- p.m.	32	27.000	4.400
Whole population	5699	21.612	3.572

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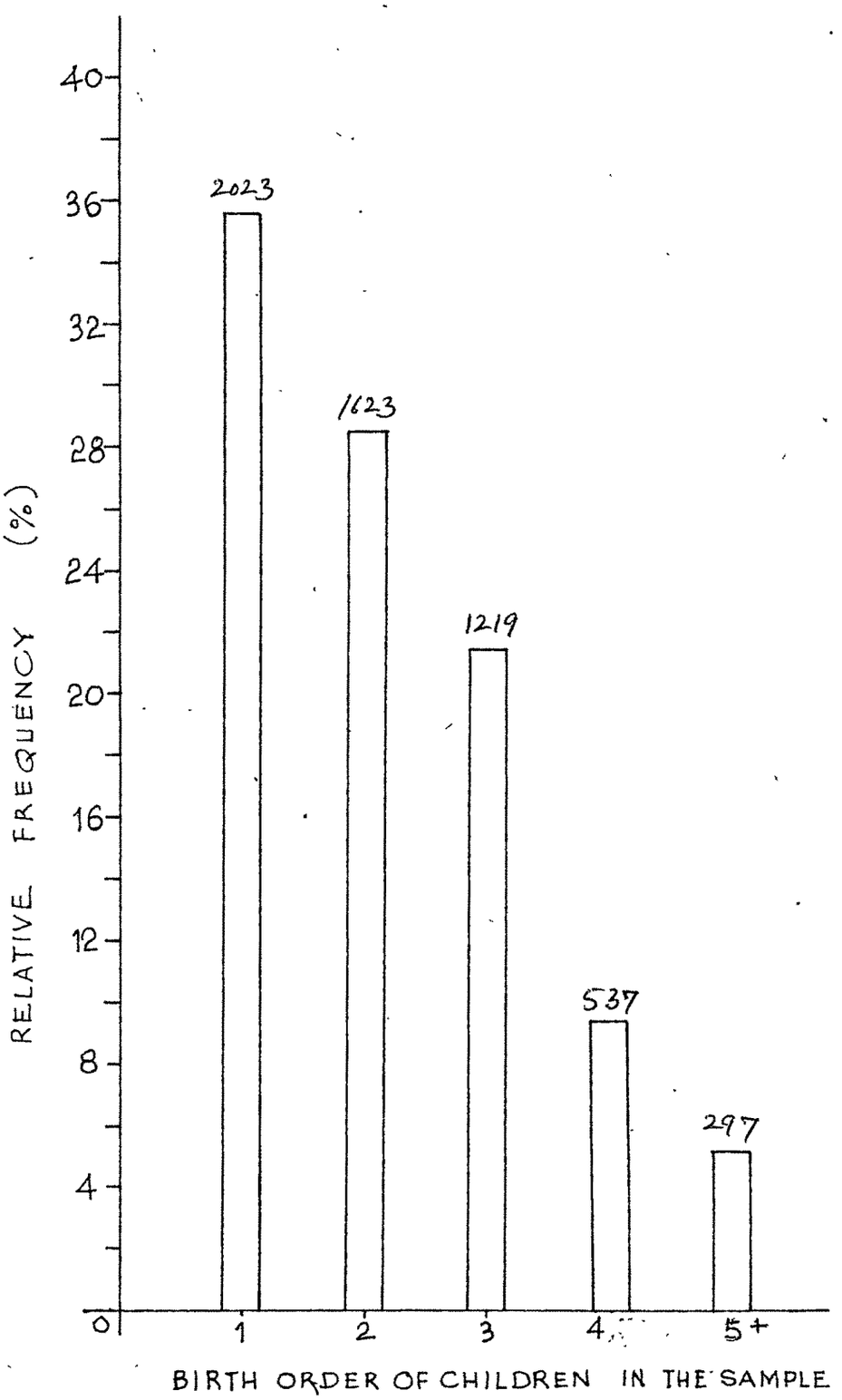
Table 3.11 (viii) - showing the mean age of Mothers at first child-birth in different socio-economic groups. (cross-sectional study)

Socio-economic Level	Frequency	Mean Age (Mother) in years	Std. dev.
Low	568	19.801	3.296
Low-middle	1827	21.039	3.504
Middle	2111	21.991	3.525
High-Middle	1078	22.443	3.235
High	115	24.313	3.869
Whole population	5699	21.612	3.572

Table 3.12 (i) - showing the frequency (O) of children in each of the birth order positions for different age points. (Cross-sectional study).

Age-point Yrs.-months	Birth Order 1	2	3	4	5	6	7	8	9	Total (O)
2 - 0	18	31	27	7	2	2	0	0	0	87
2 - 3	34	45	41	10	4	1	0	0	0	135
2 - 6	34	57	42	14	1	2	1	0	0	151
2 - 9	42	56	50	14	1	3	0	0	0	166
3 - 0	67	66	52	20	1	3	1	0	0	210
3 - 3	51	38	28	11	2	2	0	0	0	132
3 - 6	93	59	38	14	3	3	2	1	0	213
3 - 9	132	97	58	22	4	7	1	0	0	321
4 - 0	173	125	75	28	7	9	1	0	0	418
4 - 3	189	144	88	35	7	9	2	0	0	474
4 - 6	210	157	104	40	13	13	5	0	0	542
4 - 9	218	159	110	53	16	10	3	2	0	571
5 - 0	232	173	125	58	16	13	6	1	0	624
5 - 3	161	127	106	59	14	9	2	0	0	478
5 - 6	137	104	99	53	23	8	5	1	0	430
5 - 9	127	99	89	52	18	5	3	0	1	394
6 - 0	105	86	87	47	19	4	4	0	1	353
Totals	2023	1623	1219	537	151	103	36	5	2	5699
					297 (5.2%)					

GRAPH NO. 3.12(i)



12-8

Table 3.12(ii) - showing the frequency (O) of children for each of the birth order groups for each of the five categories of mother's age (at birth of child observed). (Cross-Sectional study)

	Mother's age-group	Birth order of children									Total
		1	2	3	4	5	6	7	8	9	
1.	Upto 20 years	607	197	75	1	0	0	0	0	0	880
2.	21 - 25 years	1115	733	459	134	25	7	0	0	0	2473
3.	26 - 30 years	263	531	432	249	67	17	12	1	0	1572
4.	31 - 35 years	32	148	190	128	48	49	7	0	1	603
5.	above 35 years	6	14	63	25	11	30	17	4	1	171
	Totals	2023	1623	1219	537	151	103	36	5	2	5699
	Average age of the mothers for the whole sample										

GRAPH NO. 3·12(ii)